ISLAMIC REPUBLIC OF PAKISTAN
BOARD OF INVESTMENT

PREPARATORY SURVEY
ON
JICA COOPERATION PROGRAM
FOR
INDUSTRY DEVELOPMENT
(INVESTMENT CLIMATE IMPROVEMENT IN KARACHI)

FINAL REPORT

VOLUME II
MAIN REPORT

SEPTEMBER 2012

JAPAN INTERNATIONAL COOPERATION AGENCY
(JICA)
NIPPON KOEI CO., LTD.

PT
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COMPOSITION OF INAL REPORT

VOLUME I: EXECUTIVE SUMMARY (JAPANESE)

VOLUME II: MAIN REPORT (ENGLISH)
APPENDICES

VOLUME III: DRAWINGS

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VOLUME II: MAIN REPORT

ABBREVIATIONS

AASHTO	American Association of State highway and Transportation Official
ADB	Asian Development Bank
APs	Affected Persons
B/C	Benefit/ Cost Ratio
BOI	Board of Investment
BOO	Build Operation and Own
BOT	Build Operation Transfer
BQPS-I	Bin Qashim Power Station - I
BQPS-II	Bin Qashim Power Station - II
BRT	Bus Rapid Transit
CBD	Central Business District
CDGK	City District Government Karachi
CHASHNUP	Chashuma Nuclear Power Plant
CNG	Compressed Natural Gas
CSR	Corporate Social Responsibility
DD	Detail Design
DHA	Defense Housing Authority
DISCOs	Distribution Companies
ECNEC	Executive Committee of National Economic Council
EHS	Environmental Health and Safety
EIA	Environment Impact Assessment
EIRR	Economic Internal Rate of Return
EMP	Environmental Management Plan
EPA	Environmental Protection Agency
EPO	Environmental Protection Order
EPZA	Export Processing Zones Authority
EVTL	Engro Vopak
F/S	Feasibility Study
FDI	Foreign Direct Investment
FESCO	Faisalabad Electric Supply company
FIRR	Financial Internal Rate of Return
FOTCO	Fauji Oil Terminal Company
FTC	Finance & Trade Center
GDP	Gross Domestic Product
GE	General Electric
GENCOs	Generation Companies
GENECO I	Jamshoro TPS, Kotri TPS
GENECO II	Guddu TPS, Quetta TPS
GENECO III	Muzaffargarh TPS, Faisalabad TPS, Multan TPS, Shahadara PP
GENECO IV	Lakhra Coal Power Plant
GEPCO	Gujranwala Electric Power company
GOP	the Government of Pakistan
GPS	Global Positioning System
HESCO	Hyderabad Electric Supply company

HFL	High Flood Level
HFO	Heavy Fuel Oil
HRSG	Heat Recovery Steam Generator
HSE	Health, Safety and Environment
IEE	Initial Environmental Examination
IESCO	Islamabad Electric Supply company
IFC	International Finance Corporation
IMC	Independent Monitoring Cousultant
IMF	International Monetary Fund
IPPs	Independent Power Producers
JACI	the Japanese Association of Commerce and Industry
JBIC	Japan Bank for International Cooperation
JETRO	Japan External Trade Organization
JICA	Japan International Cooperation Agency
KANUPP	Karachi Nuclear Power Plant
KATI	Korangi Association of Trade and Industry
KCCPP	Korangi Combined Cycle Power Plant
KCR	Karachi Circular Railway
KDA	Karachi Development Authority
KEPZ	Karachi Export Processing Zone
KESC	Karachi Electricity Supply Company
KGTPS-I	Korangi Town Gas Turbine Power Station – I
KGTPS-II	Korangi Town Gas Turbine Power Station – II
KMC	Karachi Metropolitan Corporation
KSDP 2020	Karachi Strategic Development Plan 2020
KTIP	Karachi Transportations Improvement Project
KTPS	Korangi Town Gas Turbine Power Station
KUTC	Karachi Urban Transport Corporation
KUTMP	Karachi Urban Transport Master Plan
KW & SB	Karachi Water & Sewerage Board
LAA	land Acquisition Act
LCT	Liquid Cargo Terminal
LESCO	Lahore Electric Supply company
LFLS	Low Frequency Load Shedding
LIA	Landhi Industrial Area
LNG	Liquid Natural Gas
M-10	Northern Bypass
MDGs	Millennium Development Goals
MEPCO	Mutan Electric Power Company
MES	Military Estate Service
MGD	Mega Gallon per Day
MMCFD	Millions of cubic feet per day
N-25	RCD Highway
N-5	National Highway
N-9	Super Highway
NCS	National Conservation Strategy

NEAP	National Environmantal Action Plan
NEPRA	National Electric Power Regulatory Authority
NEQS	National Environmental Quality Standards
NHA	National Highway Authority
NOC	No Objection Certificate
NPV	Net Present Value
NTDC	National Transmission and Dispatch Company
NTRC	National Transport Reserch Center
O&M	Operation & Management
OD	Origin-Destination
ODA	Official Development Assistance
PC	Project Concept Paper
PCU	Passenger Car Unit
PEPA 1997	the Pakistan Environmental Protection Act, 1997
PEPC	Pakistan Environmental Protection Council
PEPCO	Pakistan Electric Power Company
PEPO	Pakistan Environmental Protection Ordinance
PESCO	Peshawar Electric Supply company
PIBT	Pakistan International Bulk Terminal
PPP	Public - Private - Partnership
PQA	Port Qasim Authority
PSM	the Pakistan Steel Mills
PTPS	Pakistan Transport Plan Study
QESCO	Quetta Electric Supply company
QICT	Qasim International Container Terminal
RAP	Resettlement Action Plan
ROW	Right of Way
SADEP	Special Assistance for Development Policy and Project
SEA	Strategic Environmental Assessment
SEPCO	Sukkur Electric Power company
SEZ	Special Economic Zone
SGTPS-I	SITE Gas Turbine Power Station – I
SGTPS-II	SITE Gas Turbine Power Station – II
SITE	Sindh Industrial Tranding Estates
STPS	Site Thermal Power Station
TESCO	Tribal Electric Supply company
TMAs	Tehsil Municipal Administrations
TOR	Terms of Reference
TSR	Transport Sector Report
TTC	Travel Time Cost
UFLS	Under Frequency Load Shedding
UNDP	United Nations Development Program
VOC	Vehicle Operating Costs
WAPDA	Water and Power Development Authority
WB	World Bank
WTP	Willingness to Pay

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CHAPTER 1 INTRODUCTION

1.1 Background of the Study

In response to the request of the Government of Pakistan, the Japan International Cooperation Agency (hereinafter referred to as "JICA") decided to dispatch an Investment Climate Advisor (hereinafter referred to as "the advisor") to the Board of Investment (hereinafter referred to as "BOI"). The advisor commenced his work in May 2010.

Under the initiative of the advisor, a "Problem-Analysis & Solution-Action" document was submitted to the BOI by the Japan Association for Commerce & Industries (JACI) and the Japan External Trade Organization(JETRO). A number of suggestions from the Japanese private sector was given to improve the business climate in Karachi, and these suggestions were included in the "Problem-Analysis & Solution-Action" document. Effective implementation of these suggestions is strongly recommended to meet the demands of foreign investors as well as to attract future investment.

In order to concretize the suggestions, BOI, JICA, and the advisor are of the same opinion pertaining to the necessity for detailed studies by each specialist from various areas/sectors. To respond timely and efficiently to the requests from the private sector, BOI, JICA, and the advisor agreed to conduct a "Basic Study on Program for Investment Climate in Karachi" and accordingly, JICA decided to undertake the Study in close cooperation with the BOI.

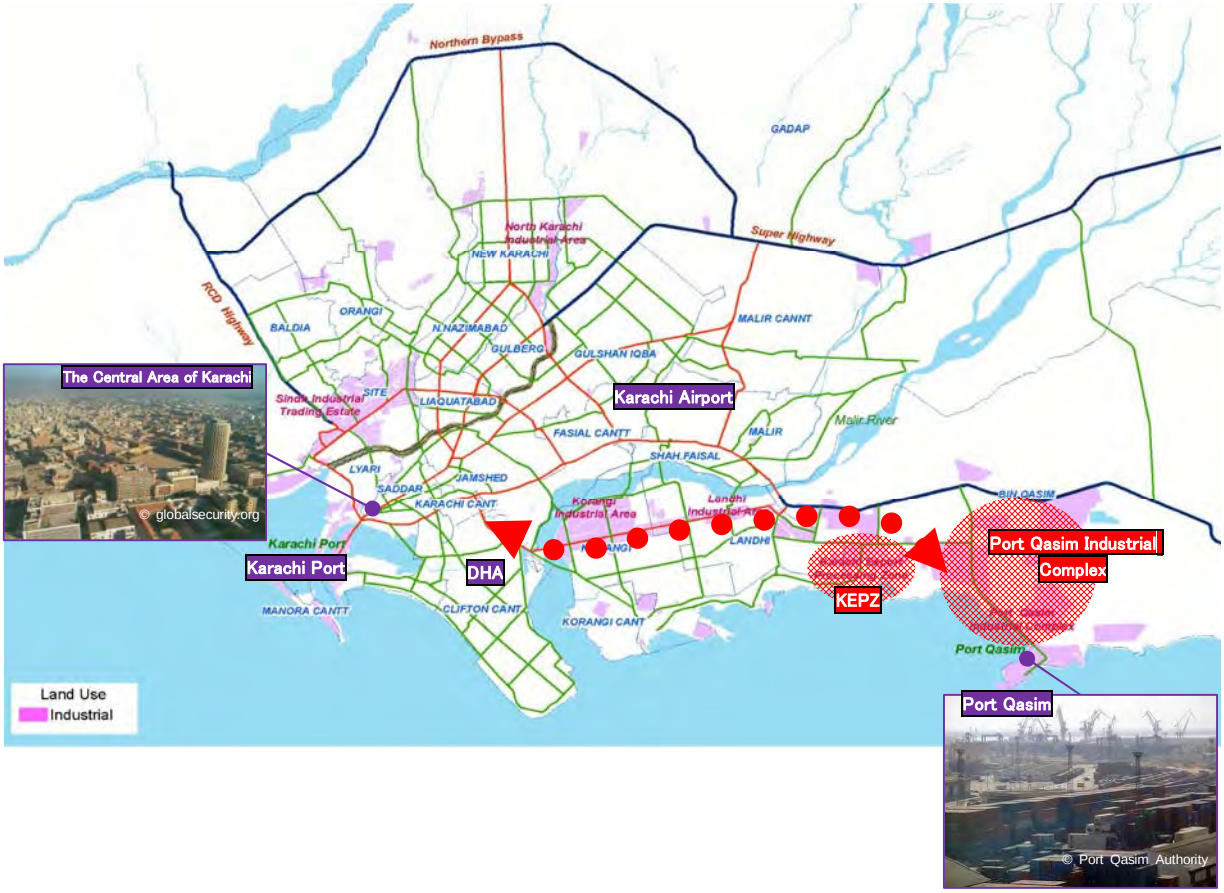
1.2 Objectives of the Study

The study seeks to:

1) Clarify the present problems of industrial infrastructure such as roads and electric power supply in the Study Area from the aspect of improving the overall investment climate;
2) Identify candidates for industrial infrastructure programs/projects; and
3) Formulate a priority project.

1.3 Study Area

The Study Area covers the Central Area Karachi up to the Karachi Export Processing Zone (hereinafter referred to as "KEPZ"), Port Qasim Industrial Area, and surrounding areas including access roads to the industrial zones, which are located about 30 km east from the central area of Karachi, as shown in **Figure 1.3.1**.



Source: Study Team based on Karachi Transportation Improvement Project, 2011, JICA

Figure 1.3.1 Study Area

1.4 Scope of Works

The scope of work is shown below.

(1) Interview Survey for Enterprises in the Study Area and Pakistan-related Organizations

1) The interview survey will be carried out for companies in the Study Area (Japanese companies and foreign-affiliated companies) to clear the present problems and conditions of the industrial infrastructure.

2) Main components to be surveyed include the following:

   i) Present condition of industrial infrastructure;

   ii) Level of service;

   iii) Utilization situation; and

   iv) Identification of problems/issues.

(2) Specifying Priority Project of the Road Sector

1) Traffic survey will be conducted.

2) Road inventory survey will be conducted.

3) Based on the above surveys, priority projects (around two or three projects) will be selected.

(3) Specifying Priority Project of the Power Sector

1) Existing survey, development plan, and feasibility study (F/S) will be reviewed.
2) The electricity supply time and the quality of supplied electricity will be confirmed.
3) The condition of KESC's plants regarding electrical production, transmission, transformation, and distribution will be confirmed.
4) Based on the above surveys, priority projects (around two or three projects) will be selected.

(4) Preparation of Project Concept Paper for the Road Sector and Power Sector

The project concept paper will be prepared to classify/categorize the following:

i) PC-I: The project which feasibility study (F/S) or detailed design (D/D) has already completed appropriately.
ii) PC-II: The project which is necessary to formulate the implementation plan in the future and F/S was not carried out or additional survey is required.

(5) Pre-feasibility Study (Pre-F/S) for Priority Road Project

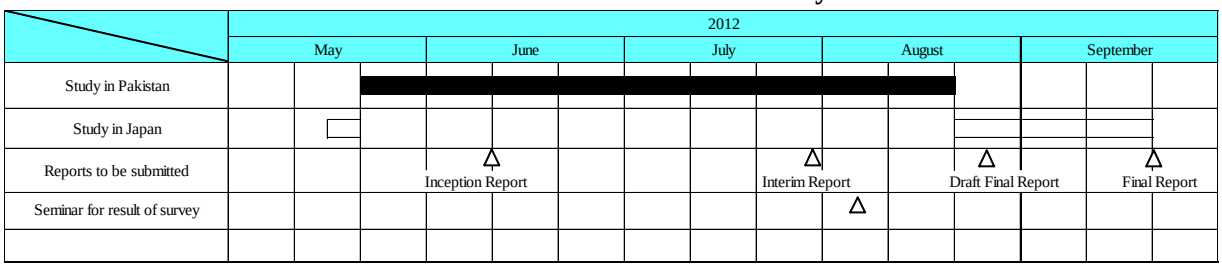
1) Pre-F/S for the highest priority project in the road sector will be conducted.
2) Scope of Pre-F/S includes the following:
   i) Preliminary design
   ii) Cost estimation
   iii) Project effects
   iv) Project implementation organization
   v) Implementation schedule
   vi) Management and maintenance system
   vii) Pre-environmental assessment

1.5 Schedule of the Study and Progress

1.5.1 Schedule of the Study

The entire work period of this Study is approximately 3.5 months, beginning with the preparatory work in the middle of May, and ending with the submission of the final report at the end of September 2012, as shown in **Table 1.5.1**.

Table 1.5.1 Schedule of the Study



Source: JICA Study Team

1.5.2 Implementation of the Seminar for Survey Results

The Study Team held a seminar for the result of the survey as presented below.

- Title: BOI-JICA Joint Seminar on Investors Friendly Climate Improvement in Karachi
- Date: Monday, August 6, 2012
- Venue: Khorshed Mahal, Avari Towers, Karachi
- Host: Board of Investment
- Program: refer to **Table 1.5.2**
- Handout: Appendix1

Table 1.5.2 Program of the Seminar

16:00-16:30	Registration
16:30-16:35	Recitation of the Holy Quran
16:35-16:45	Opening Remarks by Mr Saleem H. Mandviwalla, MOS/Chairman, Board of Investment
16:45-16:50	Speech by Mr Muhammad Hussain Syed, Administrator, Karachi Metropolitan Corporation
16:50-16:55	Speech from the Government of Sindh
16:55-17:00	Speech by Mr Zubair Motiwalla, Chairman, Sindh Board of Investment
17:00-17:05	Speech by Mr Masaharu Sato, Consul-General, Consulate-General of Japan in Karachi
17:05-17:35	Report on the Efforts for Investment Climate Improvement in Karachi by Mr Masao Nagase, JICA Special Advisor to the Board of Investment
17:35-18:05	Study Report on Investment Climate Improvement in Karachi by Mr Masaaki Ueda, Leader, JICA Study Team
18:05-18:35	Study Report on Infrastructure in Karachi by Mr Hisatoshi Naito, Leader, JICA Study Team
18:35-19:05	Q&A
19:05-19:15	Closing Remarks by Mr Takatoshi Nishikata, Chief Representative, JICA Pakistan Office

Source: JICA Study Team

CHAPTER 2 CURRENT CONDITIONS FOR INFRASTRUCTURE DEVELOPMENT

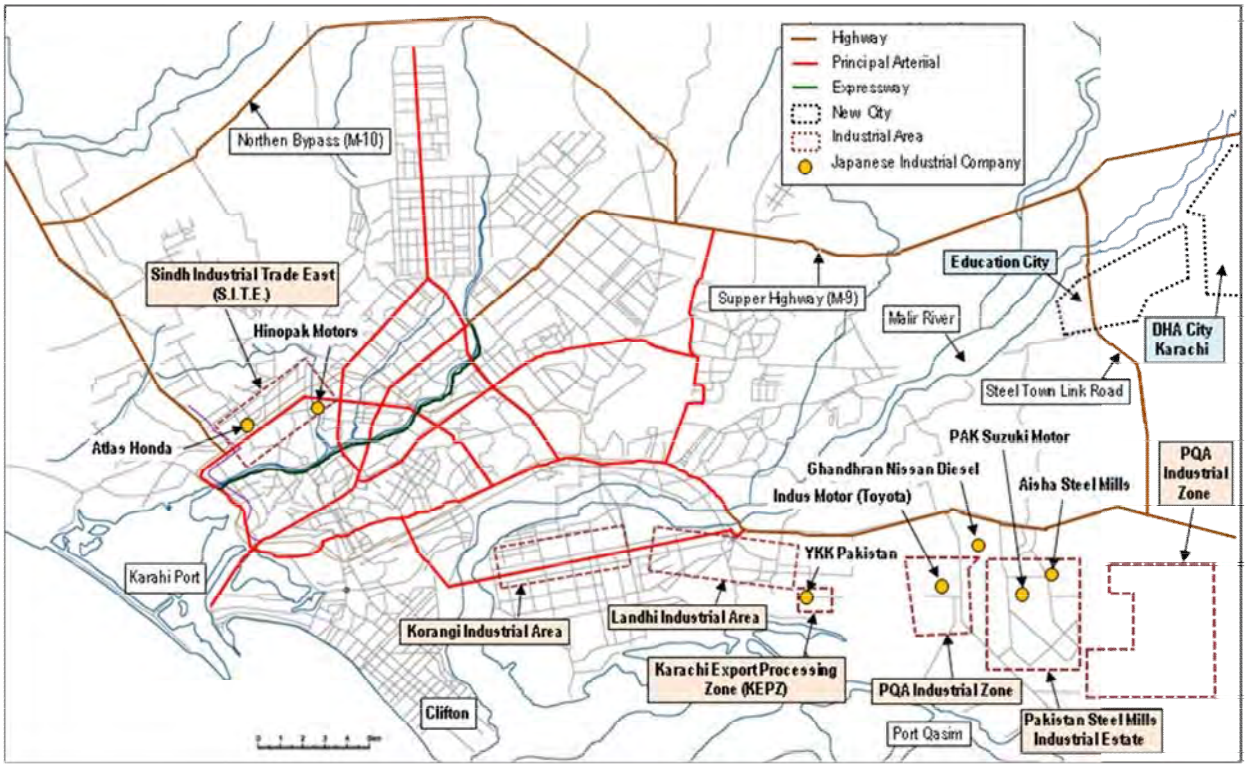
2.1 Issues on the Investment Climate in the Infrastructure Sector

2.1.1 Industrial Zone and New City Development in Karachi

Karachi City has a large industrial base. The major industries of Karachi are textiles, pharmaceuticals, steel, and automobiles. Furthermore, Karachi is also recognized as the software outsourcing hub of Pakistan. Karachi City is also home to major automobile manufacturing companies such as Toyota, which is in the process of increasing production capacity to over 120,000 units per annum, and Suzuki Motor Company. The manufacturing plant located in Bin Qasim has a production capacity of 150,000 vehicles per year. Manufacturing plants of Millat Tractors, Adam Motor Company, Daihatsu, and HinoPak Buses and Trucks are also located in Karachi.

A new residential zone in Clifton, Karachi has been in development since 1980 by the Defense Housing Authority (DHA) Karachi. Employees of foreign investment companies usually reside at the Clifton area. Since basic housing infrastructure has been almost developed in the entire area of Clifton at present, DHA Karachi has a new housing area development plan along the Super Highway in the north of Karachi. In addition, the Government of Sindh also has a development plan for a new city in the north of Karachi.

Figure 2.1.1 shows the location of the existing industrial areas and the new city development plan.



Source: JICA Study Team

Figure 2.1.1 Location of Industrial Zone and New City in Karachi

(1) Industrial Area

The industrial zones in Karachi have been developed from the 1940s at the Sindh Industrial Trading Estates (SITE) area and the Korangi or Landhi areas in accordance with the expansion of the Port of Karachi. After commencement of operations of Port Qasim, the new and large-scale industrial area is being developed in the southeast of Karachi. **Table 2.1.1** shows an outline of the major industrial

zones in Karachi.

Table 2.1.1 Major Industrial Zones in Karachi

Major Industrial Zone	Description
Sindh Industrial Trading Estates (SITE)	- SITE was established by the Government of Sindh in the year 1947 in order to promote industrialization and create attractive conditions for industrialists. - There are more than 2000 industrial units on 4500 acres (1800 ha) of land west of the Lyari River. - The estate benefits from the proximity of the Port of Karachi and various roads linking to the rest of Pakistan. The town grew as worker colonies were established around the industrial estate. - Atras Honda Ltd. and HinoPak Motors Ltd. are located in SITE.
Korangi Industrial Area	- Korangi Industrial Area houses approximately 3000 facilities for various industries including textile, steel, pharmaceutical, automobile, chemical, engineering, and flour mills.
Landhi Industrial Area	- Landhi Industrial Area is one of the pioneer industrial estates in Pakistan and was established in 1949, and jurisdiction of this estate began from the Farooqe Textile Mill located at 8000 Feet Road to Port Qasim including the Karachi Export Processing Zone. - It encompasses about 11,000 acres (4,500 ha) of land, and consists of medium and large size industries. The industrial area houses many industries including textile, steel, pharmaceutical, automobile, chemical, engineering, and flour mills.
Karachi Export Processing Zone (KEPZ)	- The Export Processing Zones Authority (EPZA) was established in Pakistan through Ordinance IV of 1980 with a mandate to plan, under the Ministry of Industries run by a Board of Directors. KEPZ is the first project of EPZA, which was set up in 1981. - KEPZ has been planned on 500 acres (200 ha) of land, out of which 200 acres have been developed as the Phase-I program. Additional 100 acres are being considered for development under BOT basis as the Phase-II program. The rest of the 200 acres have been reserved by the Government of Sindh for future expansion program. - YKK Pakistan (Pvt) Ltd. is located in the Phase-II lot.
PQA's Industrial Zone	- Port Qasim has been operated by the Port Qasim Authority (PQA) since September 1980. - PQA encompasses a total area of 12,000 acres (48,600 ha) wherein many industrial zones have been operating 8700 acres industrial estate. - Indus Motor Company Ltd. (Toyota) is located in the north western area of the industrial estate.
Pakistan Steel Industrial Estate	- Pakistan Steel Mills has been in operation since 1985. At present, it is the country's largest industrial enterprise having a production capacity of 1.1 million tons of steel. - Pakistan Steel Mills is spread over a total area of 18,660 acres (about 7550 ha), with 10,390 acres for the main plant, 8070 acres for the industrial zone and township, and 200 acres for a 110 MG water reservoir. - PAK Suzuki Motor Company Ltd. and Aisha Steel Mills Ltd. are located in the industrial estate.

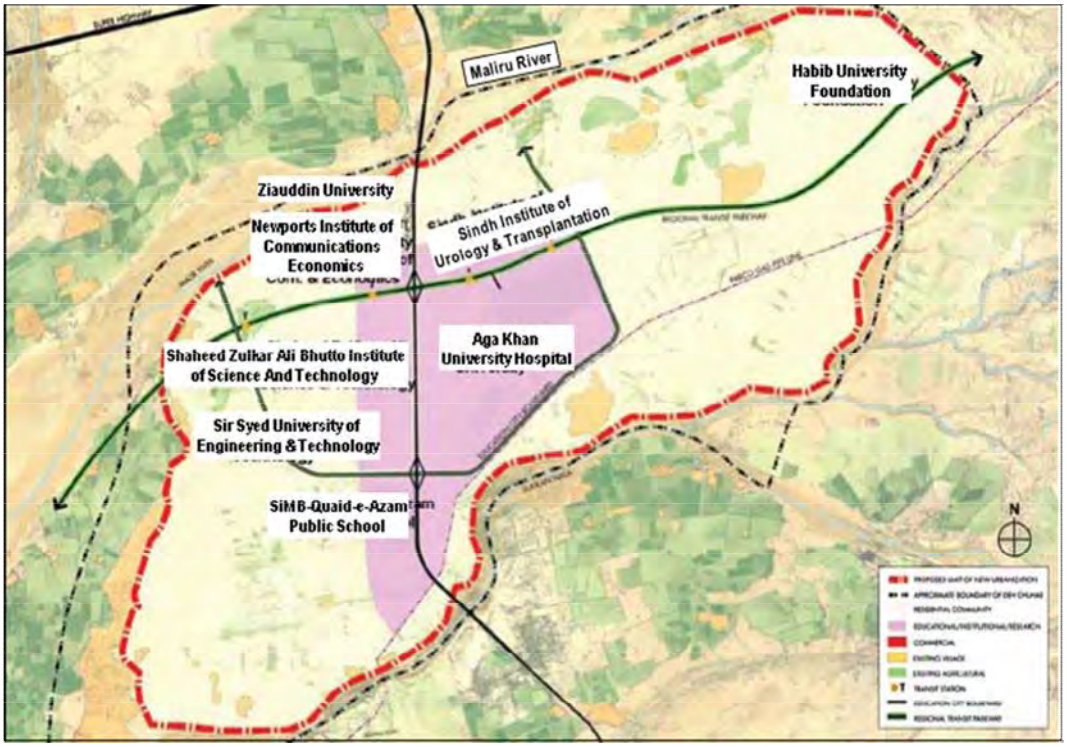
Source: JICA Study Team

(2) New City Development Plan

1) Education City

The Government of Sindh has considered an area of 9000 acres for establishing an "Education City" along the Malir River in the north of Karachi. The core elements of the Education City include 'local' educational and health institutions that will provide solutions to Pakistan's challenge of higher education, which is to bring large-scale investment in the higher education sector of the country. The project would be managed by an independent authority, which will oversee the overall management and development of the Education City. In this regard, the process on the release of funds and appointment of consultant for establishing such an authority has already been taken up expeditiously by concerned institutions. The first step is to secure the land by conducting a topographic survey and then erecting walls along the land's boundary. According to information from the Sindh Board of Investment, the status of the Education City is as follows:

- Around 1839 acres of land has been allocated to seven local institutions while more than two dozen other institutions are awaiting allotments (refer to **Figure 2.1.2**).
- Over 50 institutions of approximately 150,000 students will be invited in 9000 acres of land.
- Educational institutions will create opportunities for private research and development businesses as a component of the Education City.
- Residential and commercial development will enjoy the 'quality of life' or 'character of community' that is typical of educational communities.
- A consortium of planners composed of the Arcop Group, Chan Krieger Sieniewicz (USA), and Halcrow (Pakistan) is in the process of developing a master plan for the Education City.



Source: Sindh Board of Investment, Government of Sindh

Figure 2.1.2 Site Plan of the Education City

2) DHA City Karachi

a. DHA at the Clifton Area

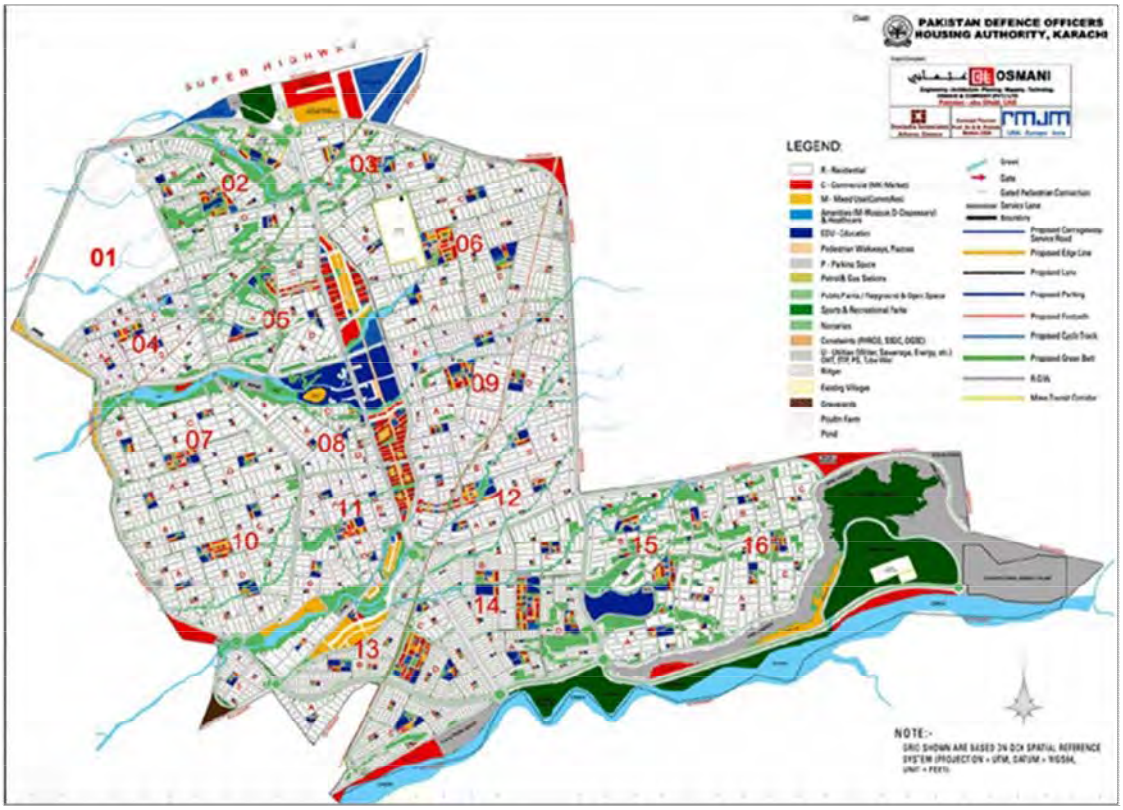
The Clifton area has been developed as a new city by DHA Karachi since 1980. DHA is spread over 8852 acres (35.82 km^2) and provides civic facilities to millions of residents. The development efforts of DHA have been fruitful, as indicated by the growth oriented high class living. The housing

projects were planned to cover every aspect of healthy living and to contain several parks, excellent educational institutions, and modern clubs.

The development projects of DHA in the Clifton area have been implemented to be divided from Phase-I to Phase-VIII. The last project, Phase-VIII, is mainly made up of reclaimed land covering an area of over 4000 acres (16 km^2), which is approximately 50% the size of the entire land of DHA Karachi. DHA began allotting plots for Phase-VIII from 1994, and the housing infrastructure has been under continued development until today.

b. New City Development along the Super Highway

DHA Karachi is a new residential-cum-commercial venture spread over an area of 11,640 acres of land which is being developed by DHA Karachi on land acquired from the Sindh government. The project is reportedly being planned in accordance with modern town planning concepts and would have a number of wide roads. It is located along the Super Highway (M-9), at a distance of 56 km from the central area of Karachi and 35 km from the international airport. A master plan was completed in September 2011.



Source: Defense Housing Authority (DHA), Karachi

Figure 2.1.3 Lot Planning in the Master Plan of DHA City Karachi

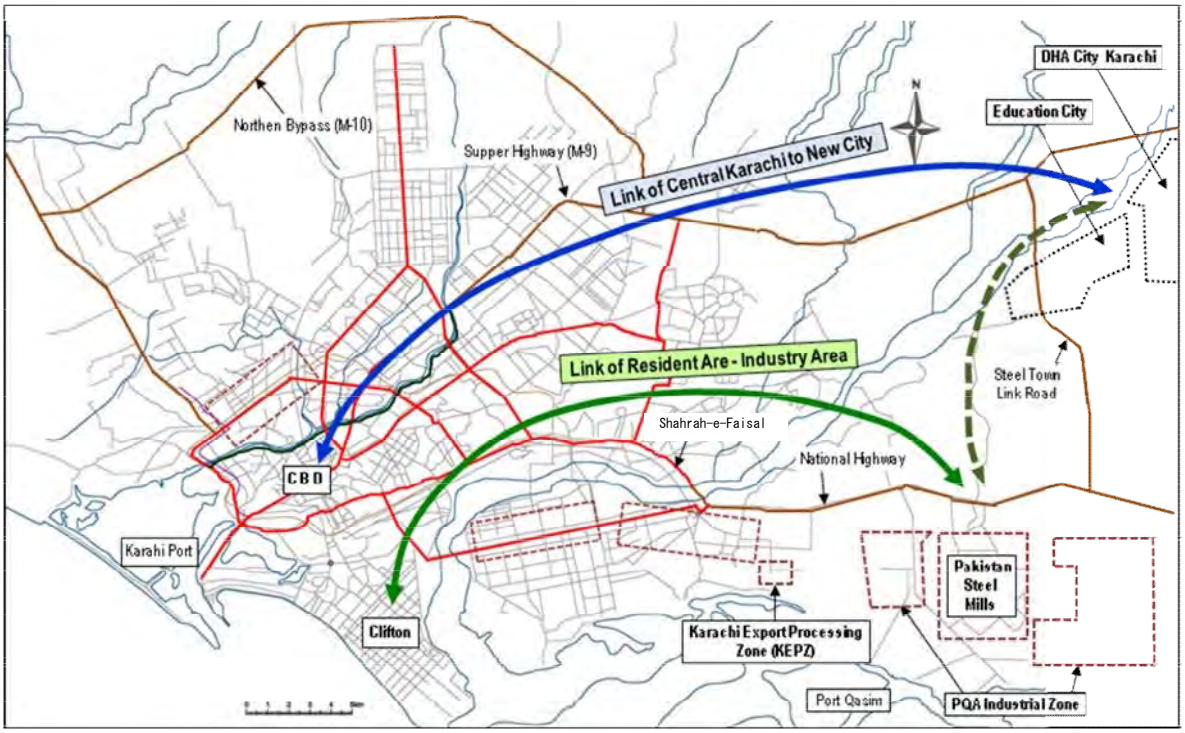
- The entire DHA City Karachi site is spread over an area of 11,640 acres which has been divided into 16 sectors. Each sector is further subdivided into four subsectors interspersed with residential and commercial plots of varying sizes (refer to **Figure 2.1.3**).
- DHA City Karachi will have its own 500 MW power plant, solar and wind energy projects, and drinking water facilities.
- Land development of DHA City Karachi will be implemented to be divided into three phases: short-term (2012-2015), medium-term (2015-2020), and long-term (2020-2030).
- The projects under the short-term development plan (2012-2015) include arterial roads, major theme parks, lakeside parks, DHA City Karachi International University, DHA City Karachi Healthcare City, and two residential sectors.

- DHA is in the process of acquiring more land adjacent to the project with the purpose of expanding the project by 2.5 times than its existing size for the medium-term phase. Out of a total of 48,521 plots, about 25,143 have been sold and the remaining 23,378 would be offered for sale in the next phase.

(3) Important Corridor for Accessibility in Investment Climate

In face of new investment, the accessibility between the residential area and industrial zone is a key factor for new investors. At present, foreign investors has set up residential houses at the Clifton area. Industrial estates in the Landhi Industrial Area and the Port Qasim area are being developed, and the southeast coastal area of Karachi has potential for future industrial development. Therefore, it should be very important for investment climate improvement to ensure accessibility between the Clifton area and the Port Qasim area, as illustrated in **Figure 2.1.4**.

In addition, accessibility between the central area of Karachi and the Education City/DHA City Karachi is required for improvement in order for new city development projects to succeed. The residential area in the Clifton area will be fully occupied in the near future, and new investors may have to consider living at DHC City Karachi. The access between DHA City Karachi and the Port Qasim area will also be focused on the investment climate, because the Steel Town Link Road, which is connected between the Super Highway and the National Highway, is used as a transportation route of tankers and trailers to access the industrial area and Port Qasim.



Source: JICA Study Team

Figure 2.1.4 Important Corridor for Accessibility in Investment Climate

Furthermore, industrial laborers working at the Port Qasim area commute from the Karachi metropolitan area. A large fraction of the laborers use courtesy buses prepared by the companies, and the said buses concentrate on Shahrah-e-Faisal and the National Highway. Form the viewpoints of labor transportation toward the Port Qasim area, enhancing the route of Shahrah-e-Faisal to the National Highway or developing alternative routes is supposed to be an important factor in the investment climate.

2.1.2 Identified Issues in the Infrastructure Sector

(1) "Karachi Vitalization Scenario (2004)" by JBIC

The Japan Bank for International Cooperation (JBIC) conducted a study on the "Karachi Vitalization Scenario" in 2004 under the Special Assistance for Development Policy and Project (SADEP). This study aimed to propose a possible vitalization scenario of Karachi involving a future development vision of Karachi as an "Attractive Economic Center", and a set of possible programs with the following objectives:

- To review the characteristics, current conditions, and development issues of Karachi.
- To propose a possible vitalization scenario(s) involving a long-term development vision of Karachi, a set of possible programs to achieve the vision, and facilitation mechanisms.

In order to vitalize Karachi, key development issues should be addressed since strategic development towards the vision of "cosmopolitan gate city" can be achieved on sound foundation for development. Therefore, identifying such development issues which hinder strategic development is crucial for vitalization. **Table 2.1.2** summarizes the direction of solutions for key development issues on urban and industrial infrastructure.

Table 2.1.2 Key Development Issues on Urban and Industrial Infrastructure

Sector	Direction of Solutions for Key Issues
Water Supply	- Short-term: priority should be given to the improvement of the current water supply system, including the improvement of water quality and efficient tariff system. - Long-term: a comprehensive study should be conducted regarding water resources management including the use of water resources in the Indus River.
Sewerage	- Short-term: decentralized primary treatment systems should be developed by area in a progressive manner with due attention to the water pollution of the Lyari River, Malir River, and so on. - Long-term: construct large and centralized sewage treatment systems.
Solid Waste Management	- The present solid waste management system should be restructured, including increase of waste disposal plants and separation of plants from residential areas. - To construct garbage recycling plants combined with waste disposal plants. - To encourage garbage recycling business as a means of livelihood for the poor; and to promote awareness campaigns about city cleanliness to citizens.
Electricity	- Basically, policy measures for general use and industrial use should be considered separately. - General use: the current electricity distribution system should be improved, including more systematic connections to individual users in order to prevent illegal connections, improvement of electricity fee collection, and establishment of institutions and organizations to enable these reforms. - Industrial use: stable power supply should be ensured, including increase of generation capacity. For efficient supply, identification of priority supply zones where industries are (will be) concentrated should be considered.
Road Transportation	- For the current road system within the city, policy measures include: i) establishment of mass transportation systems (bus, rail, etc.) and demand management system, ii) alleviation of heavily congested points/areas, and iii) regulations for managing heavy vehicles. - In consideration of the future expansion of the urban area, trunk traffic networks should be set up. - A study should be conducted on highway networks. It should also give priorities among candidate projects. - In parallel, construction and expansion of important highways should be started,

Sector	Direction of Solutions for Key Issues
	such as the Northern Bypass and Southern Bypass. (This can also contribute to solve immediate road traffic problems.)
Mass Transit Transportation	- The necessity of mass transit systems in the city is evident. The issue is how to realize them. - Regarding railway projects, feasibility studies on railways and light rail transit systems should be urgently conducted. For the Karachi Circular Railway, a feasibility study including institutional and organizational aspects should be carried out. - The city bus network seems to have a big potential of addressing the traffic congestion. Possible measures include setting up bus priority lanes at peak time improvement of frequency and punctuality of operations, construction of bus terminals, and setting reasonable bus fares. - There is also potential for long distance buses. Possible measures include construction of long distance bus terminals at business/service/industrial centers which can be efficient in connection with the land use plan.

Source: "Karachi Vitalization Scenario (2004)" by Japan Bank for International Cooperation (JBIC)

For the mass transit transportation sector, JICA has continued its assistance to the implementation of the "Karachi Circular Railway (KCR) Rehabilitation Project" since 2008. JICA also has conducted a feasibility study on the bus rapid transit (BRT) system in the urban area of Karachi in "the Study for Karachi Transportation Improvement Project" in 2012.

(2) "Problem-Analysis & Solution-Action (2011)" by JICA Expert

JICA has dispatched an expert to the Board of Investment (BOI) from May 2011 for the BOI Empowerment Project. In order to solve the critical issues, such as legal and institutional system and infrastructure problems, which are faced by Japanese investment companies in Karachi, "Problem-Analysis & Solution-Action" was prepared and led by the JICA expert in collaboration with the Japanese Association of Commerce and Industry (JACI) and the Japan External Trade Organization (JETRO) Karachi, and submitted to BOI in April 2011.

For the infrastructure sector in the "Problem-Analysis and Solution-Action", the Japanese investment companies requested the Government of Pakistan (GOP) to improve the conditions of the access roads to factories and also the electrical power supply, as follows:

a. Road Infrastructure

- The inner road at Landhi Industrial Area surrounding KEPZ is in poor condition and has insufficient road width. Such conditions have been the cause of abnormal traffic congestion and frequent traffic accidents. Thus, truck operations of factories should solve such serious problems on freight transportation. Consequently, such situation could lead to the increase of operational costs.
- Employees of foreign investment companies and factories working at KEPZ and the Port Qasim area use Shahrah-e-Faisal and the National Highway as part of their commuting route. Traffic congestion and traffic accidents usually occur after the international airport, due to the narrow width of the two-lane, one direction road, serious traffic jam at intersection, stopping and parking of oil tankers or trailers on the road shoulder between Quaid Abad Flyover and Port Qasim.
- Foreign investment companies provide shuttle bus transportation services to their factory workers. Delay of commuting seriously impacts the production activities of factories. In addition, stopping on the way due to congestion would increase the risk of gunpoint incidents on the street.

b. Electrical Power Supply

- Constant and stable electrical power supply is a key condition in the production activities of factories. However, since this condition is not guaranteed by the power supply company, manufacturing plants have to install their own generators at their own cost.
- Since fluctuation of electricity supply affects production quality, factory owners are forced to invest on additional plant facilities and equipment as measures against fluctuation.

One outcome from a dialogue between the Japanese side and BOI is the project of Mehran Highway. GOP promised to allocate budget for the construction of Mehran Highway from PMTF Road to Pakistan Still Mills Road (8.3 km) using Counter Value Fund of the Government of Japan. The project is under implementation.

The issues on utility supply such as electricity, water, and gas have been getting more serious in recent years. Consequently, a number of industrial factories have relocated to India, Sri Lanka, and Bangladesh due to inconsistent utility supply. The JICA study conducted interview surveys for a total of 25 companies based in KEPZ, Port Qasim, Landhi Industrial Area, SITE, etc. The following are the major points taken from the interview survey regarding industrial infrastructure:

- Consistent electrical power supply is an important condition for companies in the industrial park. Due to load shedding or breakdown, many companies have shifted toward their own power generation mainly utilizing the industrial gas supply network.
- Inconsistent supply of industrial gas is also an issue. Depending on industrial gas demand and consumption, load shedding of gas would affect power generation in a factory.
- There is also a problem on water supply. The water pump in the industrial zone utilizes electrical power for its operation, therefore if there is electrical power breakdown, water supply is stopped.
- The companies based at KEPZ and Port Qasim complained about the road conditions of the access to their factories.

2.2 Road Network Development Condition

2.2.1 Related Master Plan Study

(1) Overview of Existing Road Network in Karachi

Three national highways link Karachi to other parts of Pakistan, namely, the Super Highway (N-9), the National Highway (N-5), and the RCD Highway (N-25). The Super Highway extends to Hyderabad, while the National Highway extends to Hyderabad – Lahore – Peshawar – Torkham (Afghanistan border). The RCD Highway links Karachi to Chaman (Afghanistan border) via Quetta.

Karachi has six trunk roads which extend radially from the center area of the central business district (CBD). These trunk roads are: i) Korangi Road extending southeastward, ii) Shahrah-e-Faisal Road extending eastward and connecting with the National Highway, iii) University Road extending northeastward, iv) Shahrah-e-Pakistan Road extending northeastward and connecting with the Super Highway, v) Chaudry Fazal Ellahi Road extending northward, and vi) RCD Highway extending northwestward.

Meanwhile, Lyari Expressway runs along the Lyari River from the river mouth to Shahrah-e-Pakistan. The section on the left bank has been completed but the section on the right bank is currently under construction. A ring road is formed by Estate Avenue and other roads and is linked to all of the radial roads, including Shahrah-e-Faisal Road and the RCD Highway. The Northern Bypass (M-10) has been constructed passing through many of the outer areas of Karachi to connect the RCD Highway with the Super Highway, and it is primarily used by traffic as a link between the Port of Karachi and Sindh Province as well as other parts of Pakistan.

The Karachi Metropolitan Corporation (KMC), which was formerly the City District Government Karachi (CDGK), conducted a master plan study for the "Karachi Strategic Development Plan – 2020 (KSDP-2020)" in 2007. The road network in Karachi was classified into five categories in KSDP-2020, as described in **Table 2.2.1**.

Table 2.2.1 Road Classification in Karachi Urban Area

Road Category	Function/Requirement
Expressway	- Expedite movement of all types of traffic between relative points in communities of the metropolitan area. - Designed for longer intercity and through traffic movements. - Adopted with full control of access in order to ensure safe and efficient service for heavy volumes.
Principal Arterial	- Serve as the principal network for high volume of traffic flow. - Connect areas with principal traffic generation and important highways entering in to the city. - Coordinated with existing and proposed expressways and minor arterial roads to provide the distribution and collection of through traffic to and from collector/local streets. - Generally a major thoroughfare with limited at-grade access, which expands and links to the expressway system and is designed primarily for the movement of through traffic between activity centers.
Minor Arterial	- A thoroughfare with limited at-grade access, which supports, interconnects, and augments the principal arterial system by providing essential system linkages to expressways, and principal arterials of medium density. - Provide movement of traffic at a lower level than that of a principal arterial.
Collector Road	- Consist of all distributor and collector streets that serve traffic between major arterial and local streets. - Used mainly for traffic movement within residential, commercial, and industrial areas.
Local Street	- Include all streets used primarily for direct access to residential, commercial, industrial, or other surrounding areas. - Continuity is not so important.

Source: "Karachi Strategic Development Plan – 2020", City District Government Karachi, 2007

(2) Road Network Development Plan in KSDP-2020

1) Four Ring Roads

Four ring roads were proposed in KSDP-2020 to divert traffic from congested radial roads, as shown in **Figure 2.2.1.** Central Ring Road (R1), Inner Ring Road (R2), and Northern Ring Road (R3) already exist although improvement of the said roads is necessary. Outer Ring Road (R4) was recommended to be developed towards 2020.

a. Central Ring Road (R1)

Central Ring Road (R1) will utilize the Lyari Expressway alignment and circle around the CBD area, which was estimated to be a 32 km loop. KSDP-2020 recommended that Central Ring Road (R1) will be preferably grade separated all throughout, and subject to grade separation adjustments as per final alignment in the feasibility study.

b. Inner Ring (R2)

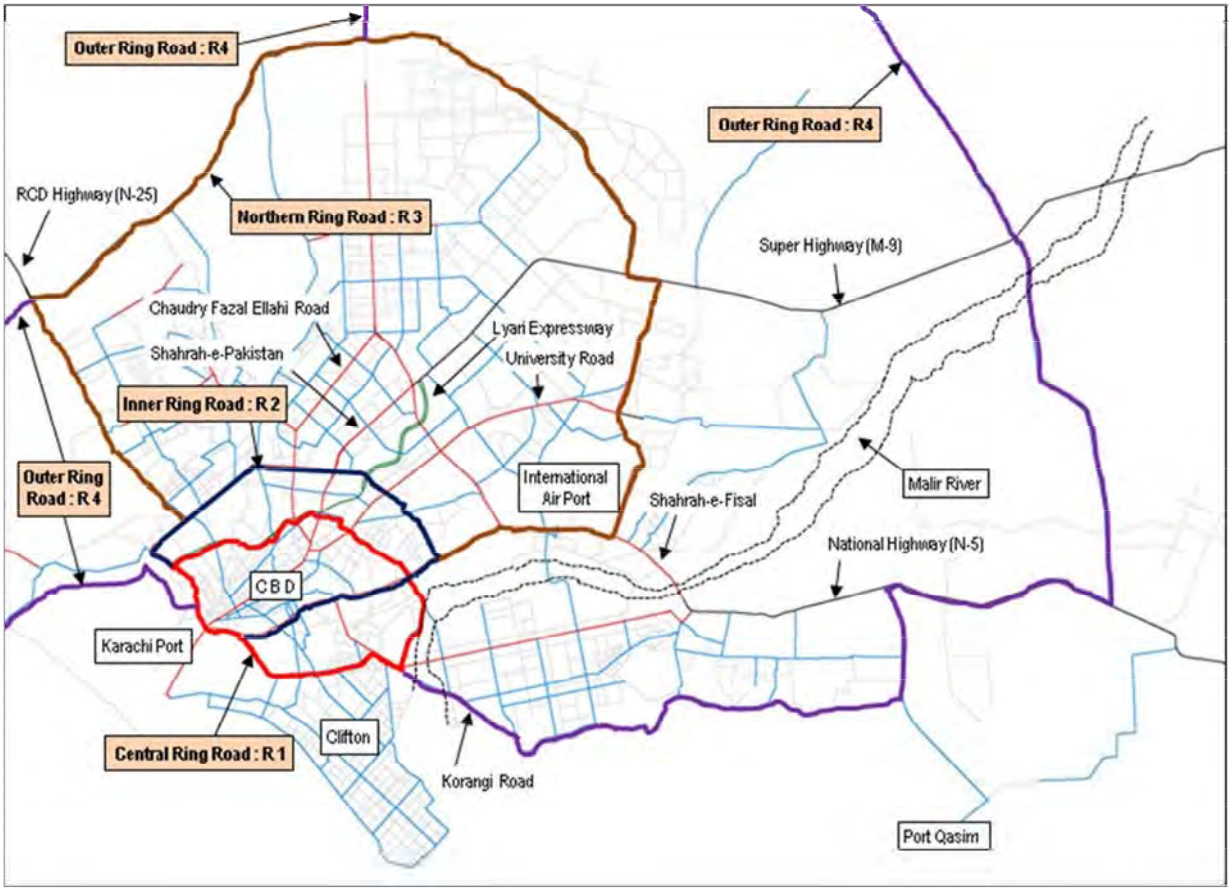
The second ring road, Inner Ring Road (R2), has a completely separate northern and eastern alignments but shares the southern and western alignments of Central Ring Road (R1). The total length was estimated at 32.5 km.

c. Northern Ring Road (R3)

The present alignment of the Northern Bypass begins from the Super Highway northward towards Taiser Town, turns in the northwest direction, and thereafter proceeds in the west direction through Surjani Township, north of Orangi and Baldia Towns until its confluence with the RCD Highway, and proceeding along SITE Avenue. The Northern Bypass has a total length of 65 km. It has all the characteristics needed to serve as a regional ring road provided that it is developed south of the Super Highway, connecting with University Road at Malir Cantonment, and connecting with Shahra-e-Faisal, east of Karachi Airport. Further connection southbound will be possible with Malir River Bund Road.

d. Outer Ring Road (R4)

Outer Ring Road (R4) has been envisioned with future growth and development, consolidating and strengthening the future highway network with a future vision of supporting the growth strategy for Karachi. The southern part of Outer Ring Road (R4) runs along the costal alignment in the direction of Port Qasim.



Source: "Karachi Strategic Development Plan – 2020", City District Government Karachi, 2007

Figure 2.2.1 Plan of the Four Ring Roads in KSDP-2020

2) Major Points of Road Development in the Southeast Area of Karachi

KSDP-2020 proposed the following road network strengthening plan in the southeast area of Karachi:

a. Strengthening Connectivity/Accessibility to Port Qasim and the Industrial Area

- Major traffic generators of Port Qasim, the Steel Mills, major vehicle assembly, and manufacturing plants, machine tool factory, power plants, and KEPZ are some of the major impetus for the strengthening and augmentation of the transport network. The evolving land use around these areas are the complementary support industries. Malir Town and its extension, Landhi and Bin Qasim areas north of the National Highway are rapidly experiencing changing

land use.

- There is also a great deal of synergistic effects with the Landhi and Korangi Industrial Areas. Major infrastructure improvements have been planned to improve their potential. Also strengthening the industrial base and key roadway improvements and development will therefore be necessary.
- A principal arterial was proposed for the connection between Mehran Highway and the National Highway.

b. Malir River Bund Road Construction

- The connection from the south to the new Education City and northward to the decentralized development of core commercial, retail land use will result in consolidated movement capacity. Radial increase in movement flow from the east will be minimized (and hence future congestion) in the eastern approaches to the city by encouraging circumferential movement.
- The expressway along the right bank of the Malir River and the connection of Mehran Highway (Shahrah-e-Darulaloom) extension south of the National Highway will also give an efficient access to the industrial areas of Landhi and Korangi.
- Construction and enhancement of the roadway through Malir towards Murad Memon Goth will serve the future Education City and will require to be extended along the right bank of the Malir River in the northeast direction crossing over into the proposed Education City at its intersection with the north-south link road connecting the National Highway and the Super Highway. Parts of the existing road will have to be rebuilt and joined with the Malir River's crossing point.

c. Grade Separated Intersection Improvement

As in other areas, when the roadways are upgraded and they intersect with other principal arterials, their points of intersection would warrant grade separation to achieve high productivity in terms of traffic service. A number of such locations have been identified where grade separations (flyovers and or interchanges) will have to be constructed subject to further technical feasibility study in order to determine the best configuration suitable at the location

(3) JICA Study for Karachi Transportation Improvement Project (KTIP)

1) Outline of KTIP

JICA has conducted the study on the Karachi Transportation Improvement Project (KTIP) with the following objectives:

- Development of the Karachi Urban Transport Master Plan (KUTMP) for 2030
- Demand based validation and screening of projects already identified by KSDP-2020 in the transport sector.
- Identification of additional projects according to KUTMP 2030
- Demand based prioritization of projects identified under Clauses 1 and 2 above.
- Feasibility study of a high priority project on mass rapid transit system based on results of Clause 4 above.

The JICA study of KTIP has been completed in June 2012, and the road network development master plan towards 2030 was proposed in KTIP. The said master plan has been formulated with the following policies:

- The road network plan in 2030 is developed based on the plan in KSDP-2020.
- The future road network should be developed to support the future land use plan and existing development plans.
- The future road network should support the public transport system.

- The capacity and density of the road network should meet future traffic demand as much as possible.
- The future road network and facilities should reduce road congestion.
- Accessibility of all inhabitants of Karachi should be improved.
- Traffic accidents should be reduced and the road system should ensure safety.

The master plan program was set up and divided into three phases: short-term (2012-2020), medium-term (2021-2025), and long-term (2026-2030).

2) Road Development Program to Relate Investment Climate Improvement

The JICA study of KTIP proposed that the road improvement, new road construction, and intersection improvement programs for the CBD–Port Qasim Corridor should focus on the following:

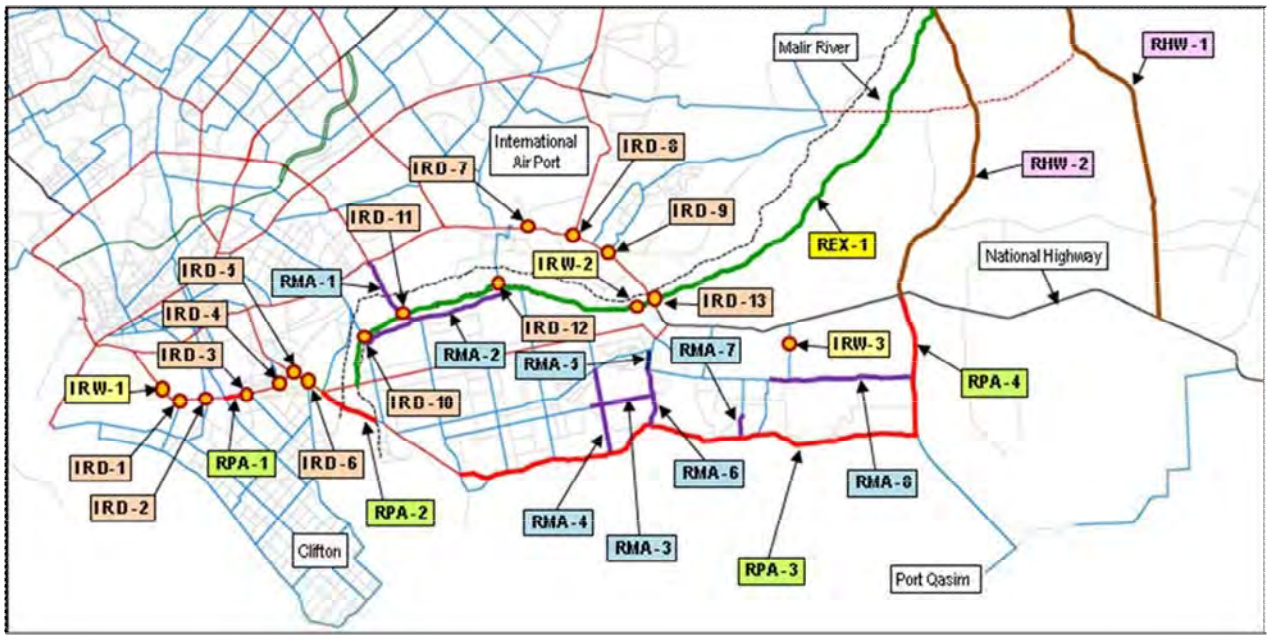
i) Construction of coastal road and strengthening the link between Outer Ring Road (R4) and the Super Highway;

ii) Grade separation improvement on Shahrah-e-Faisal;

iii) Road network improvement in the Korangi/Landhi /Port Qasim areas; and

iv) Construction of Malir River Bund Road.

The locations of each program above are shown in **Figure 2.2.2**.



Source: "the Study for Karachi Transportation Improvement Project", JICA, 2012

Figure 2.2.2 Road Network Master Plan for Arterial Road on CBD – Port Qasim Corridor

a) Development of Outer Ring Road (R 4)

The grade separation improvement of major intersections on Sunset Boulevard Road to Karangi Road up to Qayyum Abad Flyover will be completed in 2020 as the short-term target. The construction of Korangi Creek Road (coastal road) will be implemented from 2019 to 2023 as the medium-term target.

Table 2.2.2 Road Construction/Improvement Plan Related to Outer Ring Road (R4)

[Road Construction]

ID No.	Road Section	Road Category	Length (km)	Cost (Rs million)	Target
RPA- 1	Sunset Boulevard Road	Principal Arterial	0.90	67	Short
RPR- 2	Korangi Road (Bridge Construction: 2.2 km)	Principal Arterial	2.68	2,581	Short
RPA- 3	Korangi Creek Road (Coastal Road)	Principal Arterial	18.99	1,836	Medium
RPA- 4	Port Qasim Access Road	Principal Arterial	5.78	362	Medium
RHW-1	Super Highway – National Highway Connection	Highway	17.66	1,499	Long

[Grade Separation Improvement at Intersections]

ID No.	Road Section	Road Category	Cost (Rs million)	Target
IRD- 1	Khayaban-e-Reomi Road / Khayaban-e-Saadi Road	Principal Arterial	326	Medium
IRD- 2	Khayaban-e-Reomi Road / Choudhy Khaliq-uz-Zaman Road	Principal Arterial	326	Short
IRD- 3	Sunset Boulevard Road / Commercial Road	Principal Arterial	326	Short
IRD- 4	Sunset Boulevard Road / South Circular Road	Principal Arterial	326	Short
IRD- 5	Sunset Boulevard Road / Korangi Road	Principal Arterial	326	Short
IRD- 6	Korangi Road / Khayaban-e-littehad Road	Principal Arterial	326	Short
IRW- 1	Mai Molachi Road / Pakistan Railway	Principal Arterial	549	Long

Source: "The Study for Karachi Transportation Improvement Project", JICA, 2012

b) Grade Separation Improvement at Intersections on Shaharah-e-Faisal

Three intersection locations on Shaharah-e-Faisal between the international airport and Malir Bridge will be completed for grade separation improvement in 2020 as the short-term target.

Table 2.2.3 Grade Separated Intersection Improvement Plan on Shahrah-e-Faisal

ID No.	Road Section	Road Category	Cost (Rs million)	Target
IRD- 7	Shahrah-e-Faisal / Airport Access Road	Principal Arterial	326	Short
IRD- 8	Shahrah-e-Faisal / Jinnah Avane	Principal Arterial	326	Short
IRD- 9	Shahrah-e-Faisal / Malir Rausi Roads	Principal Arterial	549	Short

Source: "The Study for Karachi Transportation Improvement Project", JICA, 2012

c) Road Network Improvement in Korangi and Landhi Industrial Areas

Several programs for road improvement within Korangi and Landhi Industrial areas were recommended to be implemented as the medium-term target.

Table 2.2.4 Road Network Improvement Plan in the Korangi/Landhi/Port Qasim Areas

[Road Construction]

ID No.	Road Section	Road Category	Length (km)	Cost (Rs million)	Target
RMA-1	Extension of Habib Rechmatsllah Road	Minor Arterial	3.16	348	Long
RMA-2	4000 feet Road	Minor Arterial	5.90	649	Medium
RMA-3	Extension of Korangi Industrial Road (1,400)	Minor Arterial	2.53	279	Medium

ID No.	Road Section	Road Category	Length (km)	Cost (Rs million)	Target
RMA-4	Extension of Korangi Industrial Road (1,500)	Minor Arterial	3.12	344	Medium
RMA-5	1500 feet Road	Minor Arterial	0.83	29	Medium
RMA-6	Extension of 1500 feet Road	Minor Arterial	2.24	224	Medium
RMA-7	Road between Majahid Road and Coastal Road	Minor Arterial	1.02	113	Medium
RMA-8	Extension of Majahid Road	Minor Arterial	5.79	466	Medium
RHW-2	Super Highway – Education City – National Highway Connection	Highway	17.66	1,457	Long

[Grade Separation Improvement at Intersection]

ID No.	Road Section	Road Category	Cost (Rs million)	Target
IRW- 3	Road between Shahrah-e-Faisal Road and Extension of Mujahid Road / Pakistan Railway	Minor Arterial	326	Middle

Source: "The Study for Karachi Transportation Improvement Project", JICA, 2012

d) Construction of Malir River Bund Road

Based on the results from the future traffic forecast analysis conducted in the study of KTIP, the construction project of Malir River Bund Road up to the Super Highway was recommended to be implemented from 2026 to 2030 as the long-term target.

Table 2.2.5 Malir River Bund Road Construction Plan

[Road Construction]

ID No.	Road Section	Road Category	Length (km)	Cost (Rs million)	Target
REX-1	Malir River Bund Road	Expressway	41.12	18,915	Long

[Grade Separation / Interchange]

ID No.	Road Section	Road Category	Cost (Rs million)	Target
IRD-10	Flyover crossing 3000 feet Road	Expressway	368	Long
IRD-11	Interchange at Habib Rehmatullah Road	Expressway	1,264	Long
IRD-12	Interchange at 1300 feet Road	Expressway	1,463	Long
IRD-13	Interchange at Shahrah-e-Faisal	Expressway	1,566	Long
IRW- 2	Flyover crossing Pakistan Railway	Expressway	549	Long

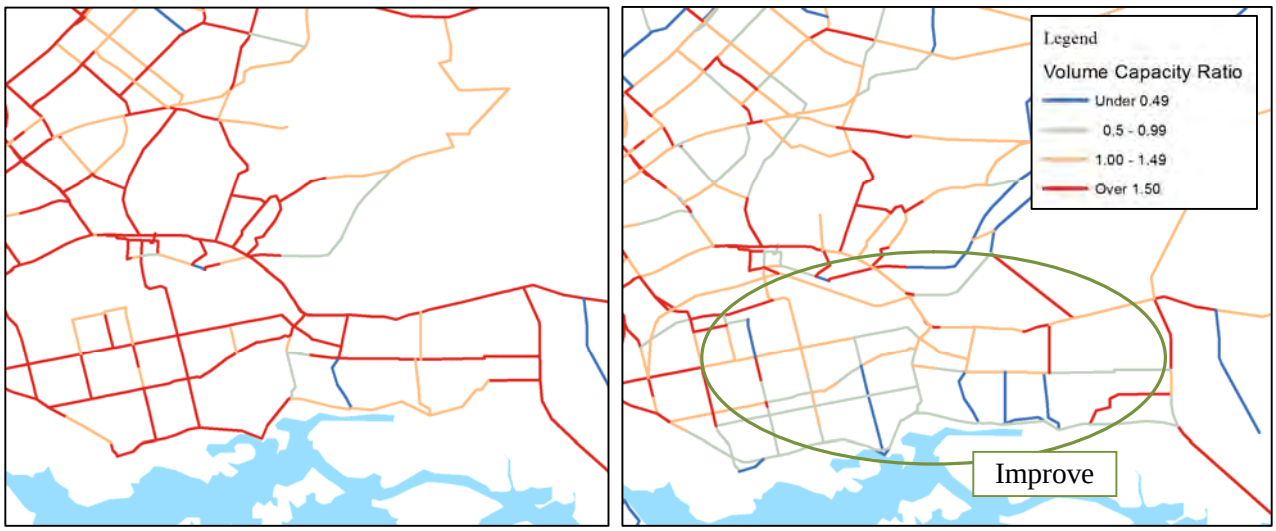
Source: "The Study for Karachi Transportation Improvement Project", JICA, 2012

3) Assumed Impact of Future Road Network Development

In the implementation of the future road network development, alleviation of traffic congestion and improvement of travel speed are expected.

According to the result of traffic demand analysis of KTIP, regarding alleviation of traffic congestion, the volume-to-capacity ratio is about 2.0 in Karachi City in case of "do nothing". On the other hand, the volume-to-capacity ratio was calculated at about 1.1 in case of future road network development. The average travel speed is greatly improved from about 20 km/h (do nothing case) with about 40 km/h (future road network development case) in Karachi City.

Especially, on Shahrah-e-Faisal Road, Korangi Road, including the center of Karachi City, it was expected that the congestion situation would improve more. For example, around Malir Bridge, the volume-to-capacity ratio would improve from about 9.0 to 1.2, and the travel speed would improve from 12.2 km/h to 68.8 km/h.



Note: Left Figure : Do-Nothing case, Right Figure : Future Road Network Development case
Source: "The Study for Karachi Transportation Improvement Project", JICA, 2012, Study Team (utilized KTIP as reference)

Figure 2.2.3 Impact of Future Road Network Development (Volume-to-Capacity Ratio)

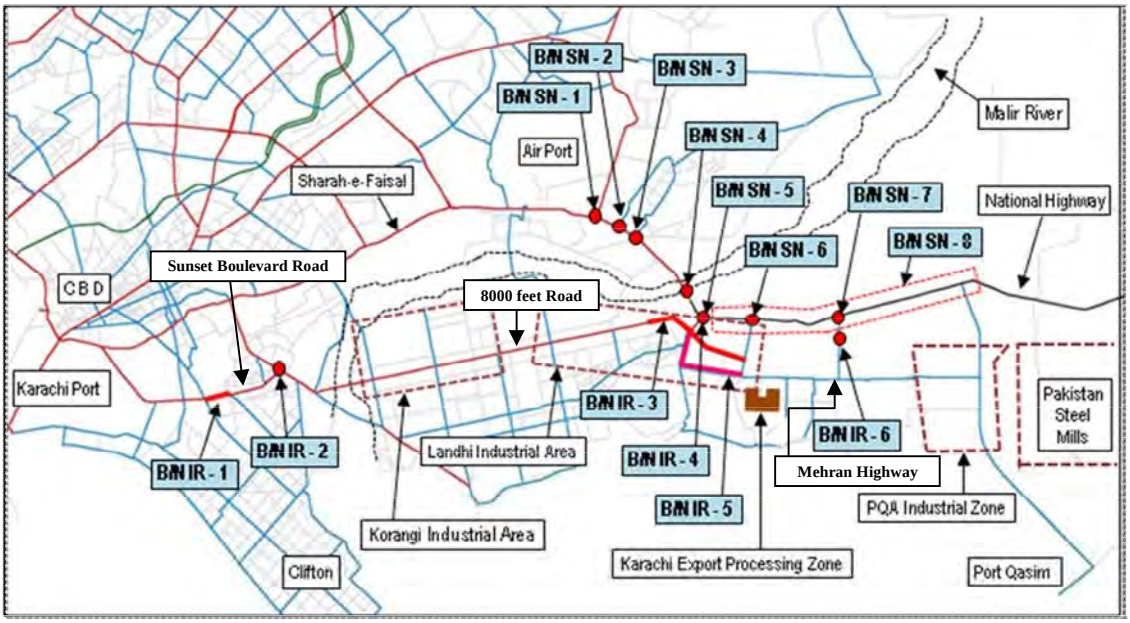
2.2.2 Current Bottlenecks on the Access to the Industrial Area

The following are the two main routes to access Korangi Industrial Area, Landhi Industrial Area, and Port Qasim from CBD and the Clifton residential area:

i) Sunset Boulevard Road – 8000 feet Road – Mehran Highway Route

ii) Shahrah-e-Faisal – National Highway Route

Figure 2.2.4 shows the locations of bottlenecks identified in the site reconnaissance survey of the Study Team.



Source: JICA Study Team

Figure 2.2.4 Locations of Identified Bottlenecks between CBD and Port Qasim

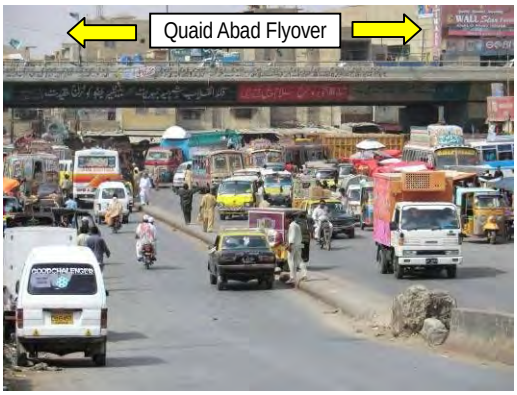
1) Sunset Boulevard Road – 8000 feet Road – Mehran Highway Route

The major bottlenecks along the route of Sunset Boulevard Road – 8000 feet Road – Mehran Highway are shown and described in **Table 2.2.6**. Most problems of the said route are regarding the connectivity of the road sections between Future Colony on 8000 feet Road and Hospital Chowrangi on Mehran Highway, such as the narrow width and poor condition of roads as well as such roads run through residential areas.

Since heavy vehicles such as trailers and tankers have high traffic on the said section, it is desirable to separate the main carriageway for heavy vehicles and the service road for community transportation. However for road widening, it seems very difficult to implement the land acquisition along the road. In addition, the accessibility between Landhi Industrial Area and the National Highway also needs to be improved.

Table 2.2.6 Bottleneck Conditions on Sunset Boulevard Road – 8000 feet Road Corridor

ID No.	B/N IR - 1	B/N IR - 2
Location	Sunset Boulevard Road at PT Colony	Intersection of Sunset Boulevard Road and Korangi Road
Site Photo		
Condition	- Only 0.9 km section has a four-lane carriageway. - Large-scale land acquisition is required to widen it to six lanes with service roads on both sides.	- Two principal arterial roads are intersected by signal control. - Sunset Boulevard Road – Qayyum Abad Flyover direction has main traffic flow.

ID No.	B/N IR - 3	B/N IR - 4
Location	8000 feet Road at Future Colony	Lottery under Quaid Abad Flyover
Site Photo		
Condition	- Carriageway is only four-lane. - On-street parking is disturbing the traffic flow on carriageway.	- Lottery has constant traffic congestion due to taxis and buses waiting for passengers on the road.

ID No.	B/N IR - 5	B/N IR - 6
Location	Mehran Highway from Rice Godown to Hospital Chowrangi	Railway Crossing on PMTF Road
Site Photo		
Condition	- Road surface condition is very poor. - On-street parking is disturbing the traffic flow on the carriageway.	- Railway crossing section is narrow compared with the anteroposterior of the road section.

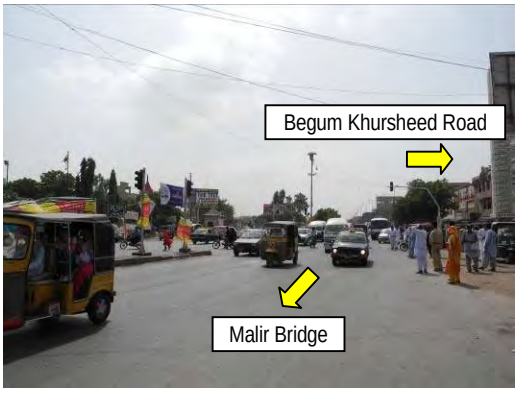
Source: JICA Study Team

2) Shahrah-e-Faisal – National Highway Route

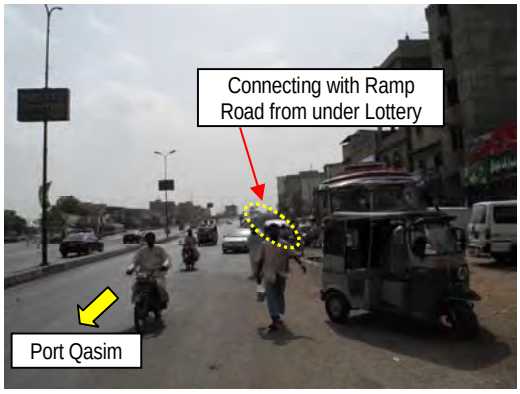
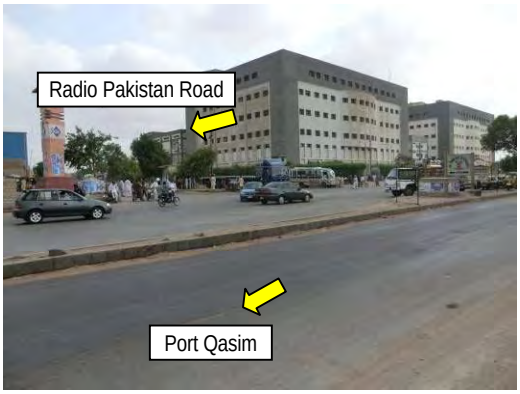
Table 2.2.7 shows and describes the major locations of bottlenecks on the road section between Shahrah-e-Faisal and the National Highway to Port Qasim.

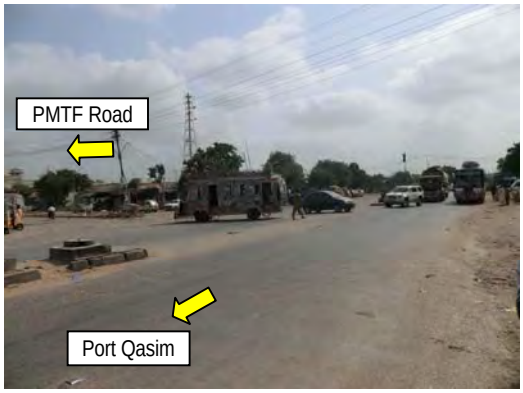
The road section of Shahrah-e-Faisal between Army Settlement Flyover and the International Airport has been completed as a "signal-free corridor", and the road alignment has a minimum six-lane carriageway with service roads leading to the residential areas, so that the smooth traffic may be provided to road users. The road section between the International Airport and Port Qasim has mainly a four-lane carriageway, and its intersections with major roads are at-grade, basically. Therefore, such locations at intersections create traffic bottlenecks.

Table 2.2.7 Bottleneck Conditions on Shahrah-e-Faisal – National Highway

ID No.	B/N SN - 1	B/N IR SN - 2
Location	Malir Halt Intersection on Shahrah-e-Faisal	Intersection of Begum Khursheed Road and Shahrah-e-Faisal
Site Photo		
Condition	- Waiting taxis and stopping buses disturb the traffic flow on the carriageway. - Open air shops standing side by side along ROW space also disturb the traffic flow.	- Waiting taxis and stopping buses disturb the traffic flow on the carriageway.

ID No.	B/N SN - 3	B/N SN - 4
Location	Malir No. 15 Intersection on Shahrah-e-Faisal	After Malir River Bridge on the National Road (Direction toward Port Qasim)
Site Photo		
Condition	- Two intersections (Abdullah Naseem Road and Marad Memon Goth Road) are closed. - Waiting taxis and stopping buses disturb the traffic flow on the carriageway. - Open air shops on the narrow ROW space also disturb the traffic flow.	- A community road connects with the beginning of the approach of Malir River Bridge. - Parking and stopping vehicles (minibuses, and taxis) disturb the traffic flow.

ID No.	B/N SN - 5	B/N SN - 6
Location	After Quaid Abad Flyover on National Road (Direction toward Port Qasim)	Intersection of Radio Pakistan Road (towards Hospital Chowrangi) and the National Highway
Site Photo		
Condition	- A ramp road from Lottery under the flyover connects with the beginning of the approach of the flyover bridge without providing the required taper. - Stopping and parking vehicles on the road shoulder disturb the traffic flow.	- A signal system has not been installed at the intersection. - The intersection has high traffic volume of trailers and tankers coming from the between Landhi Industrial Area and Port Qasim.

ID No.	B/N SN - 7	B/N SN - 8
Location	Intersection of PMTF Road and the National Highway	Entire section between Quaid Abad Flyover and Port Qasim along the National Highway
Site Photo		
Condition	- A signal system has not been installed at the intersection. - The intersection has a high traffic volume of trailers and tankers coming from the direction between Landhi Industrial Area and Port Qasim.	- Parking or stopping tankers and trailers along the road shoulder disturb the traffic flow on the carriageway.

Source: JICA Study Team

2.2.3 Organization of Road Network Development in Karachi

(1) Government Departments Responsible for Road Construction

The main department responsible for road construction in Sindh Province is the Sindh Highways Department. In addition, there are other departments that are also responsible for the construction of roads under various categories. They are briefly discussed below.

(2) Sindh Highways Department

The Sindh Highways Department is responsible for construction and maintenance of the entire provincial road network. At the time of independence, Sindh inherited only about 1,039 km of blacktopped roads, mostly 9 ft to 12 ft in width. The only major road at that time was the National Highway running from Karachi to Reti, bordering on Punjab having a length of 664 km. The roads before were constructed on the basis of stage construction. Now the provincial roads are constructed as per design requirement. The design standards and specifications are regularly updated to provide better quality and long lasting roads. Presently though the total road network in Sindh including federal roads is more than 36,500 km in length, it still seems too limited when compared with the minimum requirement of 1 km/km^2 i.e., 140,900 km.

Road assets have become much deteriorated due to inadequate maintenance and the ever-increasing traffic volume. According to a survey conducted by the Road Management Unit in 2000-2001, about 70% of the road network was in poor condition and required reconstruction/rehabilitation. Taking cognizance of the situation, the province is now allocating modernization and repair (M&R) funds at an annual growth of 20% over previous yearly allocations. This is a welcome change as 70% of M&R funds are utilized on prioritized roads, and 30% on emergency road works. Furthermore, through the development budget, major roads are improved and rehabilitated according to the current traffic intensity.

(3) National Highway Authority (NHA)

In 1978, GOP decided to federalize five important interprovincial roads called “National Highways”.

GOP created the National Highway Board to monitor the development and maintenance of such federalized roads by provincial highway departments.

The National Highway Authority (NHA) was created, in 1991, through an Act of the Parliament, for planning, development, operation, repair and maintenance of national highways and strategic roads specially entrusted to NHA by the federal government, a provincial government, or other authority concerned. Total length of the federalized roads under NHA now stands at 8,780 km, which account for 3% of the entire road network and 75% of the commercial road traffic in the country.

NHA is the custodian of the highway assets of Pakistan's road network. It is committed to provide a safe, modern and efficient transportation system. As the cornerstone of Pakistan's future highway network, national highways function as the backbone of Pakistan's transportation system, playing an important role in the development of micro and macro economies and also the enhancement of national integration by increasing social and economic dependence between provinces. In Karachi, the jurisdiction of NHA starts after the Port Qasim area near Gharo railway crossing.

(4) Cantonment Boards

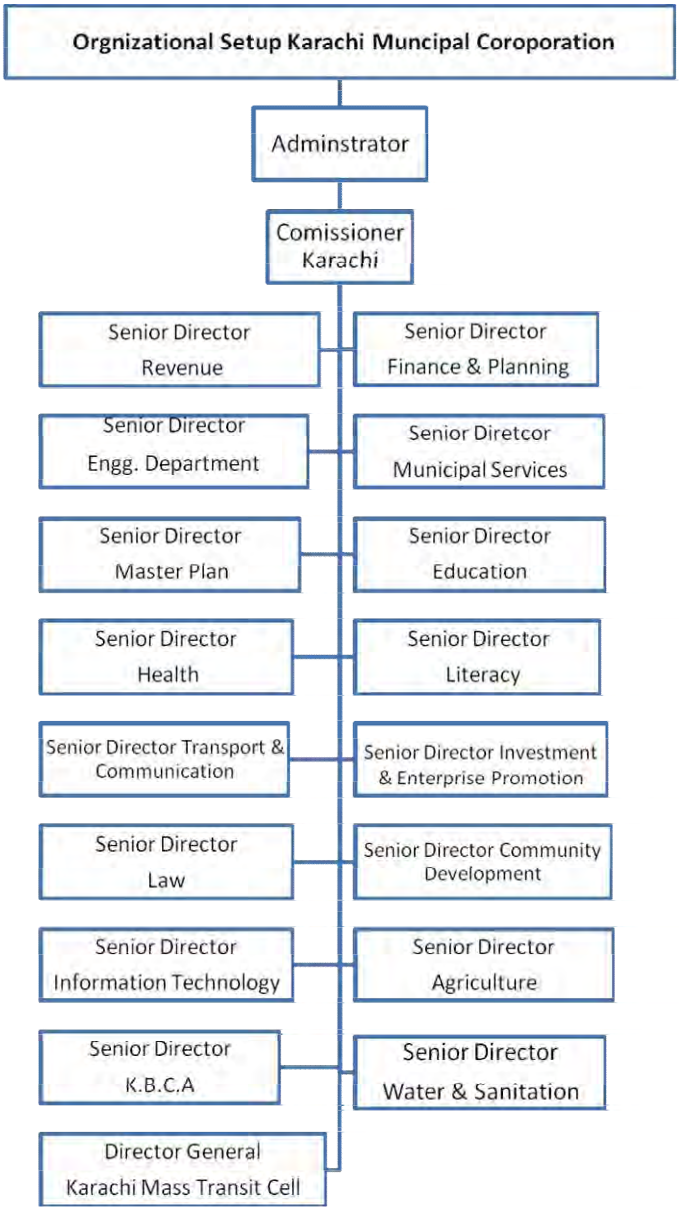
There are five cantonment boards in Karachi City, namely, Karachi, Malir, Faisal, Korangi Creek and Clifton. The head of the organization is called the Cantonment Executive Officer. The department responsible for the maintenance of infrastructure such as roads is the Military Estate Service (MES).

(5) Karachi Metropolitan Corporation (KMC)

The development and maintenance of infrastructure including roads in Karachi City was initially the responsibility of KMC and the Karachi Development Authority (KDA). In 2001, during the decentralization of power, Karachi City was divided into 18 towns. Each town was headed by an elected official called the Town Nazim. The Town Nazim had administrative control over his/her respective town. Besides other responsibilities, development of roads was looked after by the Transport and Communication Group whose functions are the following:

- Planning and design of road network components, conducting traffic surveys, preparation and implementation of traffic management schemes, conducting geometric design and addressing air pollution control measures.
- Management of offices of the District Regional Transport Authority, Karachi with funding under the Motor Vehicle Ordinance 1965 and Motor Vehicles Rules 1969. Its main functions include public transport route classification. Also it is responsible for issuing road permits to public service vehicles and cargo vehicles.
- Installation management, operation, and maintenance of traffic signals in the jurisdiction of CDGK. Management and operations of intracity bus terminals in the city.
- Provision of traffic control devices including traffic signs, road markings and other control measures. Identification of accident blackspots and implementation of counter measures, such as pedestrian bridges, in coordination with the Works and Services Department of CDGK.
- Provide safety education and public awareness programs.

After 2011, the old system was revived and KMC is now overseeing infrastructure including road development schemes. **Figure 2.2.5** illustrates the organization of KMC.



Source: Karachi Metropolitan Corporation (KMC)

Figure 2.2.5 Organization of KMC

2.3 Development of the Port Qasim Area

2.3.1 Current Conditions of Port Qasim

(1) Overview of Port Qasim

The Port Muhammad Bin Qasim, also known as Port Qasim, is a seaport in Karachi, Pakistan on the coastline of the Arabian Sea. It is Pakistan's second busiest port, handling about 35% of the nation's cargo (26 million tons per annum). Port Qasim and the Port of Karachi, are the busiest ports of the country, together handle more than 90% on all external trade of Pakistan.

Table 2.3.1 shows Port Qasim's performance in the last five years. **Table 2.3.2** indicates the major handling commodities at Port Qasim.

Table 2.3.1 Ship and Cargo Statistics of Port Qasim Over the Last Five Years

Year	2006-2007	2007-2008	2008-2009	2009-2010	2010-2011
Handling Cargo (million tons)	24.35	26.42	25.02	25.61	26.17
Vessel Call (number of ships)	1,051	1,155	1,238	1,187	1,227

Source: Port Qasim Authority

Table 2.3.2 Principal Imports and Exports at Port Qasim

Import/Export	Major Handling Commodities
Imports and Exports	Wheat, Containers, and General Cargo
Imports Only	Chemicals, Coal, Crude Oil , Furnace Oil, Edible Oil, Iron Ore, and Sugar
Export Only	Rice and Cement

Source: Port Qasim Authority

Pakistan had only one seaport (in Karachi) in 1947 which handled all import and export commodities of the country. GOP, through the Act of Parliament, created the Port Qasim Authority (PQA) in 1973. The main reasons for the creation of a second port are summarized below.

- The Port of Karachi became congested. With the growing volume of ships calling at the port, the waiting time of ships at outer anchorage increased to more than a month.
- Cargo handling pace at the port was affected because of labor problems and the existence of the Karachi Dock Labor Board.
- Strategically, there was a need for an alternative port to meet any eventuality of the port closing down due to unforeseen reasons.
- The GOP had decided to set up a steel plant at a location where port facilities could be provided for handling its raw material import requirements. The site of Port Qasim was considered due to the availability of hinterland and natural deep sea water.

Port Qasim encompasses a total area of 12,000 acres (49 km^2) wherein many industrial zones operate. In addition to the Pakistan Steel Mills and Karachi Electric Supply Company (KESC) Bin Qasim Power Plant, around 80% of Pakistan's automotive industry is located at Port Qasim. The port also provides direct waterfront access to two major nearby industrial areas, Landhi Industrial Area and Korangi Industrial Area. Approximately 60% of the country's export and import originates from these areas. Port Qasim is managed by PQA, a semi-autonomous government body.

(2) Strategic Planning Study of Port Qasim in 2000

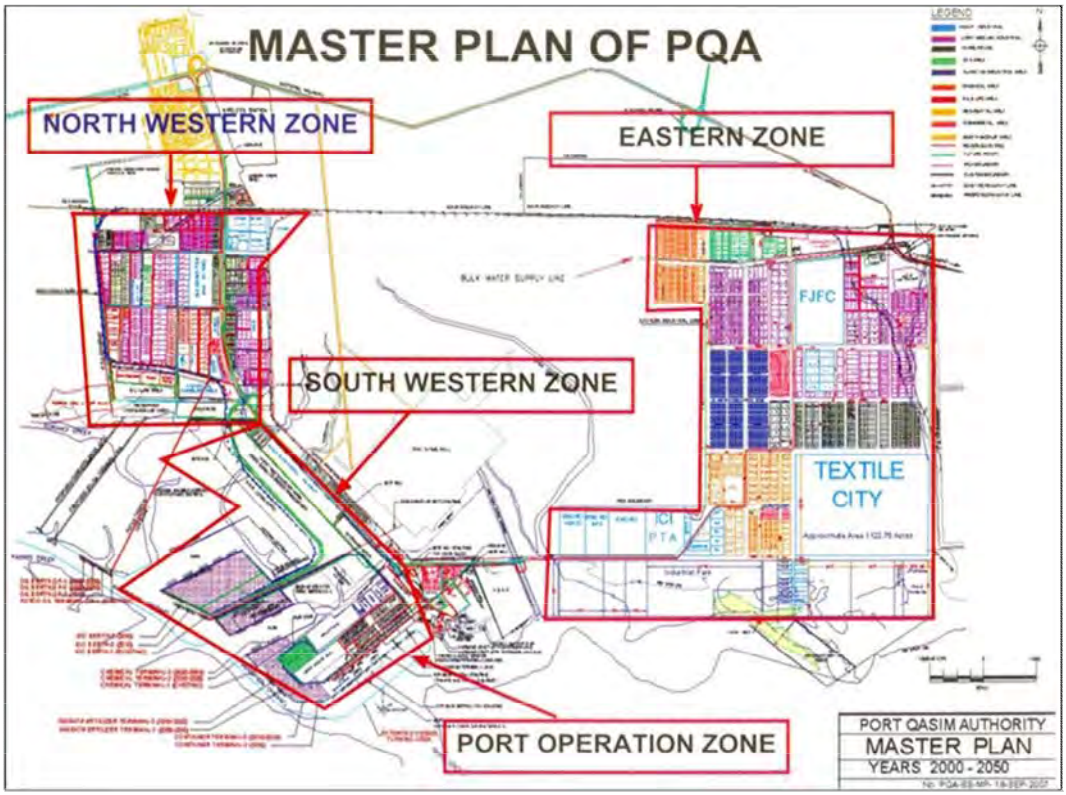
PQA prepared the master plan study report, "Strategic Planning Study for Port Qasim February 2001". The said study was carried out by Engineering Consultants International Ltd. in association with Maunsell Consultancy Services Ltd. The terms of reference of the study requires the development strategies and the master plan to be realized for the following periods:

- Short-term Plan: the first ten years (2001-2010)
- Medium-term Plan: from the 10^{th} to 20^{th} year (2011-2020)
- Long-term Plan: from the 20^{th} to 50^{th} year (2021-2050)

The study incorporated the following major elements:

- Review of present situation of the port,
- Review of existing industrial and commercial proposals,
- Port development strategy,
- Port Qasim master plan, and
- Financial appraisal.

In the master plan study, the port facility development programs such as berth development and channel improvement have been recommended. In addition, the land development plan for the commercial zone was also one of the important scopes of the study. The master plan had been prepared to have a land use plan which was divided into three zones as illustrated in **Figure 2.3.1**. Based on the demand forecast, the required infrastructure development plan, which included plans for water supply, sewage system, storm water drain, gas supply, and electric power supply, were also recommended in the master plan.



Source: Port Qasim Authority

Figure 2.3.1 Location of Industrial Zone at Port Qasim

(3) Existing Port Facility

The present facilities at Port Qasim have been established by both the public and private sectors. The phases of development of such facilities are as follows:

a. Iron and Coal Berth

In 1980, during the first development phase of the port, a dedicated iron and coal berth was built and commissioned. This berth with annual handling capacity of 3 million tons of iron ore and coal was connected with Pakistan Steel through a 5 km long conveyor belt facilitating the steel mill to receive cargo from a ship directly to the plant. Two unloaders and a conveyor belt have been installed by Pakistan Steel, which also operates cargo handling.

b. Multipurpose Terminal

A multipurpose terminal, also known as a marginal wharf, comprising seven berths, each 200 m long, was completed in 1981. A 41 km long navigation channel from the Fairway buoy up to the port was dredged to handle 25,000 DWT (dead weight tonnage) ships in all weather conditions, and 50,000 DWT ships in fair weather. Besides the above, a fleet of floating crafts, cargo handling equipment, cranes, offices, and other infrastructure, such as roads, railway and services, were included.

c. Fauji Oil Terminal Company (FOTCO) Oil Terminal

Port Qasim was focused on the development of port infrastructure through private sector participation. FOTCO was the first private sector company to build an oil terminal under the scheme build-own-operate (BOO). This terminal, having an annual capacity of 9 million tons, was

commissioned in 1995.

d. Qasim International Container Terminal (QICT)

QICT was developed by converting the existing marginal wharf berth nos. 5 to 7. It became operational in 1997. This project was established under build-operate-transfer (BOT) scheme, whereby the private sector is to build the facility, operate it for 30 years, and then transfer it to PQA.

e. Engro Vopak Chemical Terminal and Liquefied Petroleum Gas (LPG) Terminal

In order to meet the import requirements for liquid chemicals, M/s Engro Vopak (EVTL) has established a chemical terminal, under BOT scheme in 1998, with an annual handling capacity of 4 million tons. Subsequently, handling and storage facilities for LPG were also added to the terminal. The terminal has adequate backup area for storage tanks of various chemicals handled by EVTL. Another dedicated LPG terminal was also built in 2002 by M/s PROGAS.

f. Liquid Cargo Terminal (LCT)

An LCT has been established at Port Qasim under BOT scheme by a joint venture between a Malaysian company and a Pakistani company. The LCT, which handles edible oil at an annual capacity of 4 million tons, was completed in 2009.

g. Grain and Fertilizer Terminal

A specialized grain and fertilizer terminal was developed by M/s Fauji Akbar Portia. The terminal, which has a handling capacity of over 4 million tons per annum, was formally commissioned in 2010.

h. Second Container Terminal

An implementation agreement was signed on August 17, 2006 by QICT for the establishment of a second container terminal under BOT scheme. The terminal has a capacity of 14 million tons per annum. The terminal was designed to accommodate 6000 TEU (twenty-foot equivalent units) container vessels. Commercial operations of the project have started in January 2011.

Table 2.3.3 summarizes the phases of development of Port Qasim with regards to the installed terminals in chronological order.

Table 2.3.3 Annual Capacity of Port Qasim Terminals

Terminal	Number of Berths	Annual Capacity (million tons)	Year of Operation	Operation Basis
Iron and Coal Berth	1	3.0	1980	Public
Multipurpose Terminal (Marginal Wharf)	4	6.0 – 7.0	1983	
FOTCO Oil Terminal	1	9.0	1995	Private
Qasim International Container Terminal (QICT)	2	11.5	1997	
Liquid Cargo Terminal (EVTL)	1	4.0	1998	
PROGAS LPG Terminal	1	2.0	2007	
Liquid Cargo Terminal	1	4.0	2009	
Grain and Fertilizer Terminal	1	4.0	2010	
Second Container Terminal	1	15.8	2011	

Source: Port Qasim Authority

(4) Development of Industrial Zone

Port Qasim has a vast land area of 13,770 acres (1 acre = 0.4047 ha) for the development of port based industrial and commercial complexes, which has been divided into three main zones, as shown in Table 2.3.4.

Out of 13,770 acres of land, 3659 acres have been allocated for services and utilities. The remaining 10,111 acres has been alloted for the industrial zone. So far 9012 acres have been allotted to

potential investors. The remaining area of 1099 acres is generally low-lying area and has been reserved for warehouses and light/heavy industries. Port Qasim has also been instrumental in promoting industrialization in the country. So far 178 industrial and commercial complexes are already operating in different zones, while 276 are in the construction phase since 2011.

Table 2.3.4 Land Allocation of Industrial Area at Port Qasim

Zone	Land Area (acres)		
	For Port Service	For Industrial Use	Total
North Western Industrial Zone	904	2,016	2,920
South Western Industrial Zone	265	2,284	2,759
Eastern Industrial Zone	2,490	5,810	8,300
Total	**3,659**	**10,110**	**12,220**

Source: Port Qasim Authority

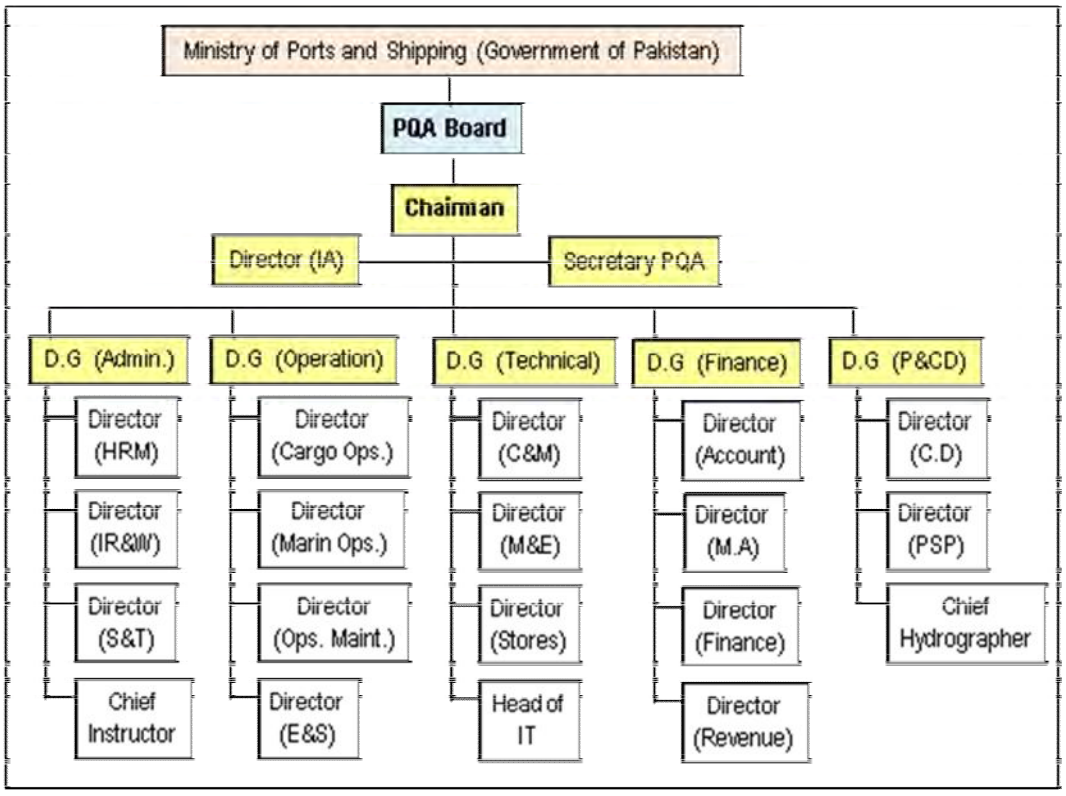
2.3.2 Management Organization of Port Qasim

PQA was established through an act of parliament on June 29, 1973. Port Qasim is the second deep sea industrial-cum-commercial port operating under a "landlord concept".

The port is under the administrative control of the Ministry of Ports Shipping, GOPakistan. The chairman is the chief executive of the port. All policy decisions are vested in the PQA board, which comprises seven members and headed by the chairman. The PQA board is a combination of public and private sector participation.

PQA is primarily a service oriented organization. The port provides shore-based facilities and services to international shipping lines and other concerned agencies in the form of adequate water depth in the channel, berths/terminals, cargo handling equipment, storage areas and facilities for safe day and night transit of vessels. PQA has a singular attraction to both port facilities and port-based industrial development. These advantages include the following:

- Close proximity to hinterland thus saving transportation costs.
- First rate multimodal connection with the communications network.
- Time efficient and cost effective port services.
- Availability of basic utilities such as potable water, power, gas, telecommunications, banking and other facilities.
- Immense possibility for expansion of port facilities to meet dynamic requirements of international shipping.
- Transshipment and transit trade facilities with Afghanistan and Central Asian countries.
- Full range of port facilities, including backup facilities, to handle general, bagged bulk, break bulk, liquid and containerized cargoes.



Source: Port Qasim Authority

Figure 2.3.3 Organization of Port Qasim Authority

2.3.3 Undergoing and Planned Project

PQA is executing and planning several development projects for expansion of port facilities, and infrastructure development in the industrial zone, as follows:

(1) Port Facility Development

a. GasPort LNG Floating Terminal

In order to meet energy demands, an LNG floating terminal with handling capacity of 3 million tons per annum is being developed by M/s GasPort at a cost of US$160 million.

b. Coal, Clinker and Cement Terminal

A dedicated coal, clinker and cement terminal is being undertaken at a cost of US$180 million. The terminal will have a handling capacity of 8 million tons per annum and a storage capacity of 0.9 million tons. An implementation agreement has been signed on November 6, 2010 with Pakistan International Bulk Terminal (PIBT). The terminal would be the country's first dedicated dirty bulk cargo handling facility and is expected to become operational from 2013.

c. LNG Terminal by Granada

An LNG terminal with handling capacity of 3.5 million tons per annum is planned to be developed by the Granada Group of Companies at a cost of US$274 million.

d. Second Oil Terminal

In order to handle the increased volume of petroleum, oil and lubricants (POL) imports, a second oil terminal with handling capacity of 9 million tons per annum is planned to be developed at a cost of US$51.4 million.

e. Second Steel Jetty

In order to handle the increased volume of Pakistan Steel Mills and to accommodate Al-Twarqui Steel Mills' imports, a second iron ore and coal berth with handling capacity of 8 million tons per annum is planned to be developed at a cost of US$150 million. Outsourcing of the terminal is under

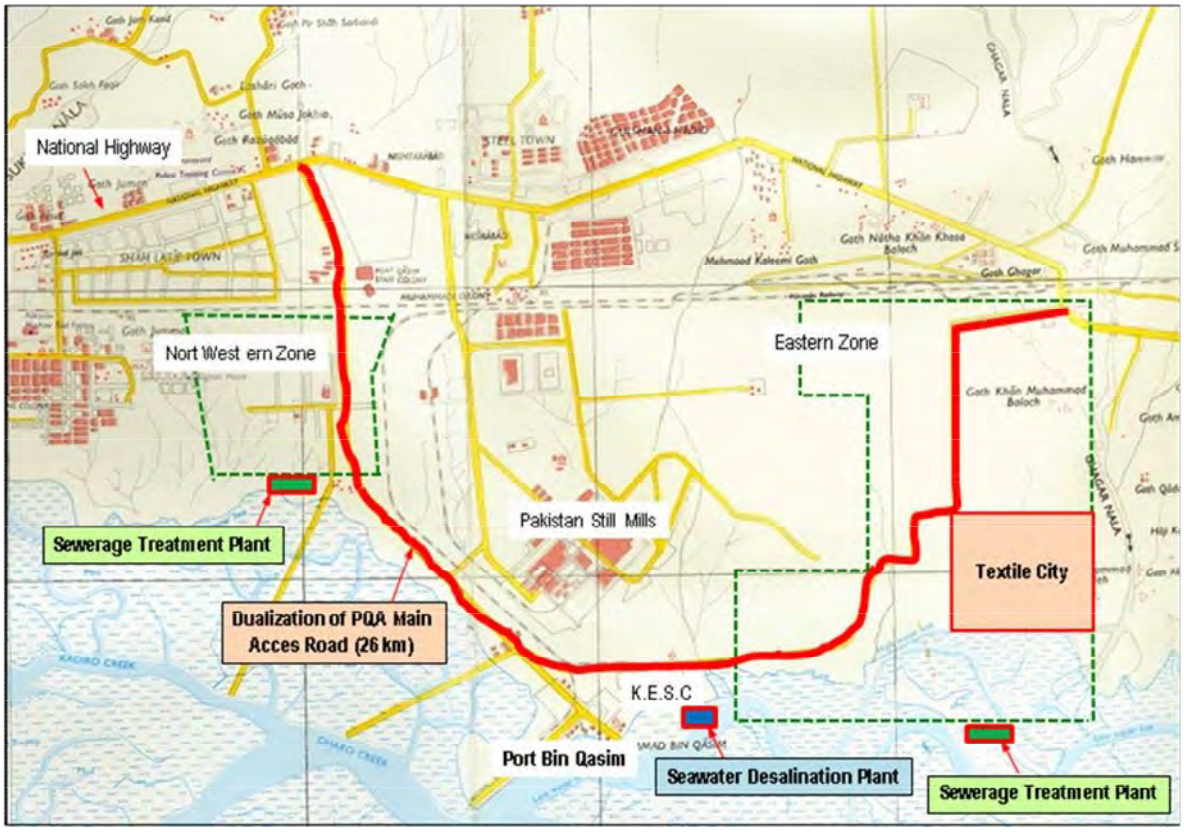
active consideration. The development of the terminal will be linked with the Pastel Expansion program.

f. Improvement of Navigation Channel

Deepening and widening the navigation channel of Port Qasim is crucial for PQA. PQA plans to deepen the navigation channel for all weather 14 meter draught vessels at a cost of US$200 million under "design, construct, and finance" basis. The project has government approval and is in the implementation process for tendering preparation.

(2) Infrastructure Development in the Industrial Zone

Besides capacity enhancement of the abovementioned projects for expansion of port facilities, the provision of infrastructure facilities in the industrial zones should be equally considered in order to advance the development of port-based industrial and commercial activities. PQA is planning to develop the main port access road, sewerage water treatment plan, and seawater desalination plant at the locations as shown in **Figure 2.3.4**.



Source: Port Qasim Authority

Figure 2.3.4 Infrastructure Development Plan in the Industrial Zone

1) Rehabilitation / Upgrading / Dualization of the Main Access Road

PQA plans the construction of a 26 km long dual carriageway from the T-junction of the National Highway passing through PQA commercial areas (Western Industrial Zone and Eastern Industrial Zone), ending at Sassui Bridge Ghaghar Railway Crossing. The plan also includes the upgrading of the main access road and the construction of two flyovers. This project will be implemented under BOT scheme at an estimated cost of Rs6.00 billion.

The design documents for BOT procurement have been completed. At present, PQA is undertaking the procurement process for the BOT concessionaire.

2) Construction of Sewerage Water Treatment Plants

Based on the master plan of the "Strategic Planning Study for Port Qasim February 2001", the

wastewater flows from the North Western Industrial Zone and Eastern Industrial Zone in 2050 were forecasted at 15.3 MGD (mega gallon per day: 1.0 MGD = 4,46 m^3/day) and 41.3 MGD, respectively. However, no wastewater treatment plant has been provided yet for PQA's industrial zone, therefore, it is necessary to design a compatible wastewater treatment plant based on technology capable of producing treated effluent that fits for disposal into the sea.

For the initial stage, oxidation ditch units with 2 to 3 MGD capacity are considered to be provided to cater the present flows at the North Western Zone and the Eastern Zone under BOT scheme. The number of treatment units will gradually be increased according to the increase of wastewater flow.

PQA has selected a consultant to conduct a feasibility study for the water treatment plants. A draft feasibility report has been submitted to PQA, and the consultant will prepare the design documents and tender documents for procurement of the BOT concessionaire.

3) Construction of Seawater Desalination Plant

At present, the water used in PQA's industrial zone is being taken from the Indus River, which is managed by the Karachi Water & Sewerage Board (KW&SB). However, due to the fast growing development of industrial units at Port Qasim, the requirement of water is increasing day by day and will increase manifold in the future with the commencement of operations of the new terminal and industrial units. It would be difficult or impossible to meet the water demand from KW&SB.

In this regard, PQA procured a design/supervision consultant for the establishment of the seawater desalination plant project under BOT scheme. This plant is required to be developed in modular fashion with a production capacity of 25 MGD or as required based on the current and future demand of water needs of PQA's industrial zone and surrounding areas. The land for such purpose has been selected in the vicinity of the Bin Qasim Terminal Power Plant by KESC which is within the Eastern Industrial Zone.

PQA has selected a consultant to conduct a feasibility study for the seawater desalination plant. The consultant will prepare the tender documents for procurement of the BOT concessionaire.

4) Textile City

In order to enhance the production and export of value-added textile products, GOP is setting up a "Textile City" in the Eastern Industrial Zone. PQA has handed over the ownership of 1250 acres of land. Five percent leveling/grading work has been completed, and for the combined effluent treatment plant, the consultant has been appointed. Road/water works commenced in June 2009, and a letter of intent for the 250 MW power plant was also approved in June 2009. Also the environment impact assessment was approved. The survey of plots will commence in the near future. This would not only facilitate the emergence of vendors and suppliers of raw materials and downstream and support industries but would also create many employment opportunities during the construction and operation phases, besides increasing value of the country's foreign exchange.

2.4 Institutional Conditions for Environmental and Social Consideration

2.4.1 Regulations for Environmental Clearance

(1) National Environmental Policy and Guidelines

1) National Conservation Strategy (NCS)

The NCS is the primary policy document of GOP regarding national environmental issues. This policy was approved by the Federal Cabinet in March 1992. The NCS also attained recognition from international donor agencies, principally the World Bank. The NCS identifies 14 core areas including conservation of biodiversity, pollution prevention and abatement, soil and water conservation, and preservation of cultural heritage, and recommends immediate attention to these core areas in order to preserve the country's environment.

A mid-term review of the achievements of the NCS in 2000 concluded that achievements under the NCS have been primarily on raising awareness and institutional building rather than actual improvement to the environment and natural resources, and that the NCS was not designed and is not adequately focused as a national sustainable development strategy (GOP, November 2000). The need therefore, arose for a more focused National Environmental Action Plan (NEAP) which is required to bring about actual improvements in the state of the national environment with greater emphasis on poverty reduction and economic development in addition to environmental sustainability.

NEAP was approved by the Pakistan Environmental Protection Council (PEPC) under the chairmanship of the President/Chief Executive of Pakistan in February 2001. NEAP now constitutes the national environmental agenda and its core objective is to initiate actions that safeguard public health, promote sustainable livelihood, and enhance the quality of life of the people in Pakistan.

A national environmental policy has been approved by the Federal Cabinet in its meeting held in June 2005. This policy has already been endorsed by the PEPC during 2004. The new policy has a total of 171 guidelines on sectoral and cross-sectoral issues. The objectives of the new policy include assurance of sustainable development and safeguarding the natural resources of the country. The following are the approved sectoral guidelines:

- Air quality and noise;
- Waste management;
- Forestry;
- Water supply and management;
- Biodiversity and protected areas;
- Climate change and ozone depletion;
- Agriculture and livestock;
- Multilateral environment agreements; and
- Water supply and management.

2) National Environmental Action Plan – Support Program (NEAP-SP)

GOP and the United Nations Development Program (UNDP) jointly initiated an umbrella support program called the NEAP-SP which was signed in October 2001 and implemented in 2002. The development objectives supported by the NEAP-SP are environmental sustainability and poverty reduction in the context of economic growth.

3) National Environmental Policy

This policy covers all sectors and a wide range of means for promoting conservation and environmental protection in water, air and waste management, forestry, and transport. The policy aims to promote protection of the environment, compliance with international regulations, sustainable management of resources, and economic growth. It calls for the setting of standards and regulations for ambient and indoor air quality, vehicle emissions and manufacturing, energy conservation, fuel specification and building codes. It aims to promote mass transit and non-motorized transport as well as cleaner technologies, including natural gas (LPG), solar, hydroelectric, biogas and cogeneration with waste, and offering tax incentives for efficient products. It also calls for creating increased public demand for environmentally friendly products through education and mass awareness campaigns.

A national environmental policy has been approved by the Federal Cabinet in its meeting held in June 2005. This policy has already been endorsed by the PEPC during 2004. The new policy has a total of 171 guidelines on sectoral and cross-sectoral issues. The objectives of the new policy include

assurance of sustainable development and safeguarding the natural resources of the country.

4) National Sanitation Policy

The national sanitation policy of Pakistan provides a broad framework and policy guidelines to the federal government, provincial governments, federally administrated territories, and local governments to enhance and support sanitation coverage in the country through formulation of sanitation strategies, plans, and programmes at all respective levels in order to improve the quality of life of the people of Pakistan and also the physical environment necessary for a healthy life.

The primary focus of sanitation based on the purpose of this policy is on the safe disposal of excreta, away from dwelling units and work places, by using a sanitary latrine and includes creation of an open defecation free environment along with the safe disposal of liquid and solid wastes, and the promotion of health and hygiene practices in the country. The policy resolves to meet the Millennium Development Goals (MDGs) and targets whereby, the proportion of people without sustainable access to improved sanitation will be reduced by half in 2015, and 100% of the population will be served in 2025.

Byelaws on sanitation related issues will be developed by provincial governments and implemented by the Tehsil Municipal Administrations (TMAs) and development authorities for developing sanitation systems including sewage and wastewater treatment facilities for housing and other development schemes in the private sector. The proportionate costs of appropriate sanitation system developed will be charged from the developers by the local governments.

The overall sanitation plans will be developed for all urban settlements by their respective city governments, development authorities and TMAs in coordination with all other relevant agencies involved in sanitation. All TMAs and/or city district governments will develop appropriate municipal and industrial waste water treatment facilities and landfill sites for the disposal of solid waste.

Relevant government agencies will initiate research and pilot projects for developing sustainable models for the safe disposal of liquid, solid, municipal, industrial, and agricultural wastes. Provincial governments will ensure that city governments and TMAs follow the Hospital Waste Management Rules 2005 of the Ministry of Environment and the provisions of the Basel Convention on Management of Hazardous Wastes and their Disposal. The sanitation policy and local plans at the city and district levels will be reviewed periodically preferably every five years.

The relevant federal, provincial, and local government agencies including relevant research organizations will ensure the development of water efficient sanitation systems and technologies by developing guidelines and designs for private and public sanitation related manufacturing industries. The federal, provincial, and local government agencies will promote, through electronic and print media, awareness in the masses on sanitation related issues and mitigation measures. All relevant ministries, provincial, and local government departments/agencies, will develop educational programs and also devise plans, programs and projects to implement the policy provisions. The policy proposes to give rewards to all “open defecation free” *tehsils*/towns; to *tehsils*/towns achieving 100% sanitation coverage; and to the “cleanest *tehsil*/town” as well as rewards for the “cleanest industrial estate/cluster”.

The policy will be implemented by the federal government and local government agencies in accordance with the guidelines, principles, and measures mentioned in the policy. In order to ensure effective coordination of policy implementation and to oversee the progress, a national sanitation policy implementation committee comprising representatives from the public and private sectors as well as from civil society organizations will be established at the federal level. Similarly, all relevant provincial governments will also establish special groups to coordinate and monitor the implementation of the policy.

5) Environmental Guidelines of the Pakistan Environmental Protection Agency (EPA)

Environmental guidelines to facilitate environmental assessment studies have been developed under the statutory cover of the Pakistan Environmental Protection Act, 1997. The following guidelines have been developed through a consultative process:

- Guidelines for the preparation and review of environmental reports,
- Guidelines for public consultations,
- Guidelines for sensitive and critical areas, and
- Sectoral guidelines.

(2) International Environmental and Social Guidelines

1) JICA Guidelines for Environmental and Social Considerations

➢ Policy

Japan's ODA Charter states that in formulating and implementing assistance policies, Japan will take steps to assure fairness. This will be achieved by giving consideration to the conditions of the socially vulnerable and the gap between the rich and the poor, as well as the gaps among various regions in developing countries. Furthermore, when implementing ODA, great attention will be paid to factors such as environmental and social impacts on developing countries. JICA, which is responsible for ODA, plays a key role in contributing to sustainable development in developing countries. The inclusion of environmental and social costs in development costs and the social and institutional framework that makes such inclusion possible are crucial for sustainable development. Internalization and an institutional framework are requirements for measures regarding environmental and social considerations, and JICA is required to have suitable consideration for environmental and social impacts.

Democratic decision making is indispensable for environmental and social considerations. It is important to ensure stakeholder participation, information transparency, accountability, and efficiency, in addition to respect for human rights, in order to conduct an appropriate decision making process. In this context, with respect to human rights and in view of the principles of democratic governance, the measures for environmental and social considerations are implemented by ensuring a wide range of meaningful stakeholder participation and transparency of decision making, as well as by working for information disclosure and ensuring efficiency. Governments bear the responsibility of accountability, but at the same time stakeholders are responsible for their comments. Owing to the issues discussed above, JICA always considers the environmental and social impacts when implementing cooperation projects.

➢ Objectives

The objectives of the guidelines are to encourage project proponents to have appropriate consideration on environmental and social impacts, as well as to ensure that JICA's support for examination of environmental and social considerations are conducted accordingly. The guidelines outline JICA's responsibilities and procedures, along with its requirements for project proponents in order to facilitate the achievement of these objectives. In doing so, JICA strives to ensure transparency, predictability, and accountability in its support for examination of environmental and social considerations.

➢ Basic Principles Regarding Environmental and Social Considerations

While the project proponents bear the ultimate responsibility for environmental and social considerations of projects, JICA supports and examines appropriate environmental and social considerations undertaken by project proponents to avoid or minimize the development project's

impacts on the environment and local communities, and to prevent the occurrence of unacceptable adverse impacts. JICA thus, promotes sustainable development in developing countries.

In these guidelines, JICA has created clear requirements regarding environmental and social considerations, which project proponents must meet. JICA provides project proponents, with support in order to facilitate the achievement of these requirements through the preparation and implementation of cooperation projects. JICA examines undertakings by project proponents, in accordance with the requirements, and makes adequate decisions regarding environmental and social considerations on the basis of examination results.

JICA recognizes the importance of the following seven principles:

- A wide range of impacts must be addressed. The types of impacts addressed by JICA cover a wide range of environmental and social issues.
- Measures for environmental and social considerations must be implemented from an early stage to the monitoring stage. JICA applies a strategic environmental assessment (SEA) when conducting master plan studies, etc., and encourages project proponents to ensure environmental and social considerations from an early stage to the monitoring stage.
- JICA is responsible for accountability when implementing cooperation projects. JICA ensures accountability and transparency when implementing cooperation projects.
- JICA asks stakeholders for their participation. JICA incorporates stakeholder opinions into decision making processes regarding environmental and social considerations by ensuring the meaningful participation of stakeholders in order to have consideration for environmental and social factors and to reach a consensus accordingly. JICA replies to stakeholders' questions. Stakeholders who participate in meetings are responsible for what they say.
- JICA discloses information. JICA itself discloses information on environmental and social considerations in collaboration with project proponents in order to ensure accountability and to promote the participation of various stakeholders.
- JICA enhances organizational capacity. JICA makes efforts to enhance the comprehensive capacity of organizations and operations in order for project proponents to give consideration to environmental and social factors, appropriately and effectively, at all times.
- JICA makes serious attempts at promptness. JICA addresses request of acceleration for the prompt implementation of projects while undertaking environmental and social considerations.

➢ <u>Process of Environmental and Social Considerations</u>

- Information Disclosure
- Categorization
- Impacts to be Assessed
- Consultation with Local Stakeholders
- Concern about Social Environment and Human Rights
- Laws, Regulations and Standards of Reference

2) World Bank Guidelines on the Environment

The major World Bank publications containing environmental guidelines are listed below.

- Environmental Assessment-Operational Policy 4.01. Washington, DC, USA. World Bank 1999.
- Environmental Assessment Sourcebook, Volume I: Policies, Procedures, and Cross-Sectoral Issues. World Bank Technical Paper Number 139, Environment Department, the World Bank,

1991.

- Pollution Prevention and Abatement Handbook: Towards Cleaner Production, Environment Department, the World Bank, United Nations Industrial Development Organization and the United Nations Environment Program, 1998.
- Environmental Health and Safety (EHS) Guidelines, International Finance Corporation (IFC) World Bank Group, 2007.

The first two publications listed above provide general guidelines for the conduct of an initial environmental examination (IEE), and address the IEE practitioners themselves as well as project designers. While the sourcebook in particular has been designed based on the World Bank projects, and is especially relevant for the impact assessment of large-scale infrastructure projects, it contains a wealth of information which is useful to environmentalists and project proponents.

The sourcebook identifies a number of areas of concern, which should be addressed during impact assessment. It sets out guidelines for the determination of impacts, provides a checklist of tools to identify possible biodiversity issues, and suggests possible mitigation measures. Possible development project impacts on wild lands, wetlands, forests, etc., are also identified and mitigation measures suggested. The sourcebook also highlights concerns in social impact assessment, and emphasizes the need to incorporate socioeconomic issues in EIA exercises.

The EHS guidelines published by IFC are technical reference documents that address IFC's expectations regarding the industrial pollution management performance of its projects. They are designed to assist managers and decision makers with relevant industry background and technical information. This information supports actions aimed at avoiding, minimizing, and controlling EHS impacts during the construction, operation, and decommissioning phases of a project or facility. The World Bank's guidelines on noise levels are provided in **Table 2.4.1** below.

Table 2.4.1 The World Bank's Guidelines on Noise Levels [a]

No.	Receptor	Day (07:00 – 22:00)	Night (22:00 – 07:00)
1	Residential, institutional, and educational	55	45
2	Industrial and commercial	70	70

Note: a: Maximum allowable log equivalent (hourly measurements) in dB (A)

Source: Pollution Prevention and Abatement Handbook World Bank Group (1998)

(3) National Environmental Legislation

1) Pakistan Environmental Protection Act 1997

The Pakistan Environmental Protection Act 1997 (PEPA 1997) is the basic legislative tool empowering the government to frame regulations for the protection of the environment. PEPA 1997 is broadly applicable to air, water, soil, marine, and noise pollution. Penalties have been prescribed for those violating the provisions of the act. Under the provisions of the act, federal and provincial EPAs have been formed which ensure enforcement of the act in their respective areas of jurisdiction.

The two primary deliberations of the act are the conduct of projects only after approval of environmental assessments from the relevant EPA and adherence with National Environmental Quality Standards (NEQS).

Under Section 12 of PEPA 1997, no project involving construction activities or any change in the physical environment can be taken unless an IEE or EIA, as required, is conducted and a report submitted to the federal or provincial EPA.

2) Sindh Local Government Ordinance

- Under the devolution program, the local government structure was introduced in the province through the PLGO 2001 on August 14, 2001. The new local governments include Zila Councils, District Governments (city district governments in the four provincial capitals), Tehsil Councils, TMAs, Union Councils and Union Administrations.
- The PLGO 2001 provides clear functional jurisdiction for different local governments.
- According to the functions specified in Section 40, the Zila Council in a city district shall approve plans having appropriate environmental controls and ecological balance. It will review implementation of rules and byelaws governing the environment and also review the development of an integrated system of water reservoirs, water sources, treatment plants, drainage, liquid and solid waste disposal facilities, and sanitation and other municipal services.
- According to Clause 53, the Tehsil Officer (Infrastructure and Services) shall be responsible for water, sewerage, drainage, sanitation, roads, other than provincial and district roads, streets and street lighting; firefighting, park services.
- According to the functions specified in Section 54, the functions and powers of the Tehsil Municipal Administration shall be to provide, manage, operate, maintain, and improve the municipal infrastructure and services, including water supply and control, and development of water sources; sewerage, sewage and sewage treatment and disposal; stormwater drainage; sanitation and solid waste collection and sanitary disposal of solid and liquid wastes.
- According to Clause 80, Union Nazim shall report to the concerned authorities with respect to environmental and health hazards within the area of the union.
- Depending upon the economies of scale and nature of infrastructure, the City District Government may vary grouping of offices and set up district municipal offices for integrated development and management of the services like environmental control, including control of air, water, and soil pollution in accordance with federal and provincial laws and standards.
- In the sixth schedule (see Section 195), Clause 48 in page 156 exclusively authorizes local governments to work for environmental protection.

3) Antiquities Act of 1975

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

4) Pakistan Penal Code (1860)

The Pakistan Penal Code (1860) authorizes fines, imprisonment or both for voluntary corruption or fouling of public springs or reservoirs so as to make them less fit for ordinary use.

5) Karachi Building and Town Planning Regulations 2002

These regulations shall supersede the Karachi Building and Town Planning Regulation, 1979. These regulations shall apply to the whole city district of Karachi but not applicable to the cantonment area of the projects for national security declared by the federal government. In order to meet emergency conditions and regulations of persons with sub-economic income, the government may declare special areas where these regulations may be relaxed for a specific period. Under these regulations there are important information related to design and operation of a project.

➢ Sanitation and Solid Waste

- In case a recycling plant or treatment of effluent/sewage is provided, all requirements for construction and maintenance as set by NEQS shall be followed.
- In all public projects, the central waste disposal system shall be provided by the developer.
- Where no public sewer is in existence, all sewage shall be disposed after properly treating, through a digester or septic tank, and effluent shall be discharged safely into a soak pit as a temporary measure until such time a system is set up.
- Ventilating pipes shall be provided in all stacks carrying wastewater or sewage, in accordance with the plumbing code.
- At every change of alignment, gradient or diameter of a drain, there shall be a manhole or inspection chamber. Bends and junctions in the drains shall be grouped together in manholes as far as possible.
- The roofs of every building and the floor or balconies abutting on a street or constructed over a street, shall be so constructed or framed as to permit effectual drainage of the rain water there from, by means of a sufficient number of leaders of adequate sizes, so arranged, jointed, and tied as to ensure that the rain water is carried away from the building without causing dampness in any parts of the walls, or foundations of the walls, or foundations of the building, or those of an adjacent building, provided the fall is not greater than 20 ft (6 m) in case of spouts.
- A leader spout shall not discharge into or connect with any soil pipe or its ventilating pipe, or any waste pipe or its ventilating pipe, nor shall it discharge into a sewer.
- Rain water from leader spouts, etc. shall not discharge onto a public street at a height greater than l2 in (300 mm) from that street, or onto a neighboring property.

➢ Temporary Works in Connection with Building Operations

- No part of any street shall be used in connection with the construction, repair, or demolition of any building except with the written permission of the concerned authority. Any person holding such permission shall put up and maintain to the satisfaction of the concerned authority, fences or barriers in order to separate the building work from such street. Where such separation is not possible he shall make arrangement for the security of public to the satisfaction of the concerned authority.
- Any person causing any building materials or other things to be deposited, any excavation to be made, or any hoarding to be erected shall at his own expense cause sufficient and adequate red lights to be fixed upon or near the same and shall continue such lights every night from sunset to sunrise while such materials, hoardings, things, or excavation remain. In addition to above, red flags of reflective material shall be provided during daytime.
- Any excavation has to be sufficiently fenced until it is filled up.
- All material, hoarding, fences, or other obstructions on any street shall be kept clear of any fire hydrants, if any, and other utility service installations, or alternative arrangements shall be made and precautions shall be taken according to the laid down procedure of the utility agencies and to the satisfaction of the concerned authority in order to divert or keep clear of obstruction of any roadside or other drain during the period of temporary obstruction.
- All obstructions shall be removed within seven days of completion of the work and the street and all drains and public utility installations shall be left in clean, tidy, and serviceable conditions.
- No excavation or dewatering or earthwork or demolition of a building, which is likely to affect the stability of any adjacent building, shall be started or continued unless necessary steps have been taken before and during the work to prevent the collapse/damage of any adjacent building or the collapse of any part of it.

- Adequate safety measures shall, where necessary, be provided and used to protect any person from falling. Conversely, any material shall not be placed or stocked near the edge of any excavation so as to endanger persons working below.
- No load shall be placed or moved near the edge of any excavation, where it is likely to cause a collapse of the side of the excavation and/or endanger any person.

(4) National Environmental Standards

1) NEQS 1993

NEQS were first promulgated in 1993 and were last revised in 2000. These are the basic guidelines for liquid effluent and gaseous emissions of municipal and industrial origin to comply with. These standards present the maximum allowable concentration for liquid effluent before its discharge into the sea, inland water, and sewage (total of 32 parameters to comply with), and gaseous emissions in the ambient air from industrial sources (total of 16 parameters to comply with).

2) NEQS for Ambient Air and Noise

NEQS for noise and ambient air have been drafted by the Pakistan EPA. These NEQS have been provided to be followed by the proponent in order to maintain health and safety conditions at their place.

Table 2.4.2 NEQS for Motor Vehicle Exhaust and Noise

S.No.	Parameter	Standard	Measuring Method
1	Smoke	40% or 2 on the Ringelmann scale during engine acceleration mode	To be compared with Ringelmann Chart at a distance of 6 m or more
2	Carbon Monoxide	New vehicles: 4.5% Used vehicles [a]: 6%	Under idling conditions, nondispersive infrared detection through gas analyzer
3	Noise	85 dB (A)	Sound level meter at 7.5 m from distance

Note: a; 10 years or older

Source: Environmental Protection Agency (EPA)

(5) EIA Decision Making and Approval Process

1) Introduction

The EIA process in Pakistan is critically examined in this chapter with particular focus on decision making. It is based on document analysis, secondary data from a number of EIA reports, and information obtained through semi-structured interviews with government officials and experts. These included concerned officials of the federal and provincial EPAs in the country, line departments/agencies, proponents, EIA consultants, and experts from various backgrounds. The first and second sections provide a brief account of the legislative provisions, guidelines, and administrative setup for EIA.

Major steps of the decision making and approval process are presented in the third section. Lastly, the overall weaknesses and opportunities regarding the EIA system in Pakistan are summarized. This chapter is also published in the form of a research paper in an international journal (see Nadeem and Hameed, 2008).

2) Legal Provisions for EIA

EIA was first introduced in the country by promulgation of Pakistan Environmental Protection Ordinance (PEPO) 1983 (GOP, 1983). The ordinance required that every proponent shall file a

detailed environmental impact statement at the time of planning the project, which was likely to cause adverse effects on the environment. However, being an ordinance, it was later on repealed and PEPA 1997 was enforced (GOP, 1997). This act was prepared after consulting stakeholders including industrialists, NGOs and even the general public by holding seminars and workshops.

Section 12 of PEPA 1997 states that project proponents, whether belonging to the public or private sectors, are required to prepare an IEE. The IEE mainly includes preliminary environmental review in order to determine if the proposed project may lead to adverse environmental and socioeconomic impacts and thus needs to undergo an EIA. The EIA is required to be submitted to the concerned EPA prior to start of construction work. However, there is no legal requirement for SEA of policies, plans and programs in the country until now. The act also contains provisions for imposing fines in case of non-compliance of Section 12, other specified clauses in the act, and any of the subsequent rules and regulations. The fine may extend up to Rs1 million or US$11,905 (US$1 = Rs94), with an additional fine extendable up to Rs100,000 (US$1,190) per day as the contravention continues. Such amounts of fines are much higher as compared to fines of similar violations in other countries. Under this act, the concerned EPA is bound to a make decision about the fate of EIA within a period of four months. If no decision or objection is communicated within the specified time period, an application is deemed approved up to the extent that it does not contravene with the provisions of the act. Section 22 provides for appeal against any order by the federal or provincial EPA under any provision of the act, to the environmental protection tribunal within 30 days after the date of the order. The environmental protection tribunals are the 'final fact finding authority' with regards to cases and issues pertaining to the environment as a whole (GOP, 2006). For this purpose, four tribunals were created in all the provinces of the country each headed by a chairperson with two technical members and one legal member (GOP, 2006). But unfortunately, most of these tribunals remain non-functional because there are no members appointed (GOP, 2006). In order to facilitate project proponents and the implementing agencies, the Pakistan environmental assessment package was also formulated during 1997 (GOP, 1997d). The package includes guidelines for the following:

- Preparation and review of environmental reports,
- Public consultation,
- Sensitive and critical areas, and
- Specific developmental sectors, such as major roads, industrial estates, oil and gas exploration, etc.

The package also includes sectoral guidelines for seven important types of mega development projects, such as industrial estates and major roads. But unfortunately, these guidelines are not fully practiced, as availability alone is not sufficient to ensure good practice, other things are also needed in the system (Fuller, 1999). Although the guidelines are primarily based on the guidelines of the Asian Development Bank and the World Bank, the official stance is that these have been formulated according to local circumstances.

Late in 2000, regulations on the review of IEE/EIA were promulgated. These contained mandatory requirements and procedures for public hearing, review of environmental assessment reports along with provisions for monitoring (GOP, 2000). It is important to note that the guidelines as well as regulations for EIA are very detailed and quite comprehensive in nature as compared with similar guidelines and regulations in other countries such as Sri Lanka, India, Bangladesh, and Egypt (Zubair, 2001; Paliwal, 2006; Momtaz, 2002; Ahmad and Wood, 2002).

3) EIA Administration

In Pakistan, separate ministries of environment have been created both at federal and provincial levels. The Prime Minister of the country chairs the PEPC at the federal level. This council consists of 40 members out of which at least 20 should be non-official members representing various sectors of the community. The council has been established with the view of approving and ensuring implementation of national environmental policies, NEQS, etc.

The primary responsibility of the EIA process in the country is vested in the Pak-EPA at the federal level and provincial EPAs at the provincial level. It may be noted that the federal EPA works under the administrative control of the Ministry of Climate Change. Some of provincial EPAs are under the administrative control of their respective environment protection departments or under other ministries.

Below indicates the jurisdiction of EPAs at the federal and provincial levels. The four provincial agencies (Punjab-EPA, Sindh-EPA, NWFP-EPA, and Baluchistan-EPA) were created in various years starting from 1987. The Pak-EPA delegated powers to the provincial EPAs for implementing the requirements of EIA and other provisions of PEPA 1997. Like Pak-EPA, every provincial EPA has separate directorates of EIA which is responsible for processing the EIA of both private and public sector development projects.

At the federal level, the Pak-EPA is the competent authority (with other responsibilities as well) to process the EIAs of all the projects in federal area including military projects, and projects with trans-country and trans-province impacts. However, the responsibility of processing IEE of public sector projects is vested in the Planning and Development Department (P&DD) of the federal government. The same jurisdictions of responsibilities also exist at the provincial level with the exception of military projects possibly having trans-country impacts. It is also important to mention here that the responsibility of processing EIAs also include post decision implementation and monitoring.

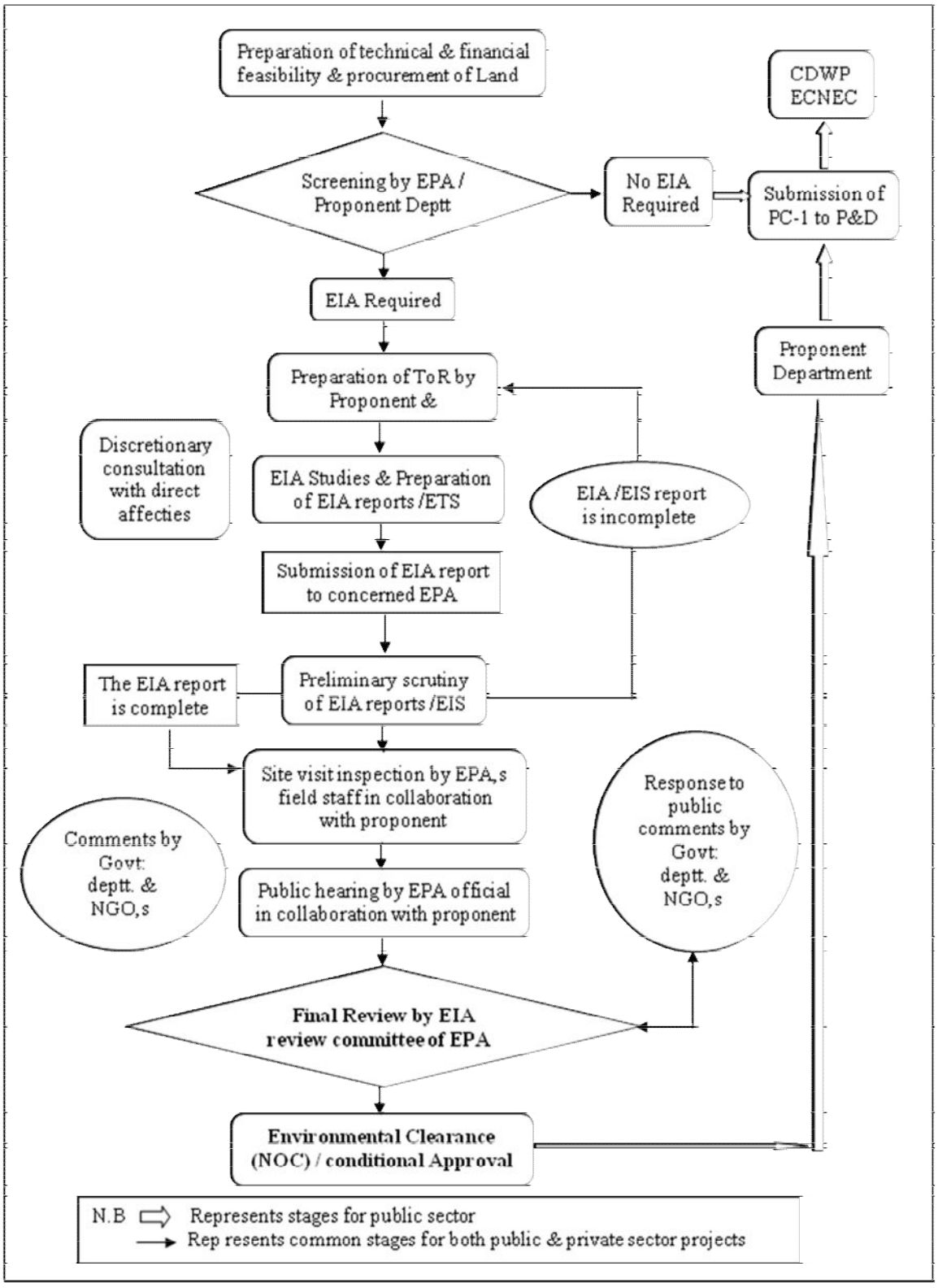
4) EIA Decision Making and Approval Process

An outline of the EIA decision making and approval process in Pakistan is shown in **Figure 2.4.1** below. For public works, the responsibility of IEE management and review as well as granting or refusing environmental approval, is vested in the P&DDs at the federal and provincial levels. The P&DDs are also responsible for economic and development planning. If an EIA is required of a public sector development project, then a consultant is appointed and EIA is submitted to EPA for issuance of no objection certificate (NOC). For private projects, after screening by the concerned EPA, the proponent, if so required, is directed to submit an EIA.

Whilst it is mandatory under Section 12 of PEPA 1997 to submit either an IEE or EIA prior to commencement of construction, in practice, EIA is undertaken as a result of repeated requests by the concerned EPA after the start of construction work. This usually occurs during public sector development initiatives and even in some private projects. The very reason behind the preparation and approval of EIA after the initiation of public sector projects is the role of P&DDs in screening and "political pressure to expedient EIA clearances" (World Bank, 2006, p. 35). Due to such reasons, EIA reports are sometimes submitted to the P&DD for economic approval of projects before seeking EIA clearance from the concerned EPA.

On the other hand, the Executive Committee of National Economic Council (ECNEC) of GOP on July 27, 2004 decided that "In case of development projects [public sector] having environmental implications, an environmental impact assessment (EIA) report should invariably be submitted along with the project document at the time of getting approval" (GOP, 2004).

During the year after the above quoted decision, ECNEC approved several projects, most of which were subjected to EIA. But the EIA reports were not approved by the concerned EPA prior to ECNEC's economic sanctioning of projects. Coordination of the EIA procedure and the project cycle has also been said to be weak in other Asian countries (Werner, 1992).



Source: Environmental Protection Agency (EPA)

Figure 2.4.1 Approval Process for EIA of Private and Public Sector Development Projects in Pakistan

(6) Project Screening and Scoping

Many projects are considered by public and private agencies each year. Development projects have biophysical as well as social and economic impacts. Sufficient understanding of these factors are necessary for the initial screening decision. It is therefore important to establish mechanisms by identifying projects which requires EIA, and this process of selection of project is referred to as

"Screening".

1) Criteria For Classification of EIA

- JBIC and JICA

a. Nature of the Guidelines

The objective of environmental consideration in development assistance is to assist the self-help efforts of developing countries directed towards attaining sustainable development. The responsibility with regard to environmental consideration of a project rests ultimately with the recipient country. At the time of its appraisal of a project, on the basis of materials provided by the recipient country, JBIC confirms that the requisite countermeasures, etc. will be taken by the recipient country with regard to the environmental issues, in accordance with each of the items listed in II Check Items and Comments. The guidelines provide guiding principles related to environmental consideration by JBIC in its appraisal of a project. They also specify the environmental matters to be considered and environmental measures to be prepared by the recipient country in the planning and preparation stages of a project.

b. Classification of Projects

At the time of their appraisal of the projects by JBIC, projects are classified into the following three categories:

Category A: Submission of EIA report is required. The project is then appraised according to the guidelines.

Category B: Although submission of an EIA report is not required, the project is to be appraised according to the guidelines.

Category C: Submission of an EIA report is not required, and appraisal according to the guidelines may be omitted.

- IFC / The World Bank

The World Bank requires EIA of projects proposed for bank financing, and imposes on the borrower of all bank financed projects the responsibility to undertake an EIA. Proposed projects are screened, and then categorized into one of the following categories based on the level of potential environmental risks associated with the project:

Category A:

Category A projects may involve significant, cumulative or even potentially irreversible negative environmental impacts or risks. Typically, such projects may include planned interventions that may change existing land and/or water uses, open up new lands, disturb natural habitat needed for maintaining biodiversity, involve significant expansion of industry, introduce water impoundment schemes, promote the use of agrochemicals, or require the acquisition of land and/or resettlement of local populations.

The significant negative effects may extend to the social arena and beyond the boundaries of the project site. Such projects automatically require an EIA so as to ensure that the negative impacts are properly analyzed and that stakeholders are consulted.

Category B:

Category B projects should not entail significant (or potentially irreversible) negative environmental (and associated social) impacts, but may still have adverse effects which can be mitigated with suitable preventive actions. Category B projects do not require a full EIA but will require further deepening of environmental or social considerations, depending on the expected magnitude of risks.

Category C

Category C projects should have minimal or no potential negative environmental (or social) impacts, either individually or cumulatively. They should not be controversial in terms of the interests of key stakeholders.

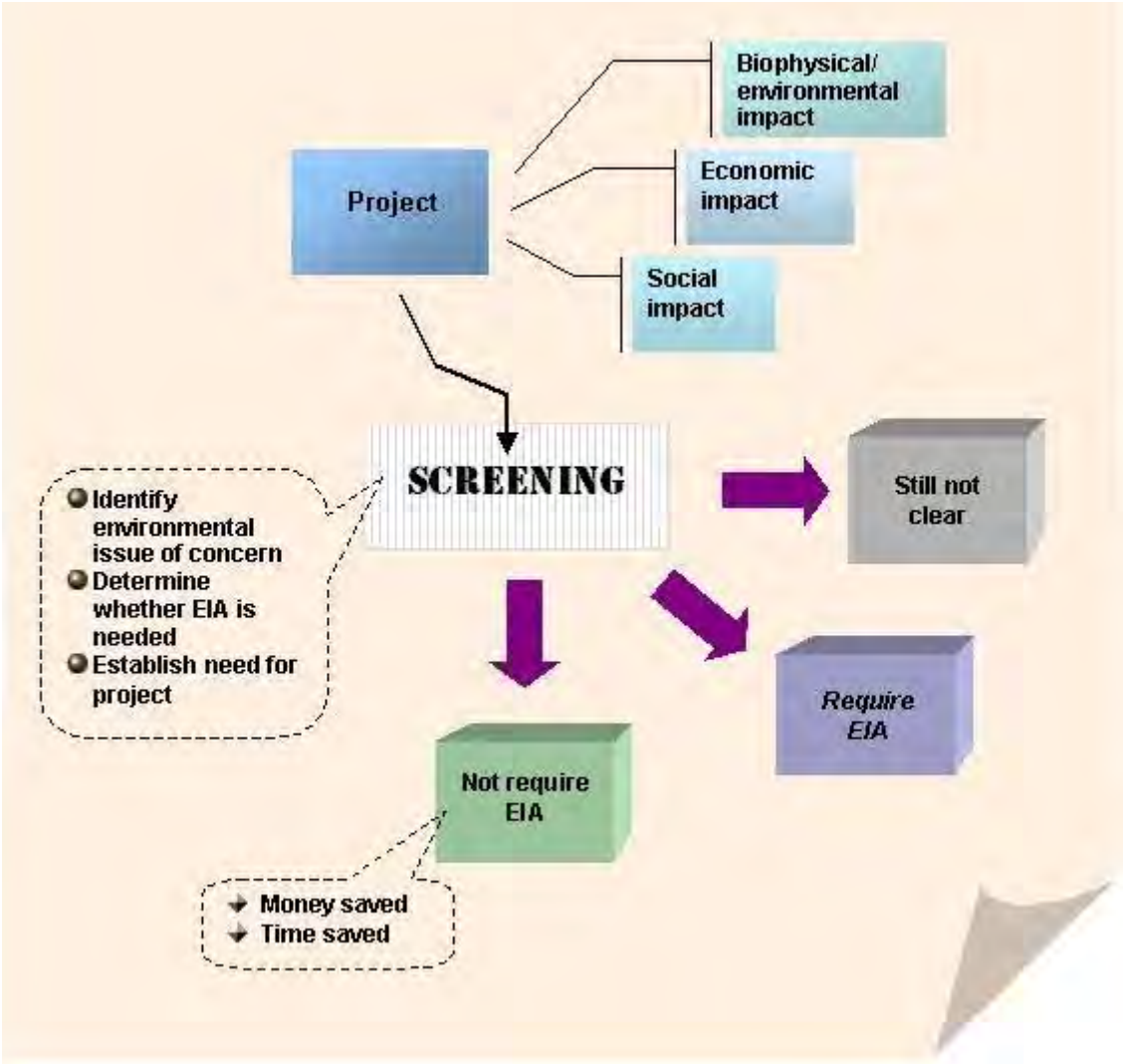
- Pakistan EPA

It is clarified that contrary to the international practice of categorizing projects as A, B or C at the time of review, a different procedure is adopted in Pakistan. According to the "Pak-EPA (Review of IEE & EIA) Regulations 2000", each project proponent is required to initiate an IEE or EIA as per the conditions laid out in Schedule I and Schedule II, and EPA do not categorize it at the time of review.

Table 2.4.3 Environmental Category by the Pak-EPA

Schedule I	List of projects requiring an IEE	Federal or provincial highways with total of cost less than Rs50 million.
Schedule II	List of projects requiring an EIA	Federal or provincial highways or major roads with total cost of Rs50 million or more

Source: Pak-EPA Regulations 2000



Source: JICA Study Team

Figure2.4.2 Project Screening Process

The screening process divides project proposals according to the following three categories:

- Project clearly requiring an EIA,
- Project not requiring an EIA, and
- Project for which the need of application of an EIA is not clear.

2) Screening Criteria for Projects Requiring EIA

To further assist in the initial screening decision, development projects can be divided into two general categories, as shown in **Table 2.4.3**.

Table 2.4.3 Screening Criteria for Requiring EIA

Threshold Criteria	Impact Criteria
Size	Significant but easily identifiable impact
Location	Significant criteria
Output	Sensitive area
Cost/Finance	
Environmental Effects	
Etc.	

Source: Environmental Protection Agency (EPA)

a. Threshold Criteria

This method of screening establishes the thresholds for key features of a project, or an environmental parameter which exceeded the thresholds, would require an EIA. Such thresholds can range from environmental factors such as the size of agricultural land used for a development project, location, cost, outputs, infrastructure demands, national standards for air, water and noise.

Note: *** *The application of financial threshold criteria sometimes becomes misleading since small-scale projects with low financial investment may have significant environmental impacts. Alternatively, projects exceeding the financial threshold may not produce any significant impacts. Therefore, relying solely upon financial threshold may result in incorrect decisions. It is therefore recommended that such thresholds criteria be utilized in conjunction with other screening criteria.*

b. Impact Criteria

These impacts are divided into the following three general categories, reflecting various degrees of potential impact on the environment, and determined on the basis of past experience with similar forms of development:

- Proposal likely to have significant but easily identifiable adverse impacts on the environment and for which mitigation measures can be readily prescribed. Such a project requires an IEE report.
- Proposals which are likely to have significant adverse impact on the environment require an EIA report.
- Proposals of project which are proposed to be located within or near environmentally sensitive areas are required to prepare an EIA report.

For the purpose of environmental screening, the Pak-EPA has divided development projects into two schedules (GOP, 2000). Schedule I requires an IEE for projects in the major categories of transport infrastructure, processing industries, agriculture, livestock and fisheries, energy, water management (dams), water supply treatment, waste disposal and urban development. Schedule II requires an EIA for projects of almost similar types as indicated in Schedule I, excluding agriculture, livestock and fisheries. The basis for deciding whether an IEE or EIA would be required is the cost of the project as well as its size. For instance, a highway project with a total cost of less than Rs50 million or US$0.595 million (US$1 = Rs84) requires an IEE, while a highway project above this cost requires an EIA. Also, a hydropower generation project is required to undertake an IEE it is less than 50 MW capacity, or an EIA if it is above the said capacity (GOP, 2000).

After initiation of a project by a proponent, the decision whether an EIA is required or not is made by the concerned EPA in case of private sector projects, and by the P&DD or sometimes by the proponent department/agency in case of public sector projects. EPAs generally require that every project whether included in Schedules I or II should undergo an IEE. Proponents of the projects not falling in both the schedules are required to give an undertaking that the guidelines and NEQS shall be fully complied with. Concerned EPAs, however, reserve the right to direct the proponent of a project to file an IEE or EIA, whether or not included in the schedules.

The guidelines suggested that the screening schedules shall be revised periodically. Interviews of academics, consultants, and officials of concerned government departments/agencies also revealed that there was an urgent need to review the schedules, but no progress has been made to this end. For instance, oil and gas extraction and large housing schemes included in the list of projects requiring an IEE should have gone through the EIA process. This creates difficulty for the EPA officials to convince the proponents, particularly of public sector projects, for undertaking EIA studies just on the basis of Sub-regulation (2) of Regulation 5 of the IEE/EIA Regulations 2000. Sub-regulation (2) gives the Pak-EPA the authority to require an EIA for any project which is not included in Schedule II.

3) Scoping

The sectoral guidelines for preparing EIA of projects under various development sectors, such as major roads and industrial estates, have been prepared to decide the issues to be included in the EIA studies (GOP, 1997d). The responsible EPA provides a typical list of steps for scoping and directs the proponents (if it contacts before conducting EIA) for thorough discussions with key stakeholders, assembling available information from concerned departments and agencies, consulting with possible affected people, considering alternatives, and identifying information gaps.

Despite suggesting the role of stakeholders in the scoping process, the guidelines put the responsibility of formulating the terms of reference on the proponents. Nevertheless, they rarely involve stakeholders during scoping. Hence, the areas of concerns of affected people and concerned government department are not truly reflected in the EIA report.

4) Review of EIA Reports

The EIA review stage helps to ensure that information on the environmental impacts of an action is adequate before it is used as a basis for decision making (Fuller, 1999). Clauses 9 and 10 of the IEE/EIA Regulations 2000 stipulate that the concerned EPA is responsible of informing the proponent about the adequacy of the EIA report or confirming its completeness within ten days of receipt. The EPA is legally bound to review the EIA report in a period of 90 days, once it confirms the adequacy of the report or admits it for this purpose.

The official EIA review criteria are more inclined towards a quantitative review rather than a qualitative one. According to the EIA guidelines (GOsP, 1997e), the review is normally undertaken by assessment officer(s) of a responsible EPA and then presented before an in-house committee which may include independent experts, if required. Interviews with EIA consultants suggested that, in practice, the review is always subjective in nature and depends primarily upon the personal judgment of the concerned officials and affiliations of the consultants.

5) Public Participation

Public participation or consultation in the form of public hearing is mandatory under Section 12 (3) of PEPA 1997 and Section 10 of IEE/EIA Regulations 2000 during the EIA review process in Pakistan. A separate module of guidelines for public consultation has been prepared by the Pak-EPA based on the World Bank's Participation Sourcebook, 1995. The guidelines suggest that project proponents should hold comprehensive discussions with the affected persons and adequately incorporate their genuine concerns in the project design and mitigation measures to avoid adverse

effects.

2.4.2 Regulation for ROW Acquisition and Social Consideration

(1) National Resettlement Policy

In Pakistan, a number of laws give and protect proprietary rights. Also, laws have been promulgated at different occasions for purposes such as urban and rural development, and for establishment of the authorities to implement their programs that include acquisition of private properties for development.

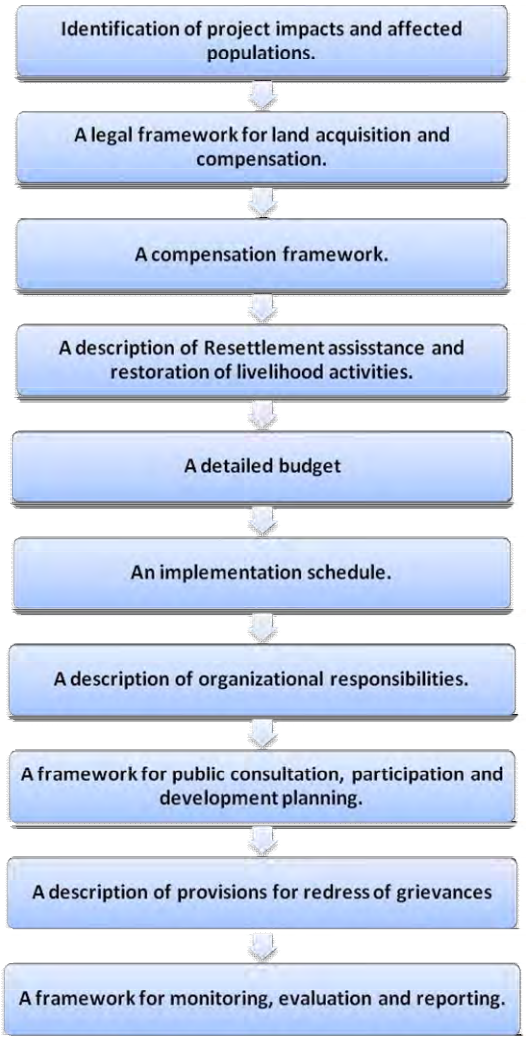
The Land Acquisition Act, 1894 (LAA) has been the most commonly used law for acquisition of land and other properties for development projects. Although it lays down detailed procedures for the acquisition of private properties for public purposes and their compensation, the LAA or any other law of the land, does not cover resettlement and rehabilitation of persons in a manner perceived today. In the absence of a resettlement policy, for development purposes and for those who are adversely affected, the LAA 1894 has been the de facto policy governing resettlement of and compensation to the project affected persons. Its provisions do not take into account the changed social, cultural, economic, and environmental landscape in which they operate. The LAA is scale neutral and does not differentiate between projects that have different development periods. Whereas, the compensation packages for projects differ with the source of funding. The budgetary priorities of federal and provincial governments tend to curtail provision of required funds thus, delaying timely payments of compensation and thereby delaying implementation of resettlement projects.

From an operational point of view, the LAA is a provincial law, and each province has its own version and interpretation of this law, mostly procedural in nature. These differences lead to different dispensations in compensation and resettlement packages for the project affected people. Provincial governments have also evolved mechanisms for calculation and payment of compensation, suited to their specific needs and socio-cultural contexts. The procedures for compensation, grievance redress, appeal periods, interest rate calculations, etc. that were so far adopted do not aggregate to a resettlement policy. Recourse is often taken to ad hoc arrangements, agreements, and understandings in difficult situations of resettlement. The experience of developments during the last century, which led to massive human suffering and dislocation in the name of development, have confirmed that people have to be at the center of all development processes. To achieve long-term social benefits in development projects, the people must be consulted, compensated for their losses, and assisted in rebuilding their lost assets and livelihoods to enjoy at least the same standard of living as they had before the project. Very often, affected people are poor and vulnerable, and therefore unable to either stand up to bureaucratic and political pressure or to absorb adverse impacts in their lives. They need significant help to restore their normal lives and reestablish their livelihoods. The mere payment of cash compensation under the LAA is not enough to restore livelihood and living standards.

The National Resettlement Policy has therefore been formulated not only to cover the affected persons (APs) in the existing systems but also to ensure an equitable and uniform treatment of resettlement issues all over Pakistan. This policy will apply to all development projects involving adverse social impacts, including land acquisition, loss of assets, income, business, etc. It has addressed those areas, which had not been looked after in the LAA, and will be applicable wherever the people, families, or communities are affected by any public sector or private development project, even when there is no displacement. The policy also aims to compensate the loss of income of those who suffer due to loss of communal property including common assets, productive assets, structures, other fixed assets, income and employment, loss of community networks and services, pasture, water rights, public infrastructure like mosques, shrines, schools, graveyards, etc.

The policy is supplemented with guidelines for planning and implementation of resettlement, which form an integral part of policy. Also, the government has put forward an enabling law, entitled “Project Implementation and Resettlement of Affected Persons Ordinance” (hereinafter referred to as “Resettlement Ordinance”), for enactment by the provincial and local governments after

incorporating the local requirements. The Resettlement Ordinance, although being a new law, shall not supersede other laws of Pakistan with regard to land acquisition and resettlement issues, and shall be supplementary to the LAA as well as the other laws.



Source: Handbook for preparing a RAP by Environment and Social Department, IFC (A member of the World Bank Group)

Figure 2.4.3 Flowchart of Resettlement Action Plan

a. Policy Objectives

The policy objectives, which are relevant to other policies and laws of GOP, include the following:

- Avoid or minimize adverse social impacts in a project wherever possible and where adverse impacts cannot be avoided, the mitigation measures and resettlement activities should be conceived and executed as development programs and the APs be provided the opportunity to share the project benefits.
- Project APs be provided with sufficient compensation and assistance for lost assets to assist them improve or at least restore their living standards, income or production capacity to pre-project levels.
- Provide a development opportunity to all vulnerable groups (including poverty groups, women headed households, refugees and those without security of tenure/usufruct rights, etc.). The vulnerable population should receive special assistance to bring them at least to minimum living standards at par with pre-project levels.
- All population adversely affected by the project should be entitled a share in the social and economic benefits, envisaged after completion of the project.

b. Transparency and Accountability

The policy will ensure full transparency and accountability in all resettlement activities. The key to both will be community participation and involvement of APs right from the project inception to completion of all resettlement activities, and subject to the satisfaction of the communities concerned. A resettlement action plan shall provide for an appropriate accountability mechanism, for ensuring due transparency, so that the APs can have accurate information about their rights and entitlements.

Similarly, the methodology for grievance redress and the institutional arrangement required shall also be shared widely with the affected population.

c. Compensation

All development projects including their resettlement components shall take into account the compensation aspect, and relevant principles would be incorporated in the resettlement action plans.

(2) Basis of Resettlement Compensation

The compensation for all APs in a project would be worked out on the basis of the following entitlements, forming part of the resettlement action plan and as per the category of impacts, to be decided at the stage of resettlement planning:

- Replacement value of the acquired land at the cutoff date of the project's notification.
- Damages sustained by the APs as caused by taking any standing crops or trees, which may be on the land at the time when such land has been acquired by the collector.
- Other damages (if any) sustained by the APs at the time when the collector acquired possession of the land, by reason of severing such land from his/her other land, or by reason of the acquisition injuriously affecting other property, movable or immovable, in any other manner, or the APs earning and/or other benefits including direct domestic consumption.
- If, in consequence to acquisition of land, the AP is compelled to change his residence or place of business, the reasonable expenses incidental to such change.
- Damages (if any) resulting from diminution of profits of land between the time of publication of the cutoff date or declaration under the LAA, and the time when such land has been acquired by the collector.
- For ensuring an equitable and fair approach towards the AP, the Resettlement Ordinance requires that all compensation and rehabilitation benefits should be given to the APs prior to commencement of any physical activity on ground. Regarding compensation in forms other than cash, such as land, houses etc., the project proponent would follow the resettlement action plan developed in agreement with the APs, separately for each project.
- The other forms of rehabilitation assistance given to affected businesses, trades, local privileges, etc. could include a host of other measures to help restore the incomes and standards of living of the APs.

a. Rehabilitation

Rehabilitation shall be considered an essential component of resettlement. It aims to assist APs who are severely affected due to loss of their productive assets, business, jobs, or other income sources. The severely APs are those whose productive assets and/or incomes are likely to be affected by more than 20% of their level as existed on the cutoff date. The severely APs are entitled to rehabilitation assistance over and above their entitlements for compensation of lost assets, as determined under the LAA. The project proponents shall take into account the links between relocation and economic rehabilitation activities, and accordingly the project scope should include resettling such APs productively on the land, as soon as possible. The project should enable the APs to share in the immediate benefits created by that very project, which has caused their displacement, such as availability of regular jobs, etc.

b. Relocation

Resettlement activities require relocation of some APs or the entire project affected community with the purpose of recreating living conditions at the new site/s.

Efforts should be made to reduce or minimize relocation as much as possible, by weighing alternative options for the main project, i.e., by changing the route of infrastructure such as roads/pipelines which cause the need for relocation. In order to foster socio-cultural interaction among the relocated APs and the host community of the new resettlement site, it is necessary that the project execution agency and some NGOs should arrange their participation at various development stages. Depending upon the scale of relocation involved, all the options will be considered and different relocation strategies would be reviewed by the project proponents, with consideration to socio-cultural and religious views.

The profiles of both the displaced persons and host communities shall also be necessary in developing the relocation sites, along with essential utilities, before any relocation activity takes place. The relocation sites should preferably be located within the same region.

(3) Institutional Framework

The compliance of Land Acquisition Act 1894 is exercised by provincial governments through respective revenue departments and land collectors. The resettlement as a consequence of development activity is not included in the list of provincial subjects. Resettlement therefore is a concurrent subject and both the federal and provincial governments can formulate the resettlement policy. Wherever the need for resettlement results from any interprovincial project, the federal government would be the appropriate authority for coordination and developing the package of entitlements, with consideration to the consent of relevant local administrations.

Present institutional arrangements are not conducive for undertaking effective resettlement operations. There are two types of resettlement institutions, i.e., government agencies and private/voluntary organizations such as NGOs. In case of public sector projects, both the sponsoring ministries/departments and EPAs will be responsible for resettlement policy implementation, in association with international agencies and local governments. Where considered necessary, the resettlement offices will be established at the municipal or district levels in order to regulate resettlement activities. For private sponsored projects, the NGOs, community based organizations (CBOs) and neighborhood/village organizations should play a key role in planning and implementation of resettlement activities. Whereas, the project proponents (both public and private) shall have responsibility for preparing and implementing the resettlement action plans and arranging budgetary allocation and disbursement of compensation and rehabilitation funds, through an appropriate mechanism.

1) Land Acquisition Act of 1984

The land acquisition in Pakistan is regulated by the LAA, and its successive amendments are the main law regulating land acquisition for public purpose. The LAA has been variously interpreted by local governments, and some provinces have augmented the LAA by issuing provincial legislations. The LAA and its implementation rules require that following an impact assessment/valuation effort, land and crops are compensated in cash at market rate to titled landowners and registered land tenants/users, respectively. The LAA mandates that land valuation is to be based on the latest three years average registered land sale rates, though, in several recent cases the median rate over the past year, or even the current rates, have been applied. Due to widespread land undervaluation by the Revenue Department, current market rates are now frequently used with an added 15% compulsory acquisition surcharge as provided in the LAA. Based on the LAA, only legal owners and tenants registered with the Land Revenue Department or possessing formal lease agreements are eligible for compensation or livelihood support. The rights of those without land titles are however addressed under the 1986 Punjab Jinnah Abadis for Non-proprietors in Rural Areas Act which recognize the right of informal settlers to receive rehabilitation in form of a replacement plot. It is to be noted that

this right has been sometimes extended in practice to include some form of rehabilitation in cash or in forms different from land. It is also noted that the LAA does not automatically mandate for specific rehabilitation/assistance provisions benefiting the poor, vulnerable groups, or severely affected households, nor it automatically provides rehabilitation of income/livelihood losses or resettlement.

2) Needs and Scope of a Resettlement Action Plan (RAP)

In guidelines for preparation of a RAP, it has been emphasized by IFC (member of the World Bank Group) to all sponsors of investment projects to avoid the disturbance and displacement of human populations. Where such disturbance is unavoidable, the project sponsor should minimize adverse effects on people and on the environment through judicious routing or siting of project facilities. The aim of the involuntary resettlement policy is to ensure that people who are physically or economically displaced as a result of a project end up no worse—and preferably, better off—than they were before the project was undertaken.

Resettlement is involuntary when it occurs without the informed consent of the displaced persons, or if they give their consent without having the power to refuse resettlement. A typical example of such displacement is a government agency's expropriation of land for a capital development project by eminent domain. People occupying or otherwise dependent on that land for their livelihoods may be given fair compensation for their losses. However, they have little recourse to oppose the government's expropriation regardless of their desire to continue occupying or using the affected land.

Displacement may be either physical or economic. Physical displacement is the actual physical relocation of people resulting in the loss of shelter, productive assets, or access to productive assets (such as land, water, and forests). Economic displacement results from an action that interrupts or eliminates people's access to productive assets without physically relocating the people themselves. IFC's policy applies in either situation. While land acquisition does not necessarily require the displacement of people occupying or using the land, it may have an effect on the living standards of people who depend on resources located in, on, or around that land. Similarly, the acquisition of water resources by a project may entail neither land acquisition nor physical relocation but may nonetheless have negative effects on the livelihoods of people living in the project area. For example, the diversion or impoundment of a river's flow for the generation of hydroelectric power may affect the livelihood of downstream farmers who rely on minimum flows for irrigating crops. A coastal power plant or factory using ocean water for cooling purposes may affect fish habitats, thereby affecting the livelihood of people who fish in the coastal waters.

The involuntary resettlement policy applies to all conditions of potential physical or economic displacement resulting from the acquisition or use of land for a project regardless of the total number of people affected or the significance/severity of anticipated impact. (*Source: Handbook for preparing a RAP by IFC)*

3) Comparison of Pakistan's Land Acquisition Act and JICA Guidelines on Involuntary Resettlement

The LAA with its amendments is normally used for acquiring land for public purposes. It has well laid out sections that need to be followed with given timelines for each of the sections. The LAA is also used as a basis for payment of compensation for trees, crops and assets located on the land that may be acquired temporarily. There are, however, some policy differences between the LAA and the JICA Guidelines on Involuntary Resettlement. The differences are described in **Table 2.4.4** below.

Table 2.4.4 Comparison of Pakistan's LAA and JICA Guidelines on Involuntary Resettlement

Pakistan's Land Acquisition Act, 1894	JICA Guidelines on Involuntary Resettlement
Land compensation only for titled landowners or holders of customary rights.	Land title should not be a restriction to compensation and/or rehabilitation.
Crop losses compensation provided only to registered	Crop losses compensation provided to landowners

Pakistan's Land Acquisition Act, 1894	JICA Guidelines on Involuntary Resettlement
landowners and sharecroppers or leasing tenants.	and sharecroppers or leasing tenants whether registered or not.
Land valuation to be based on the average of registered land sale rates in the last three years, though in several recent cases, the average rate over the past year or even the current rate has been applied. Since land undervaluation by the Revenue Department is a common practice, the current market rates (i.e., one year) are now frequently used with an added 15% compulsory acquisition surcharge as provided in the LAA.	Land valuation based on current market rate/replacement value.
The Land Acquisition Collector (LAC) is the only pre-litigation final authority to decide on disputes and address complaints regarding quantification and assessment of compensation for the affected assets.	Disputes, complaints and grievances are resolved informally through community participation in the Grievance Redress Committee (GRC), local governments, NGOs and/or local level CBOs.

Source: Environmental Protection Agency (EPA)

2.4.3 Organizational Framework for Environmental and Social Consideration

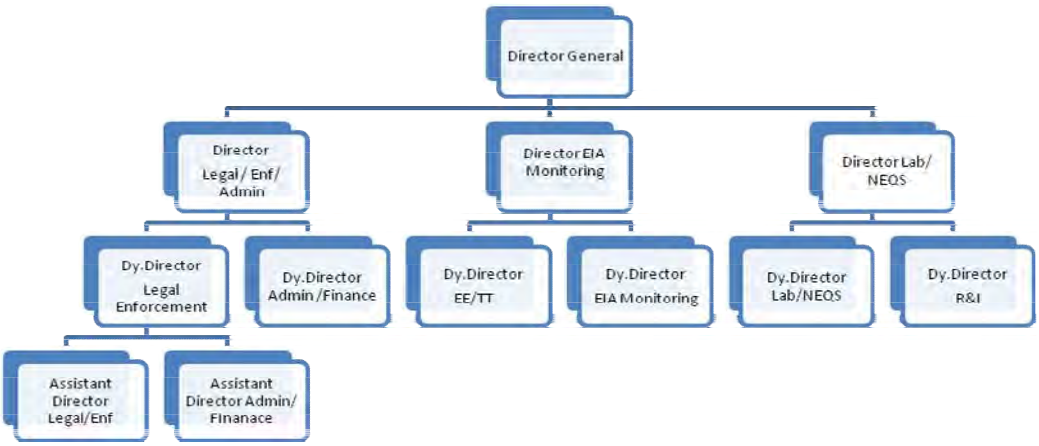
(1) Pakistan EPA

The prime organizations responsible for environmental and social considerations are Pak-EPA at the federal level and provincial EPAs at the provincial level. These organizations come under the Ministry of Climate Change (formerly known as the Ministry of Environment). It may be noted that the federal EPA works under the administrative control of the Ministry of Climate Change. Some of provincial EPAs are under the administrative control of their respective environment protection departments or under other ministries.

The four provincial agencies (Punjab-EPA, Sindh-EPA, NWFP-EPA, and Baluchistan-EPA) were created in various years starting from 1987. The Pak-EPA has delegated powers to the provincial EPAs for implementing the requirements of EIA and other provisions of PEPA 1997. Similar to the Pak-EPA, every provincial EPA has a separate directorate of EIA which is responsible for processing the EIA of both private and public sector development projects.

(2) Sindh-EPA

Provincial EPAs were created under the provision of Section 8 of PEPA 1997. The federal government has delegated its powers to provincial EPAs through respective provincial governments for implementation of the law, including enforcement of NEQS.



Source: Sindh-EPA

Figure 2.4.4 Present Organizational Structure

(3) Pakistan Environmental Protection Council (PEPC)

PEPC is an apex body of Pakistan's environmental institutional framework. It was first constituted in 1984 under Section 3 of the Pakistan Environmental Protection Ordinance (PEPO) of 1983, with the President of Pakistan as its chairman. PEPC was reconstituted after the enactment of a new law i.e., PEPA 1997. It is headed by the Prime Minister of Pakistan or his nominee. The Federal Ministry of Environment is the secretariat of PEPC. The council is represented by trade and industry, leading NGOs, educational institutions, subject experts and concerned ministries. Section 4 of the act describes the functions and powers of the council. PEPC makes important decisions with respect to environmental legislation, implementation and institutional framework. Functions of the council are to supervise enforcement of the provisions of the act, approve national environmental policies and standards, and provide guidelines for the protection and conservation of biodiversity and natural resources.

(4) Environmental Tribunal and Environmental Magistrate

Environmental tribunals have been established at the provincial levels under Section 20 of the act for trial of contraventions related with non-compliance of NEQS, violations of environmental assessment procedures, non-compliance with the provisions of the Environmental Protection Order (EPO) issues under Section 16 of the act, and import of hazardous wastes into Pakistan. Section 21 describes the functions and powers of the tribunal. Procedures for filing of appeals are mentioned in Sections 22 and 23. Any person aggrieved by the order of the Environmental Tribunal may file an appeal to the High Court within 30 days of communication of such order or sentence.

Judicial magistrates of first class have been empowered as environmental magistrates by the High Court under Section 24 of the act for trial of contraventions related with handling of hazardous substances and violations of NEQS in operations of motor vehicles. Any person convicted of any contravention by the Environmental Magistrate may file an appeal in the Court of Sessions within 30 days of the date of conviction.