The Islamic Republic of Pakistan
Karachi Metropolitan Corporation

PREPARATORY SURVEY REPORT ON THE PROJECT FOR CONSTRUCTION AND REHABILITATION OF NATIONAL HIGHWAY N-5 IN KARACHI CITY IN THE ISLAMIC REPUBLIC OF PAKISTAN

JANUARY 2017

JAPAN INTERNATIONAL COOPERATION AGENCY

INGÉROSEC CORPORATION
EIGHT-JAPAN ENGINEERING CONSULTANTS INC.

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PREFACE

Japan International Cooperation Agency (JICA) decided to conduct the preparatory survey and entrust the survey to the consortium of INGÉROSEC Corporation and Eight-Japan Engineering Consultants Inc.

The survey team held a series of discussions with the officials concerned of the Government of the Islamic Republic of Pakistan, and conducted field investigations. As a result of further studies in Japan and the explanation of survey result in Pakistan, the present report was finalized.

I hope that this report will contribute to the promotion of the project and to the enhancement of friendly relations between our two countries.

Finally, I wish to express my sincere appreciation to the officials concerned of the Government of the Democratic Republic of Timor-Leste for their close cooperation extended to the survey team.

January, 2017

Akira Nakamura

Director General,

Infrastructure and Peacebuilding Department

Japan International Cooperation Agency

SUMMARY

SUMMARY

(1) Outline of the Country

The Islamic Republic of Pakistan (hereinafter referred to as "Pakistan") is a large country in the South Asia having land of 796 thousand km^2 that is almost double of Japan and 177 million populations that is 6th in the world. In 2050, the population in Pakistan is expected to exceed Brazil and Indonesia and to be 335 million which is 4th in the world. Pakistan is located on extremely advantageous area where could be said as the crossing point between Central Asia and Middle East. Karachi where is the largest city and center of economy in Pakistan has been functioning as the hub connecting East Asia, Middle East and Europe for a long time.

Since Pakistan is located on the western edge of the Asian monsoon region, it has a typical monsoon continental climate, although rainfall is low in almost all parts of the country. There is little rainfall for most of the year, but rain is concentrated into the summer months of July and August when the tropical monsoon blows. Concerning the temperature, the months of May and June before the start of the monsoon are the hottest and driest, while the winter season of December and January is slightly cooler and more pleasant.

Concerning the socio economy in Pakistan, GDP in 2015 was 270.3 billion USD and its growth rate compared with the previous year was 4.2 % due to stagnation of economic improvement and lack of infrastructures. Major industries in Pakistan are textile and agriculture, but there are many amounts of overseas remittance from migrant workers. Also, power shortage is serious and brownout frequently happens. Economic loss by power shortage accounts 4 % of GDP.

(2) Background and Outline of the Project

Karachi is the largest city in Pakistan. The city leads the economy of Pakistan as the center of industrial and financial activities. Roads play an important role in the social and economic development of Pakistan and Karachi City. Although the road network in the city is relatively well developed, the rapid increase in the number of passenger vehicles and motorcycles in recent years has caused the heavy traffic congestion in various places in the city, which has no mass-transit system such as an urban railway system. There are approx. 20 trunk roads with a daily traffic volume of 100,000 vehicles or more in the city. The travel speed on these roads during the rush hour is around 15km/hour. The heavy congestion seriously affects people's lives and economic activities. Improvement of the urban traffic condition in the city is urgently required not only in view of the above-mentioned background but also to attract foreign investment to the city where industrial agglomeration is in progress.

National Highway N5 is a trunk road connecting Karachi City and whole Pakistan and plays an important role in supporting industrial and economic activities. However, traffic congestion on N5 has recently become a serious problem. Therefore, the widening of existing 4-lane section between Quaidabad～Pak Steel Town in 11km length to 6 lane is an urgent challenge.

Based on this background, the Government of Pakistan submitted a request to the Government

of Japan for grant aid cooperation for the Project for Construction and Rehabilitation of National Highway N5 in Karachi City (hereinafter referred to as "Project"). The project mainly consisting of the widening of N5 in the section between Quaidabad and Pak Steel Town from 4 lane to 6 lane as well as pavement rehabilitation, installation of service road, traffic control and safety facilities.

The "Karachi Strategic Development Plan 2020" prepared by Karachi City in 2007 mentions the "fostering of competitive industries" as a priority issue and improvement of the road network in and around the industrial zones as a means of promoting such fostering. Karachi City intends to foster and promote industrial activities in the Karachi Export Processing Zone and the industrial zones near Port Qasim located along the above-mentioned road section. Japanese companies have also begun to establish businesses in these zones. On the basis of the above-mentioned observations, this Project is highly consistent with the upper level plan of Pakistan.

(3) **Outline of the Survey Results and Contents of the Project**

JICA dispatched the Preparatory Survey Team (hereinafter referred to as "Survey Team") to Pakistan 3 times from 7th February 2015 to 17th November 2015.

The Survey Team held a series of discussions with the officials concerned of Pakistan, and confirmed the current condition of the existing road, natural condition and traffic condition around the project site.

Through the field survey, the Survey Team confirmed that widening and development of the target road is necessary to support the increasing traffic demand. Therefore, the Survey Team studied the appropriate target area and components of the Project.

The Survey Team conducted project planning based upon the work in Japan after the field survey taking the above survey results into account. Table-1 shows the outline of the Project.

The Survey Team carried out explanation and discussions with the Government of Pakistan from 3rd to 14th December 2016 regarding the survey results.

Table-1 Outline of the Planned Facilities

Item		Description
Target Section		Quaidabad～Pak Steel Intersection in approx.11 km length
Carriageway		3.65m x 6 Lane
Shoulder		0 to 3.0m (depend on location)
Central Median		0.5 to 2.0m (depend on location)
Service Road		3.0 to 5.5m（depend on location）
Footpath		1.5 to 3.0m（depend on location）
Max Cross fall		2.0%
Gradient		Max 7%　Min 0.3%
Pavement structure	Carriageway	Wearing=AC(asphaltic concrete)　4cm、Binder=AC 7cm、Base : Dense bitumen macadam 9cm Crushed aggregate 20cm、 Sub Base :　Granular material 35cm

	Service road	Surface： Interlocking block 6cm, Sand 3cm、Base：Granular material 10cm
	Footpath /Service road reserve	Surface： Interlocking block 6cm, Sand 3cm、Base：Granular material 10cm (Service road reserve: Crushed stone 20cm without AC)
Drainage		Side Ditch (BOX culvert)、Road crossing culvert、Catch basin
Ancillary Facilities		Curbstone、Street light、Road sign、Traffic signal、Street tree、Pedestrian bridge、Bus stop

(4) Schedule and Approximate Cost of the Project

Total project schedule is estimated as 56 months including a tendering schedule (detailed design 13 months, construction 43 months). An approximate cost borne by Pakistani side is estimated as 71.8 million Rs.

(5) Project Evaluation

The relevance, effectiveness and benefit around the Project site are shown as follows;

1) Relevance

a) Target Beneficiaries

Target beneficiaries of securing smooth and stable traffic between the centre of Karachi City and the suburbs including the industrial area around Qasim Port number about 20 million people. As the target beneficiaries are so many, the relevance of the Project is high.

b) Coordination with the long-term development plan

In the KSDP that is a long-term development plan in Karachi City, strengthening of the existing road network and enhancement of traffic capacity have been proposed to promote the competitive industry.

Furthermore, the enhancement of traffic capacity of N5 which is supposed to be one of most congested roads in Karachi City has been proposed in KTIP implemented by JICA.

Accordingly, the relevance of the Project is high.

c) Coordination with the assistance policy of Japan

As one of the assistance policy of Japan to Pakistan, “The improvement of economic infrastructure” is mentioned. Also, the development of fundamental infrastructures for the urban transport sector, especially for supporting the activities of Japanese company in the industrial area is proposed.

Accordingly, the relevance of the Project is high.

2) Effectiveness

2-1) Quantitative Effect

The Project is to improve the traffic condition of the target road and to improve the access between the city centre and suburbs.

Therefore, it is suggested that the effectiveness of the Project is 1) Enhancement of traffic capacity, 2) Improvement of average travel speed at the peak hours.

Table-2 shows the indicators of quantitative effect, baselines, and target values in 3 years

later after the completion of the Project.

Table-2 Indicators of Quantitative Effect

Indicator	Baseline（2015）	Target Value（2022） 【3 years after completion】
Traffic Capacity（pcu/hour）	5,120 / 4 lanes	7,680 / 6 lanes
Average Travel Speed at Peak Hours※ (km/h)	35	60

※peak hours : 8 :00 ~9 :00 a.m., 17 :00~18 :00 p.m.

2-2) Qualitative Effect

a) Transportation costs related to N5 will be reduced due to the shortening of travel time.
b) Access improvement between the city centre and industrial area around Qasim Port will contribute to the social and economic activation in Pakistan.
c) Safe and smooth traffic will be ensured by separating the high-speed and slow-speed vehicles.
d) Security around the Project site will be improved along with the development of road space.
e) Roadside development will be promoted due to the improvement of road condition
f) Number of traffic accidents will be reduced
g) Road maintenance costs will be reduced.
h) Water accumulation on and around the target road will be improved due to the development of drainage facilities

3) Benefit around the Project Site

Land use at the roadside varies in each section of the target road. In Section 1 and Section 2, the roadside is well developed and many buildings and shops are located. Karachi Export Processing Zone (KEPZ) is located at the south of Section 2. In addition, these sections have the heaviest traffic in the target road. Traffic is jammed in the morning and evening peak hour and crimes such as robbers using guns happen targeting the slow vehicles.

In Section 3, many large vehicles are running between the city centre and Qasim Port, and the service facilities are located along the road. Also, the logistics infrastructures related to the Project are being developed. For example, ZOTPT, the parking facility for commercial vehicles is being constructed and the improvement of Qasim Port Road is being planned.

In Section 4, many tank lorries running between Qasim Port and the suburbs are using the road, and the on-road parking by the large vehicles is frequently observed in front of gas stations. Furthermore, Japanese companies have begun to establish their factories in Bin Qasim Industrial Area.

Based on the above-mentioned land use and traffic conditions, the benefits to the roadside in each section along with the Project are summarised as the Table-3.

Table-3 Benefits to the Roadside in each Section along with the Project

Section	Benefits to roadside

Section 1, Section 2 (Quaidabad~Cattle Colony Intersection)	− Transportation time and commuting time will be reduced due to the improvement of traffic jam and the economic activities will be activated. − Risk for on-road crime will be improved due to the improvement of the average travel speed. − Logistics related to KEPZ and Qasim Port will be activated due to the traffic distribution with Mehran Highway
Section 3 (Cattle Colony Intersection~ Port Qasim Intersection)	− Transportation time between the city centre and Qasim Port will be reduced. − On-road parking and the congestion in Qasim Port due to the cargo-waiting vehicles will be improved in coordination with ZOTPT.
Section 4 (Port Qasim Intersection~ Pak Steel Intersection)	− Transportation time between the suburbs and Qasim Port will be reduced. − Economic activities by Japanese companies will be activated in Bin Qasim Area.

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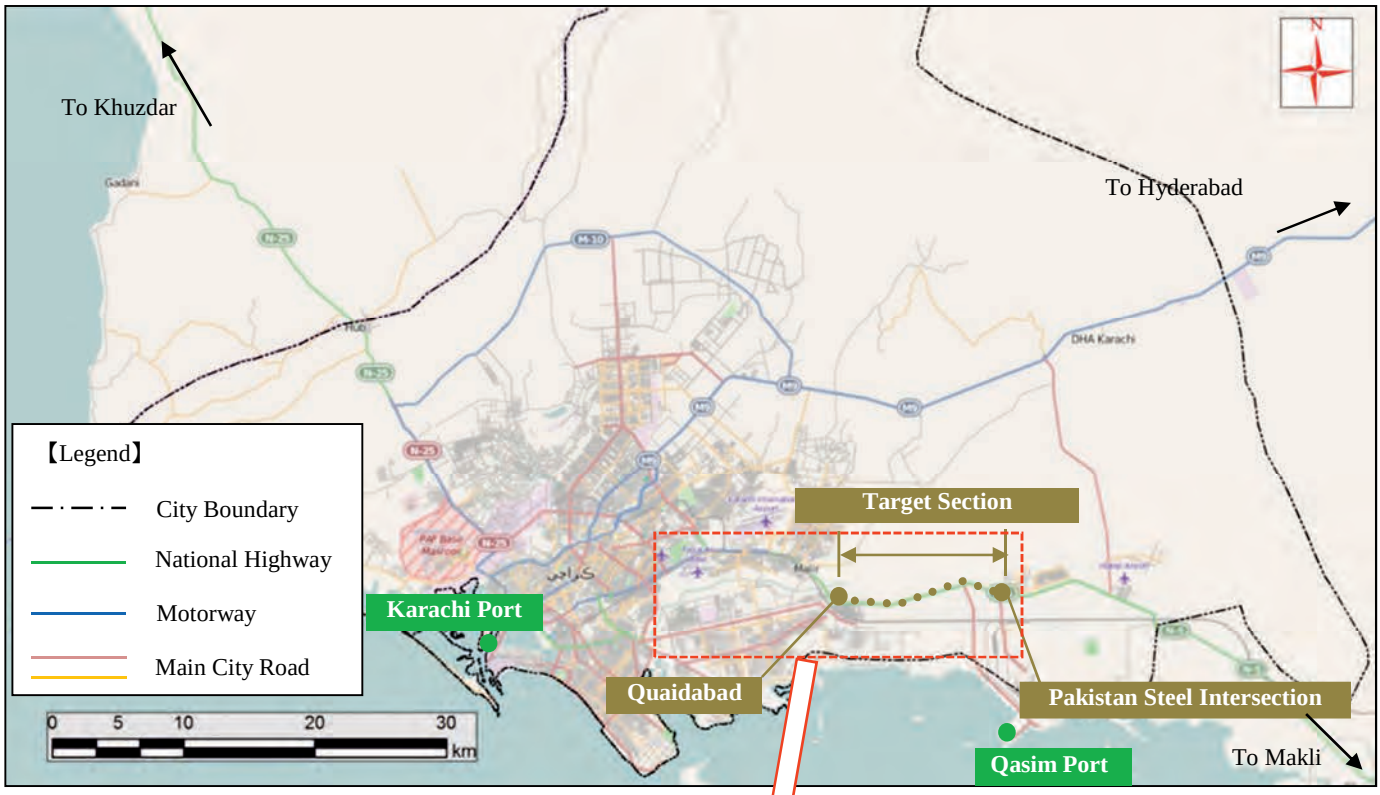
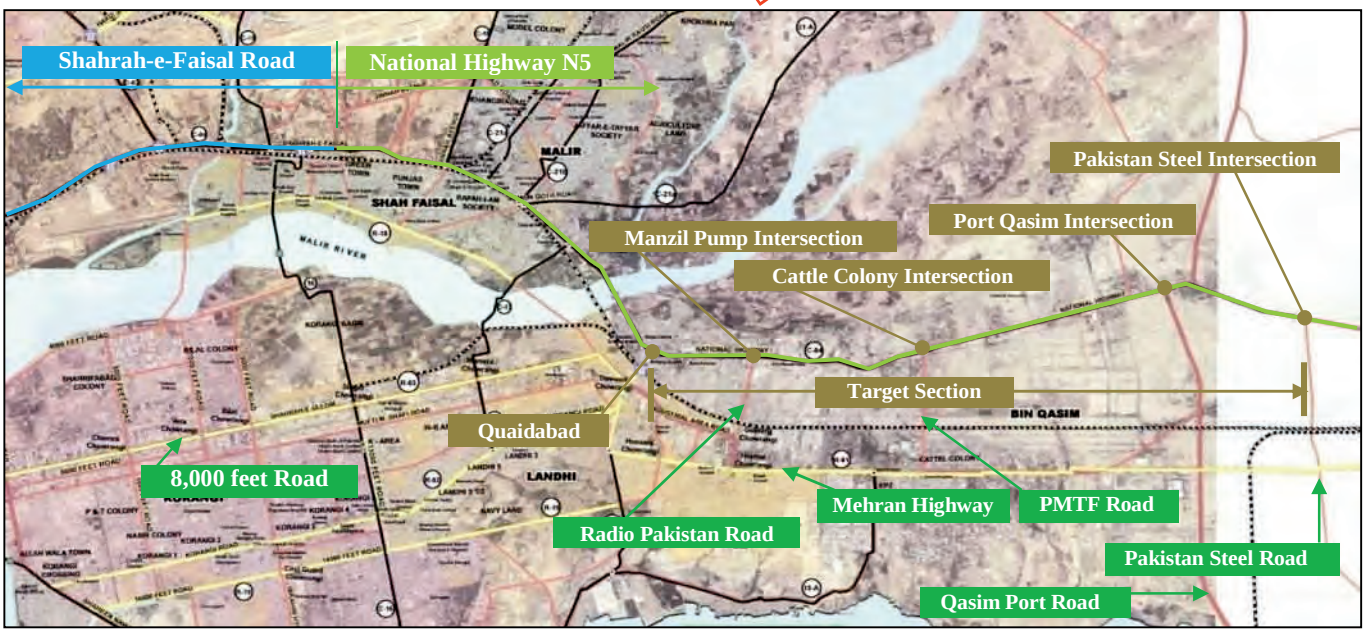
Location Map



Source：Open Street Map



Source：KMC

Perspective (1/2)

Perspective (2/2)

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Abbreviations

AADT	Annual Average Daily Traffic
AAGR	Annual Average Growth Rate
AASHTO	American Association of State Highway and Transportation Officials
ADB	Asian Development Bank
A/P	Authorization to Pay
ARAP	Abbreviated Resettlement Action Plan
B/A	Banking Arrangement
BOT	Build-Operate-Transfer
BRT	Bus Rapid Transit
CBR	California Bearing Ratio
cm	Centimetre
deg C	degrees Celsius
EIA	Environmental Impact Assessment
E/N	Exchange of Note
EMP	Environmental Management Plan
EPA	Environmental Protection Agency
ft	Feet
G/A	Grant Agreement
GDP	Gross Domestic Product
GOP	Government of Pakistan
GRDP	Gross Regional Domestic Product
GRP	Grievance Redress Committee
IEE	Initial Environmental Examination
JICA	Japan International Cooperation Agency
km	Kilometre
KMC	Karachi Metropolitan Corporation
LRT	Light Rail Transit
m	Metre
M/D	Minutes of Discussion
MRT	Mass Rapid Transit
NGO	Nongovernmental Organization
NHA	National Highway Authority
PAP	Project Affected Person
PAU	Project Affected Unit
pcu	Passenger Car Unit
PPP	Public Private Partnership
P/Q	Prequalification
PQA	Port Qasim Authority
Rs.	Pakistan Rupee
ROW	Right of Way
TOR	Terms of Reference
USD	US Dollar
WB	World Bank
ZOTPT	Zulfiqarabad Oil Tankers Parking Terminal

CHAPTER 1

BACKGROUND OF THE PROJECT

Chapter 1 Background of the Project

1-1 Present Condition and Issues of the Transport Sector

1-1-1 Present Condition and Issues

(1) Present condition of transport sector in Karachi City

Karachi City where approximately 19 million people live is the first largest city in Pakistan and it leads the economy in Pakistan as the industrial and financial centre of the country. Transport sector in the city depends on roads since no mass transit system has been developed.

The total road length in the city is approximately 10,000 km. Local roads accounted for 93%, while the highways and arterial roads for less than 5%. There are three highways namely Super Highway (M-9), National Highway (N-5), and Regional Cooperation for Development (RCD) highway (N-25).

Bus (Minibus, Coach, and Large Bus) is the primary mode of public transport in Karachi, although the number of buses has been decreasing. Rickshaw and Suzuki pickup are also popular transport modes in Karachi which complement bus networks.

Even though there is the railway connecting Karachi City and north of the country for the passenger and freight transport, it is not used for daily transport mode due to the less-frequent operation and long distance among stations.

(2) Serious traffic jams on arterial roads

Although the road network in the city is relatively well developed, the rapid increase in the number of passenger vehicles and motorcycles in recent years has caused the heavy traffic congestion in various places in the city, which has less traffic capacity of some road section and/or no mass-transit system. There are approx. 20 trunk roads with a daily traffic volume of 100,000 vehicles or more in the city. The travel speed on these roads during the rush hour is around 15km/hour. The heavy congestion seriously affects social and economic activities. Improvement of the urban traffic condition in the city is urgently required not only in view of the above-mentioned background but also to attract foreign investment to the city where industrial agglomeration is in progress.

1-1-2 Relevant Development Plan

(1) Karachi Strategic Development Plan (KSDP)

Karachi Strategic Development Plan (KSDP) 2020 that the City District Government Karachi (CDGK) has formulated in 2007 set out a strategic framework and overall development direction and future pattern of the city over the next 13 years. KSDP consists

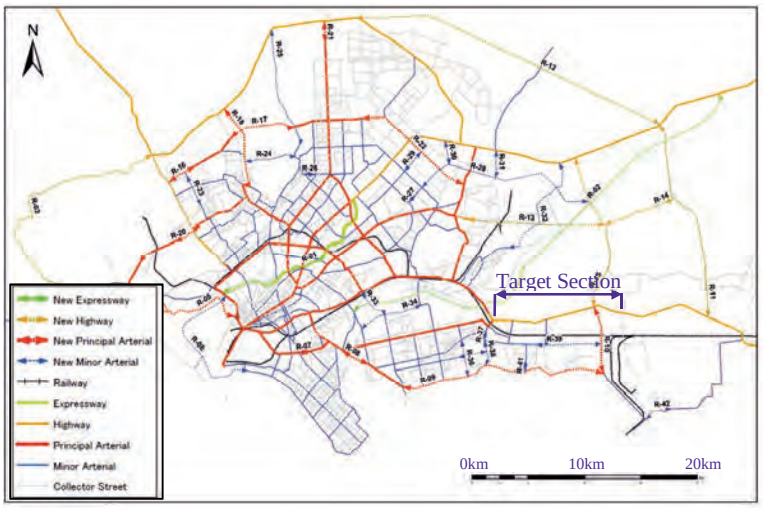
of land use, housing, transport, other public infrastructures (water supply, sewage, waste management, drainage, and electric power), etc. As the strategy of road sector, strengthening of the existing road network, enhancement of traffic capacity, improvement of drainage facilities and division of short-trip and long-trip traffic have been proposed. Furthermore, the promotion of competitive industry has been proposed as one of the priority issues of the industrial sector and the development of transport network around the industrial area is regarded to be necessary.

(2) Karachi Transport Improvement Project (KTIP)

JICA has conducted and completed the study on the Karachi Transportation Improvement Project (KTIP) in June 2012. In this study, Karachi Urban Transport Master Plan for 2030 has been prepared and the feasibility study of a high priority project on mass rapid transit system has been conducted.

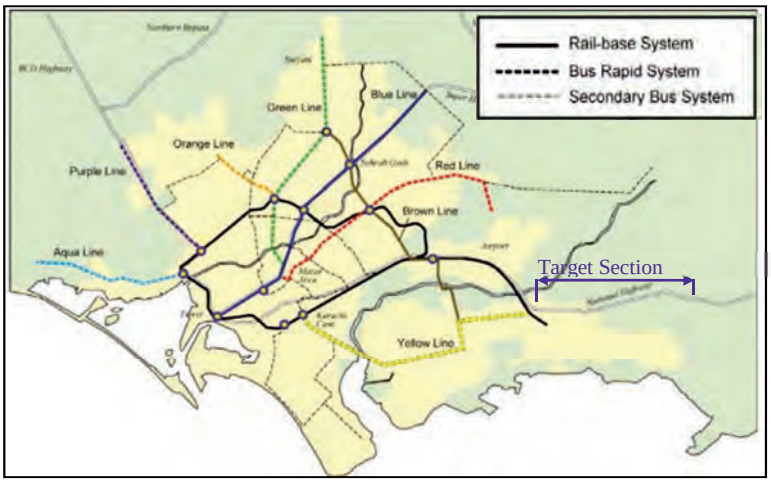
Figure 1-1-1 shows the future road network in 2030 and Figure 1-1-2 shows the public transport network proposed in KTIP. Future public transport network consists of four Mass Rapid Transit (MRT) routes including Karachi Circular Railway (KCR) and five Bus Rapid Transit (BRT) routes, which are not planned in the Project target section. Based on KTIP, these public transport projects are in the preparation stage such as the investment arrangement, procurement, utility shifting and design by PPP, KMC and Federal Government.

Future road network has been proposed taking into consideration the accessibility to new cities and port, and improvement of missing links and bottlenecks as well as the coordination with public transport stations.



Source:KTIP

Figure 1-1-1 Future Road Network in 2030 Proposed in KTIP



Source:KTIP

Figure 1-1-2 Public Transport Network Proposed in KTIP

(3) City Master Plan (Map of Karachi)

Karachi Development Authority's 'Map of Karachi' which Karachi Metropolitan Corporation (KMC) recognizes as City Master Plan (1:25,000, based on survey conducted in 1969) shows the ROW of each road in Karachi City including the Project section of ,existing N-5 as 150 ft (45.72 m) as shown in Figure 1-1-3.

However, this map does not specify the exact centrelines and their alignment.

Source: KMC

Figure 1-1-3 Map of Karachi

(4) Karachi City Regulation (Draft)

Karachi City Regulation which is currently in draft stage specifies that no building should be allowed to be erected within 220 feet from the road centre on highways such as the main road of the city serving through traffic and providing communication among the different cities.

1-2 Background and Outline of the Request for Japan Grant Aid

Shahrah-e-Faisal Road and National Highway N5 (hereinafter referred to as "N5") is a main access route from the centre of Karachi to the industrial zones near Port Qasim located 30km east of the city centre. This route plays an important role in supporting industrial and economic activities in Karachi City as it is used not only for logistics route but also as commuting routes to the above-mentioned industrial zones. However, traffic congestion as well as damage to and deterioration of the pavement on the target road have recently become a serious problem and the congestion significantly affects industrial activities in the area. Furthermore, the increase in the number of traffic accidents associated with the congestion and the poor level of road service has also become a serious problem.

On the other hand, Karachi City intends to foster and promote industrial activities in the Karachi Export Processing Zone and the industrial zones near Port Qasim located along the target road section in accordance with KSDP. Japanese companies have also begun to establish businesses in these zones. Based on this background, the Government of Pakistan submitted a request to the Government of Japan for grant aid cooperation for the Project for Construction and Rehabilitation of National Highway N5 in Karachi City (the Project), a project mainly consisting of the widening of N5 in the section between Quaidabad and Pak Steel Town.

CHAPTER 2

CONDITIONS SURROUNDING THE PROJECT

Chapter 2 Conditions Surrounding the Project

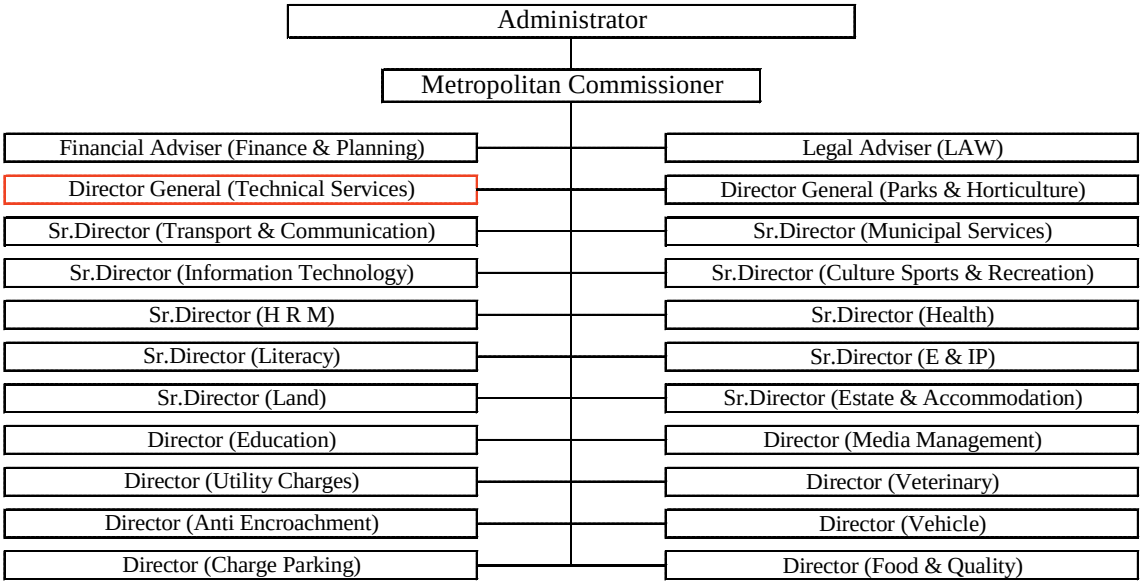
2-1 Implementation Structure of the Project

2-1-1 Organization and Staff

Figure 2-1-1 and Figure 2-1-2 show the organization charts of KMC and its Technical Service Department which are the implementing body for the Project. KMC is composed of 22 departments under the administrator and metropolitan commissioner.

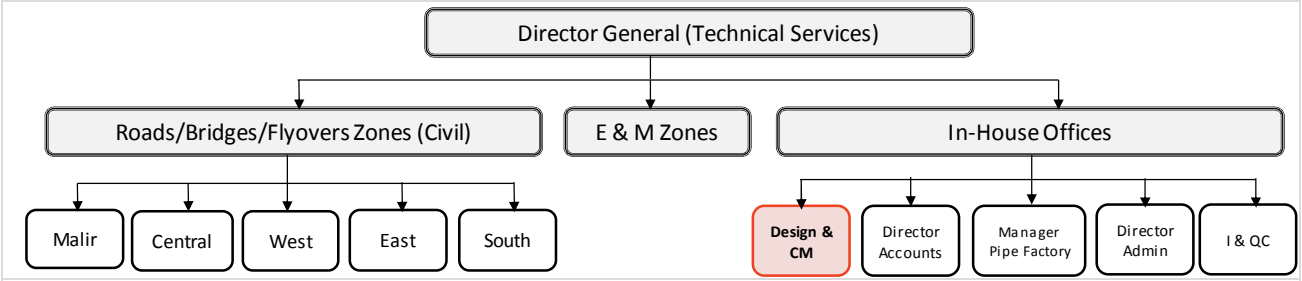
Technical Service Department is composed of Roads/Bridges/ Flyover Zones in charge of the construction management, E & M (Electrical and Mechanical) Zones in charge of the maintenance, In-House Offices including Design & Contract Management Section in charge of the Project. Else, the Project Director is appointed for each project such as the flyover projects and ZOTPT (parking facility for large vehicles) that are currently under construction.

Design & Construction Management Section is composed of 19 staff. The Survey Team confirmed, as the implementation structure of KMC for the Project, that Design & Contract Management Section will be in charge of the detail design as with this preparatory survey and the Project Director will be designated and approximately 3 engineers be assigned under him as with the other projects in the construction phase. E & M Zones will be in charge of the operation and maintenance after the completion of the Project.



Source：KMC

Figure 2-1-1 Organization Chart of KMC



Source：KMC

Figure 2-1-2　Organization Chart of Technical Service Department, KMC

2-1-2 Finance / Budget

Table 2-1-1 shows the KMC's budget related to the transport sector for 4 fiscal years from 2012 to 2015. The cost for the civil engineering, buildings and urban development are borne from the category of Engineering, the budget of which declines in 2014 but overcome a bit in 2015. The budgets of Transport & Communication and Karachi Mass Transit Cell also decline till 2014 although the total budget increases year by year.

Table 2-1-1　KMC Budget in 2012-2015

(unit: million Rs.)

Department	2012-2013	2013-2014	2014-2015	2015-2016
Engineering	9,167	9,565	6,387	6,475
Transport & Communication	1,624	1,140	720	827
Karachi Mass Transit Cell	1,445	321	279	147
Others	19,293	24,468	26,086	26,233
Total	31,529	35,494	33,472	33,682

Source：Budget KMC

2-1-3 Technical Level

The implementing body of KMC for the Project has experienced the project management of the flyover projects and 8,000 ft road whose contents is similar to the Project even though number of the staff is limited.

2-1-4 Existing Facilities

(1) Current Conditions of the Target Road

1) Road Conditions

The length of the target section is for approximately 11.3 km from approximately 100 m from the edge of Quaidabad Flyover to Pakistan Steel Intersection. Around the nose of Quaidabad Flyover, the road consists of 6 lanes (4-lane carriageway and service road on either side) and a central median, however, the cross section at the design beginning point is composed of 4-lane carriageway and central median, and this continues up to the design end point at the boundary of KMC and NHA, the Pakistan Steel Jurisdiction.

In terms of horizontal alignment, the target section is almost straight line except for an S-shape curve section at approximately the 3.3 km point and a gentle curve at the 9.2 km point from the project beginning point. In vertical terms, except for one sagging part at approximately 6.8 km (around an existing traversal box: at the intermediate point of the target road section), the road displays a gentle undulated gradient of approximately 1%. The road width is approximately 15~17 m composed of central median, (approximately 1.0 metre) and four traffic lanes (approximately 3.6 m/lane) and it is unpaved between the edge of the road and private properties. The unpaved parts are used for pedestrians, parking spaces and utility facilities. Also, land uses alongside the road can be divided into the following four types:

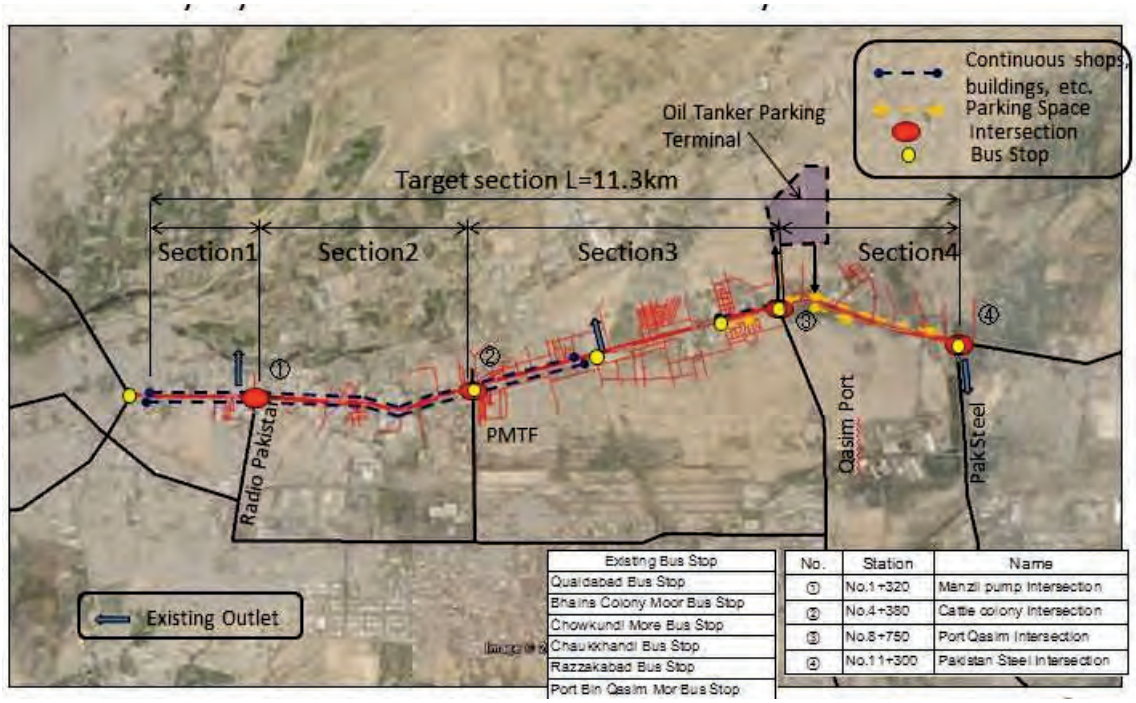
- Small stores (kiosks, auto repair shops, restaurants, etc.)
- Large factories or buildings surrounded by fences
- Fuel stations.
- Development zones or vacant lots

Moreover, numerous cars are parked on the road, while tank lorries are often parked in areas close to fuel stations, and many large trucks are parked close to auto repair shops. The current land uses and outline image are indicated below.

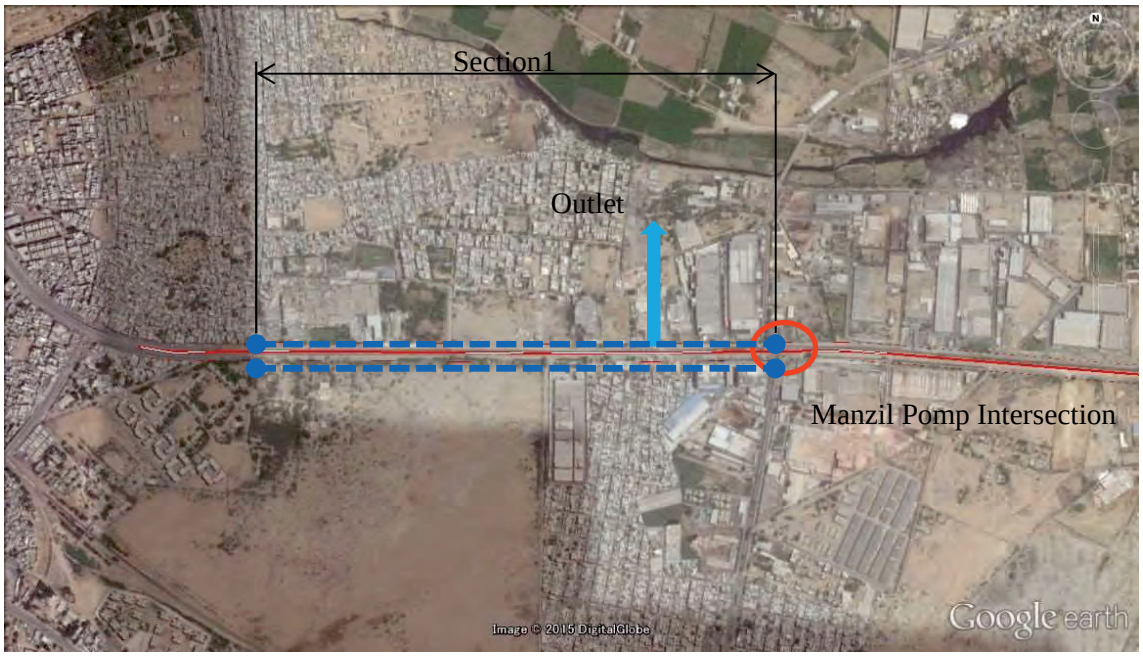
Table 2-1-2 Land Uses along the Project Road Section

Location	Roadside Land Use
Beginning point ～ Cattle Colony Intersection (approx. 0 – 4.38km)	Continuous shops, buildings, factories along the roadside, etc.
Cattle Colony Intersection～Port Qasim Intersection (approx. 4.38 – 8.75km)	There are continuous shops around Cattle Colony Intersection, however, at least half of the land comprises vacant lots.
Port Qasim Intersection～Pakistan Steel Intersection I (approx. 8.75 – 11.3km)	There are 7 fuel stations on the north side of the target road, and many tank lorries are parked. On the south side, there are two fuel stations with some parked tank lorries, however, the land is almost totally vacant.

Source: Survey Team


Continuous shops, buildings, etc.
Parking Space
Intersection
Bus Stop
Oil Tanker Parking Terminal
Target section L=11.3km
Section1
Section2
Section3
Section4
①
②
③
④
PMTF
Radio Pakistan
Qasim Port
PakSteel
Existing Outlet
Existing Bus Stop
Quaidabad Bus Stop
Bhains Colony Moor Bus Stop
Chowkundi More Bus Stop
Chaukhandi Bus Stop
Razzakabad Bus Stop
Port Bin Qasim Mor Bus Stop
No. Station Name
① No.1+320 Manzil pump intersection
② No.4+380 Cattle colony intersection
③ No.8+750 Port Qasim intersection
④ No.11+300 Pakistan Steel intersection

Section1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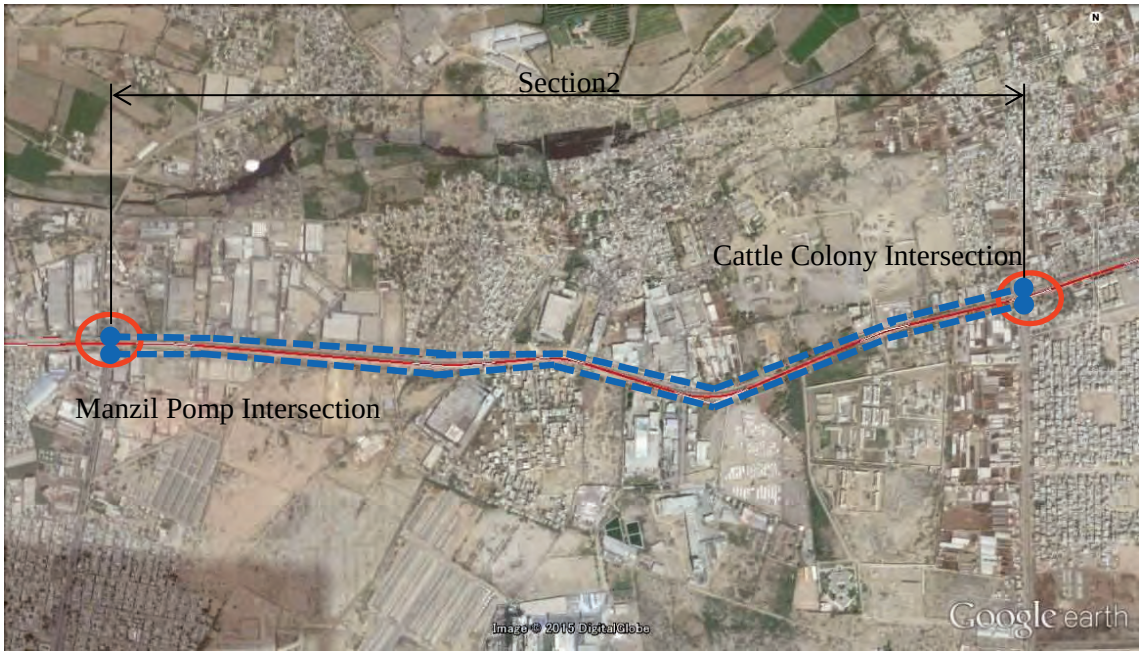
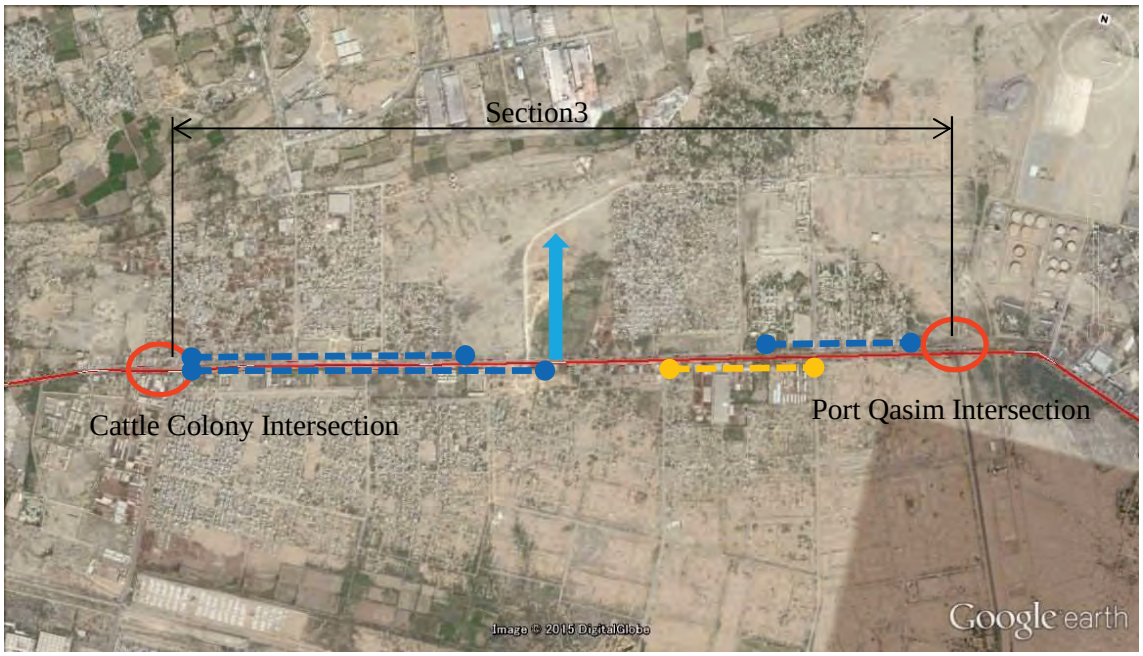
Outlet
Manzil Pomp Intersection
Image © 2015 DigitalGlobe
Google earth

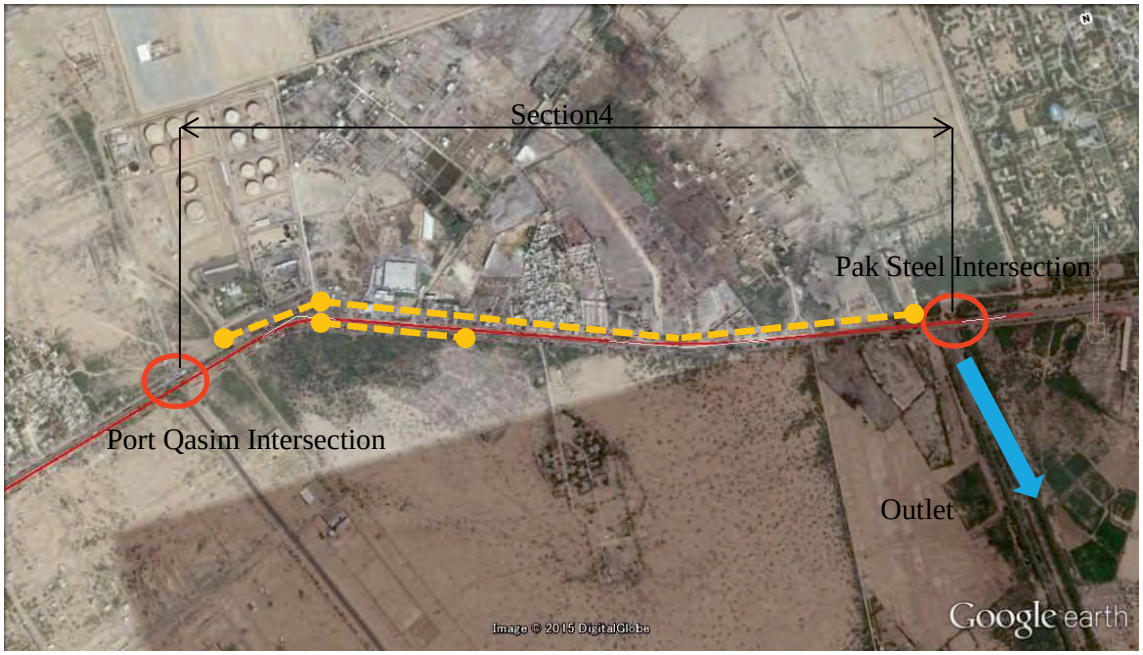
Section2



Section3



Section4



Source: Survey Team

Figure 2-1-3 Present Condition of Existing Roadside

2) Intersections

There are 4 intersections as indicated below, and these are not installed with traffic lights. Policemen control traffic flows by hand signals at congested times only on Manzil Pump Intersection and Cattle Colony Intersection. The characteristics of each intersection are summarized below.

Table 2-1-3 Outline of Intersections

Station	Intersection	Characteristics
No.1+320	Manzil Pump Intersection	This intersection is a hub of large-size vehicle traffic with the 8,000ft Road. Many large-size vehicles turn left and right here.
No.4+380	Cattle Colony Intersection	There are many shops along the N5 and PMTF Roads, and this intersection experiences the most coming and going traffic (is the busiest) of the four intersections. This is also the main intersection for gaining access to the livestock industrial park on Mehran Road.
No.8+750	Port Qasim Intersection	This is the intersection for gaining access to Qasim Port located to the south. A road (entrance) for gaining access to a public parking area for tank lorries and large-size vehicles is currently being constructed on the north side and is planned for opening in 2017. Many of the large-size vehicles that currently park on the road will use this parking area.
No.11+300	Pakistan Steel Intersection	This is the intersection for gaining access to Pakistan Steel Mills Corporation (PVT) LTD. According to the field survey, majority of the vehicles going to and from the factory use this intersection and traffic is relatively light.

Source: Survey Team

Also, tank lorries were observed making U-turns at Port Qasim Intersection and Pakistan Steel Intersection.

Photo U-turn (Pakistan Steel Intersection)

Photo Tank Lorry Parking Area under Construction

3) Pavements

Numerous pavement damages (cracks and potholes) were observed on the entire section. According to the local residents, the damages are caused by flooding due to the poor drainage, water accumulation at roadsides in the rainy season, heavy vehicles (tank lorries) and so on. Moreover, rutting can be partially seen, although they are relatively few over the entire road. Incidentally, a weigh bridge is located around 200 m from Cattle Colony Intersection on the end point side, but this is owned by the private company and not for the official use.

Photo Pavement damage example (cracking at sag section)

Photo Existing Weight Bridge

4) Road Drainage Conditions

[Present Drainage System]

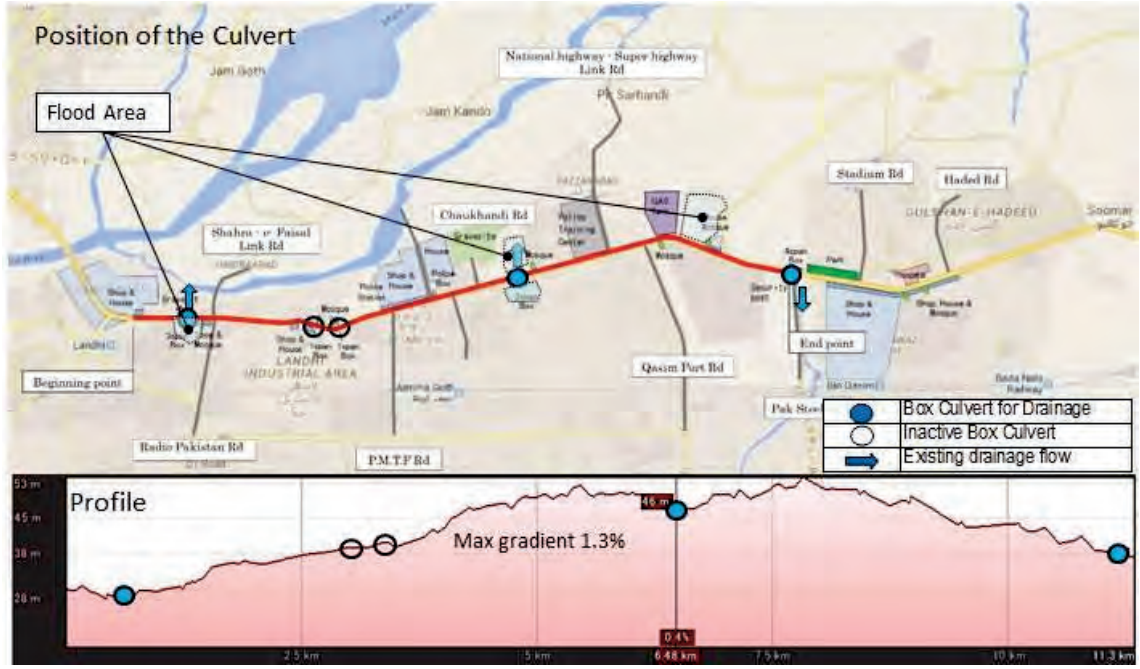
The target road is situated between a river and the ocean, and the drainage capacity of road traversal structures (box culverts) is reduced by illegally disposed waste. Moreover, there is no side ditch along the roadside, so storm water naturally flows into the adjacent land. Concerning the existing drainage system, the wastewater that concentrates in the box culvert at the beginning point flows into Sukan Nalla River on the north side, while the water collected in the box culvert near the end point flows into the river on the south side and discharges into the Arabian Sea. The following results were obtained from the hearing with local residents and KMC.

- Around the box culvert at the beginning point: The road and residential areas become

flooded during the rainy season.

- Box culverts in the middle of the target section: The road becomes flooded to a depth of 2-3 cm during the rainy season. Also, the roadside areas become flooded because they are lower than the road.
- Residential area on the north side of the road approximately 1 kilometre from Port Qasim Intersection towards the end point: This area becomes flooded to knee-height during the rainy season. Storm water and sanitary sewage from this area flow to the culvert at the end point.
- Around the box culvert at the end point: The road doesn't become flooded. There is not even any overflow at the outlet entering Pakistan Steel Co.

The outline is summarized in the following Figure 2-1-4.



Source: Survey Team

Figure 2-1-4 Present Drainage Systems

[Discharge Point]

There are 5 box culverts traversing the road in the target section as shown in Figure 2-1-4. 2 culverts of them are not functioning as outlets, and there are 3 culverts functioning as outlets in the target section. However, these 3 outlets also receive the wastewater from adjacent residential areas.

Table 2-1-4 shows an outline of each traversal box culvert.

Table 2-1-4 Outline of Traversal Box Culverts

Station	Shape (B x H)	Characteristics
No.0+890	2 Box culvert 3 x H	Discharge capacity is extremely reduced due to the accumulation of sediments and vegetation, and the drainage flow sticks in even minor rainfall. The area on the south side is a dense residential district, and the wastewater flows into the open ditch on the

		upstream side of the culvert. The outlet on the north side passes through factory grounds and flows into Sukan Nalla River. The drainage pipe that passes through the factory is diameter narrower to 1.0 metre.
No.3+140	1 Box culvert W x H	This culvert is not functioning due to heavy accumulation of sediments and vegetation.
No.3+420	1 Box culvert W x H	This culvert is not functioning due to heavy accumulation of sediments and vegetation.
No.6+520	2 Box culvert 1.65 x H	This traversal box culvert is not used as outlet. This is because storm water flooding of the road side passes to north side ,
No.11+360	4 Box culvert 2.9 x H	There is accumulation of sediments and vegetation in the surrounding area. The wastewater from the residential area on the east side of Qasim Port Intersection flows into here.

Source: Survey Team

Note: *Measurements couldn't be made at the locations denoted by W, H due to the accumulation of sediment.


Photo Left: No.0+890 road traversal culvert; Right: Wastewater flowing into the culvert (photograph taken during the dry season)


Photo Left: No.3+140; Right: No.3+420 culvert


Photo No.6+520 culvert


Photo Left: No.11+360 culvert; Right: Wastewater flowing into the culvert on the upstream side (photograph taken during the dry season)

5) Cross Sections of Other Roads in Karachi City

The Survey Team observed the other roads in Karachi City during the field survey in order to acquire the useful information for designing the target road.

1) Mehran Road: The road is located on the south side of the target National Highway N5 and connected to Radio Pakistan Road, PMTF Road, and 8,000ft Road. It is a six-lane highway, but there are no service roads.

2) 8,000ft Road: The road has a lot of large-size vehicles and is becoming increasingly urbanized. Since it is considered most similar to National Highway N-5 after improvement, the Survey Team obtained design drawings.

3) Maikolachi Road: The road is located in Clifton area and has six lanes like the target road. The cross section comprises central median, three traffic lanes, footpath (over a covered drainage channel), service road, and planting belt.

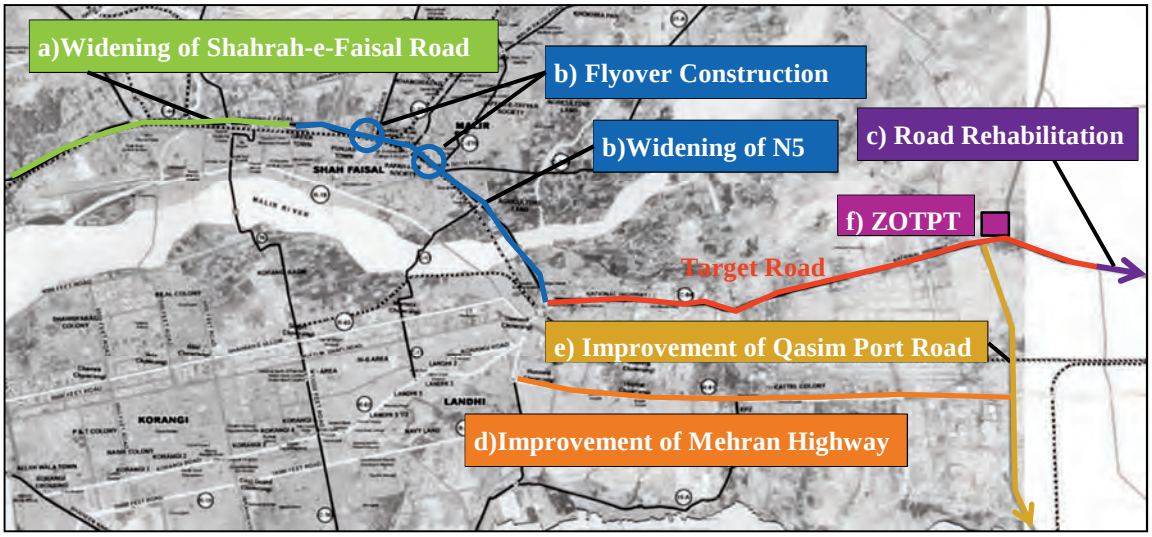


Photo Mehran Road **Photo 8,000ft Road** **Photo Maikolachi Road**

2-2 Present Condition of the Project

2-2-1 Development of Related Infrastructure

Roads and other infrastructures related to the Project have been constructed or are under construction as described below. The westward roads from the beginning point of the Project to the city centre will be widened and the eastward road from the end point of the Project has been rehabilitated. Furthermore, other access roads and facilities related to the Project are being constructed or planned. Considering the above condition, the Project widening and rehabilitating the target section of the road is expected to contribute smoothening the traffic and securing the safety in N5.



Source: KMC

Figure 2-2-1 Location of Related Infrartructure Development

a) Widening of Shahrah-e-Faisal Road

The Survey Team confirmed the whole section of Shahrah-e-Faisal Road has been widened to 6 lanes.

b) Widening of N5 and flyover projects

KMC is planning to widen the existing 4-lane road to 6 lane up to Quaidabad Flyover, the beginning point of the Project. According to KMC, this project is under the procedure of PC-1. KMC is also constructing 2 flyovers located on N5. The west-side one has been completed and operated, and the east-side one is under construction. In addition, the construction of a flyover will be started and completed in 2017 at Munzil Pump Intersection located within the target section.

Photo F/O in the west side (completed)

Photo F/O construction site in the east side (under construction)

c) Road rehabilitation eastward from the Project end point

4-lane road in 12km length from Pakistan Steel Intersection to the crossing point with railway had been rehabilitated 5 or 6 years ago. So, the road from the Project end point to the Eastern Bypass connecting to M-9 is in good state. Regarding eastward section to

Thatta in 49km length the Government of Sindh is proceeding to the contract with Frontier Works Organization (FWO) for a PPP project.

d) Improvement of Mehran Highway

3 km out of total 10km in length of the road had been constructed by the finance of Pakistan and remaining 7km had also been constructed by Japan's Counter Value Fund and completed in January 2014. The east part 2km of the road connecting with Qasim Port Road is 3 lanes and the rest part is 4 lanes.

Photo 3-lane section

Photo 4-lane section

e) Improvemnt of Qasim Port Road

Port Qasim Authority (PQA) is planning the improvement of Qasim Port Road between N5 and Qasim Port and the construction of flyover of Port Qasim Intersection by means of BOT scheme. However, the financer has not been selected yet although PQA prepared the tender document in 2012.

According to KMC, there is no concrete plan to construct the road from Port Qasim Intersection to M-9 so far.

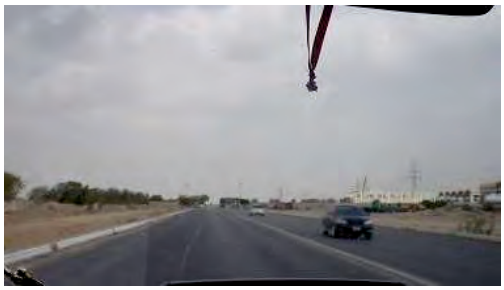


Photo Port Qasim Road

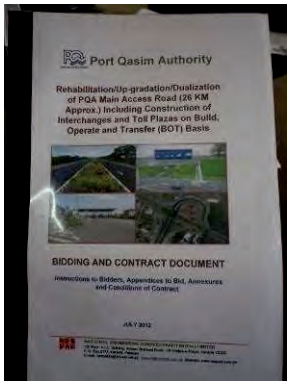
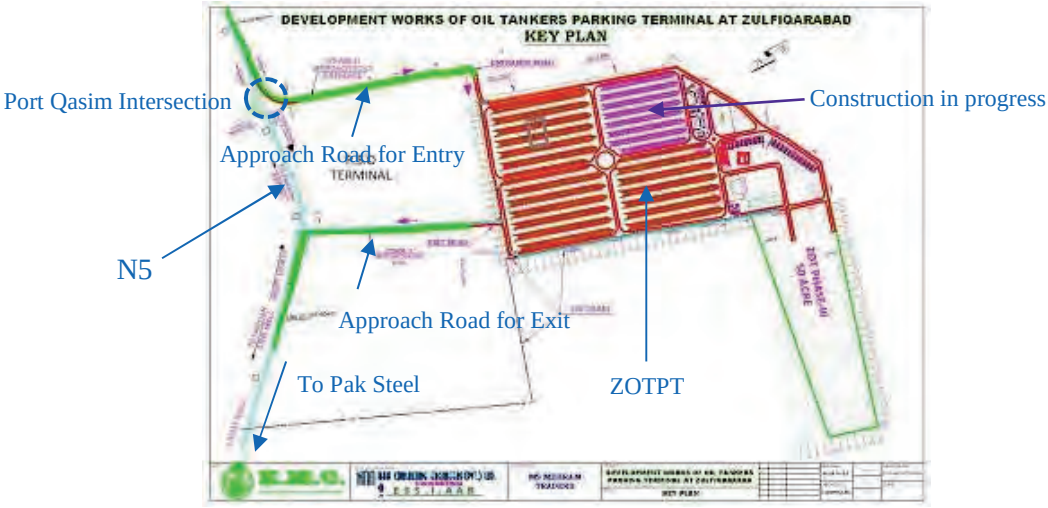


Photo Tender Document for the access road improvement project

f) Parking facility for large vehicle (ZOTPT)

KMC is currently constructing ZOTPT at the north side of Port Qasim Intersection and its progress is 80%. All activities for the facility such as the construction, maintenance and operation will be borne by KMC's fund. KMC is intending to open the facility in 2017. KMC is also constructing 2 approach roads for entry and exit separately to the facility from N5. KMC requests that the intersection of Port Qasim be planned taking into

consideration the convenience of commercial vehicles using the facility.



Source: KMC

Figure 2-2-2 Plan of ZOTPT

2-2-2 Traffic Conditions

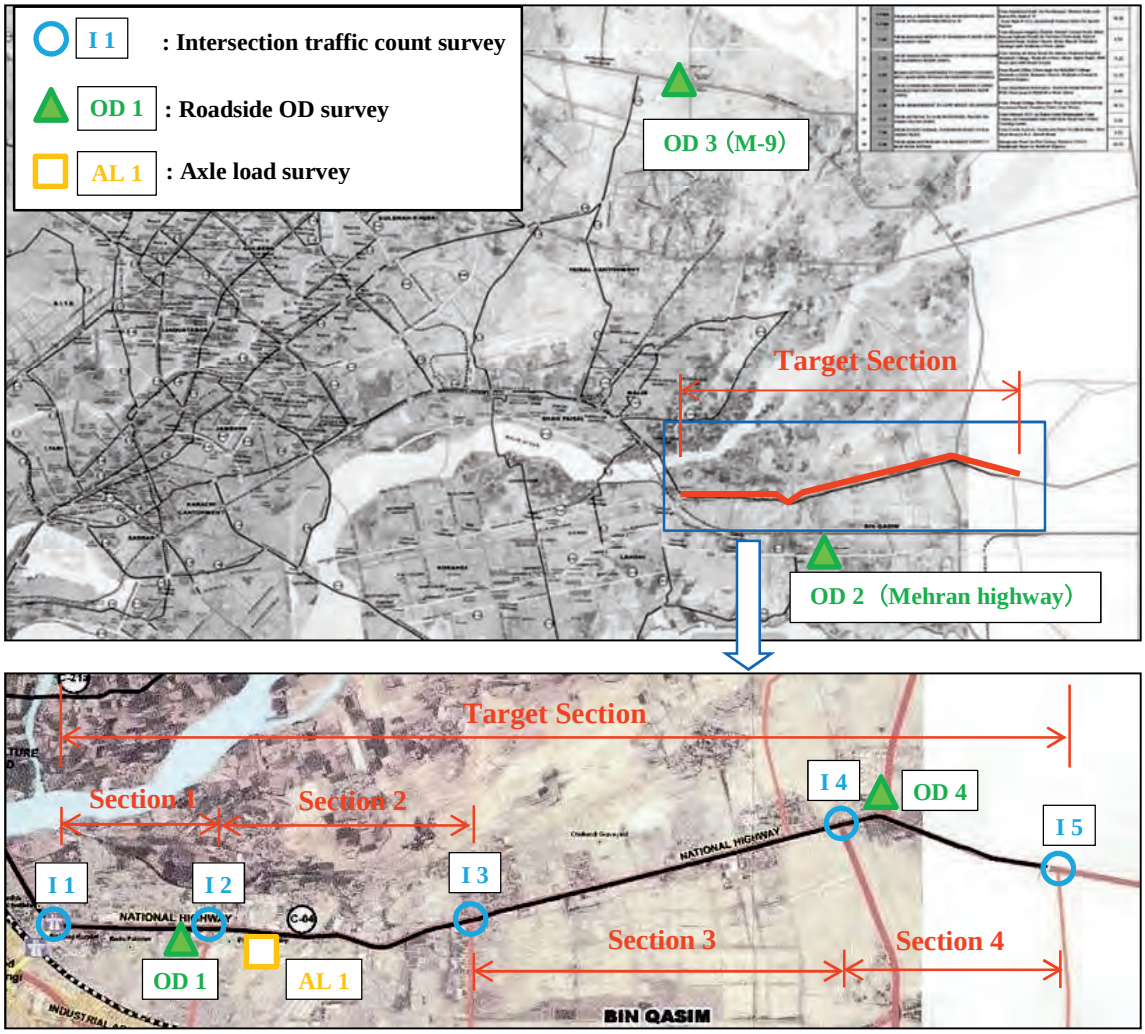
(1) Outline of traffic survey

The Survey Team has conducted the traffic survey shown in the Table 2-2-1 to verify the present traffic condition in the target road. Figure 2-2-3 shows the each location of the traffic survey.

Table 2-2-1 Outline of the Traffic Survey

No.	Survey item	Contents	Survey points, date, time
1	Intersection Traffic Count Survey	・To count the directional traffic movements by vehicle type ・To measure the traffic jam length on each approach road	5 Intersections、2 days (holiday and weekday) , for 12 hours (daytime)
2	Roadside OD Interview Survey	To interview the origin/ destination and purpose of trip, goods and quantity transported to drivers	4 points, weekday 1 day, for 12 hours (daytime)
3	Classified Traffic Count Survey	To count the traffic volume at the same points with OD Survey	Same location and date as OD Survey, for 24 hours
4	On-road Parking Survey	・To count the number of on-road parking by divided section ・Interview to the drivers	For whole target section, 2 days (holiday and weekday) , for 12 hours (daytime)
5	Axle Load Survey	To measure the actual axle load of large vehicle	1 point on the target section、weekday 1 day, for 12 hours (daytime)

Source: Survey Team



Source: Survey Team

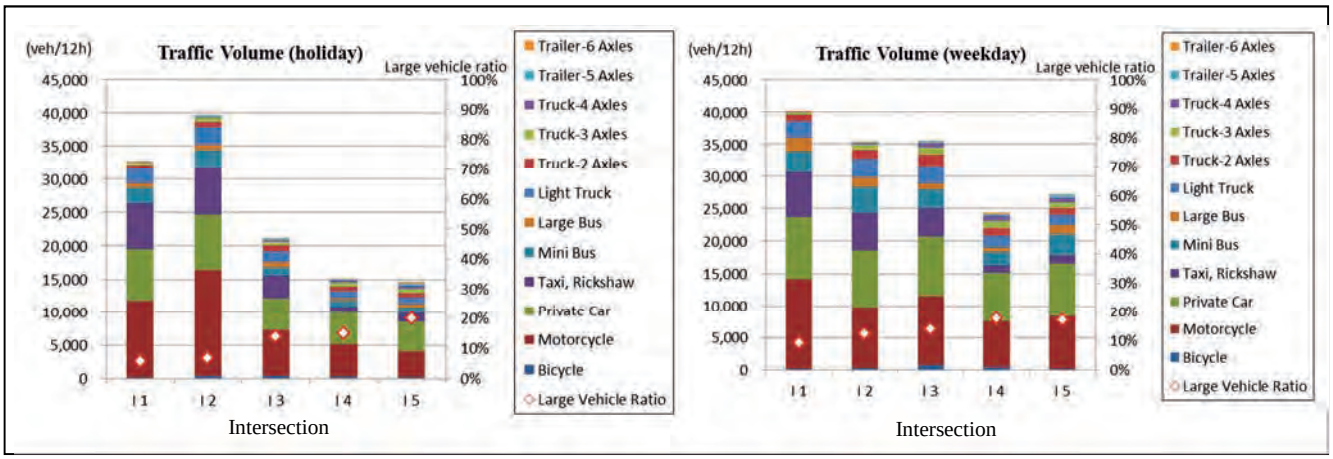
Figure 2-2-3 Location of the Traffic Survey

(2) Results of traffic survey

1) Intersection traffic count survey

Total inflow volume and vehicle composition

Figure 2-2-4 shows the total inflow volume and vehicle composition at each intersection on holiday (left) and weekday (right). The total traffic volume tends to decrease but the large vehicle ratio tends to increase as it goes eastward. On holiday, 30,000 – 40,000 vehicles were observed at I 1 and I 2 while 15,000 – 20,000 vehicles were observed at I 3 – I 5 for daytime 12 hours. On weekday, 35,000 – 40,000 vehicles were observed at I 1 - I 3 while around 25,000 vehicles were observed at I 3 – I 5 for daytime 12 hours (6 a.m. -18 p.m.). Motorcycle has the highest vehicle share at most of the intersection and number of large vehicles does not change drastically at each intersection.

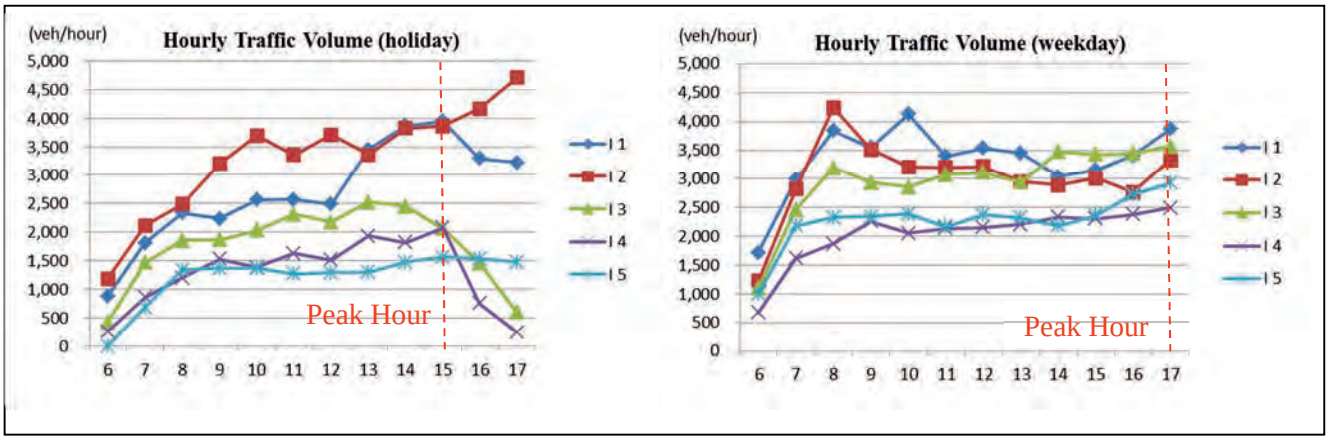


Source: Survey Team

Figure 2-2-4 Total Inflow Volume and Vehicle Composition at Intersections

Hourly Fluctuation

Figure 2-2-5 shows the hourly traffic volume at each intersection on holiday (left) and weekday (right). Peak hour for the target section which has the highest sum of traffic volume at all intersections is 15:00 p.m. on holiday and 17:00 p.m. on weekday although the peak hour at each intersection varies.

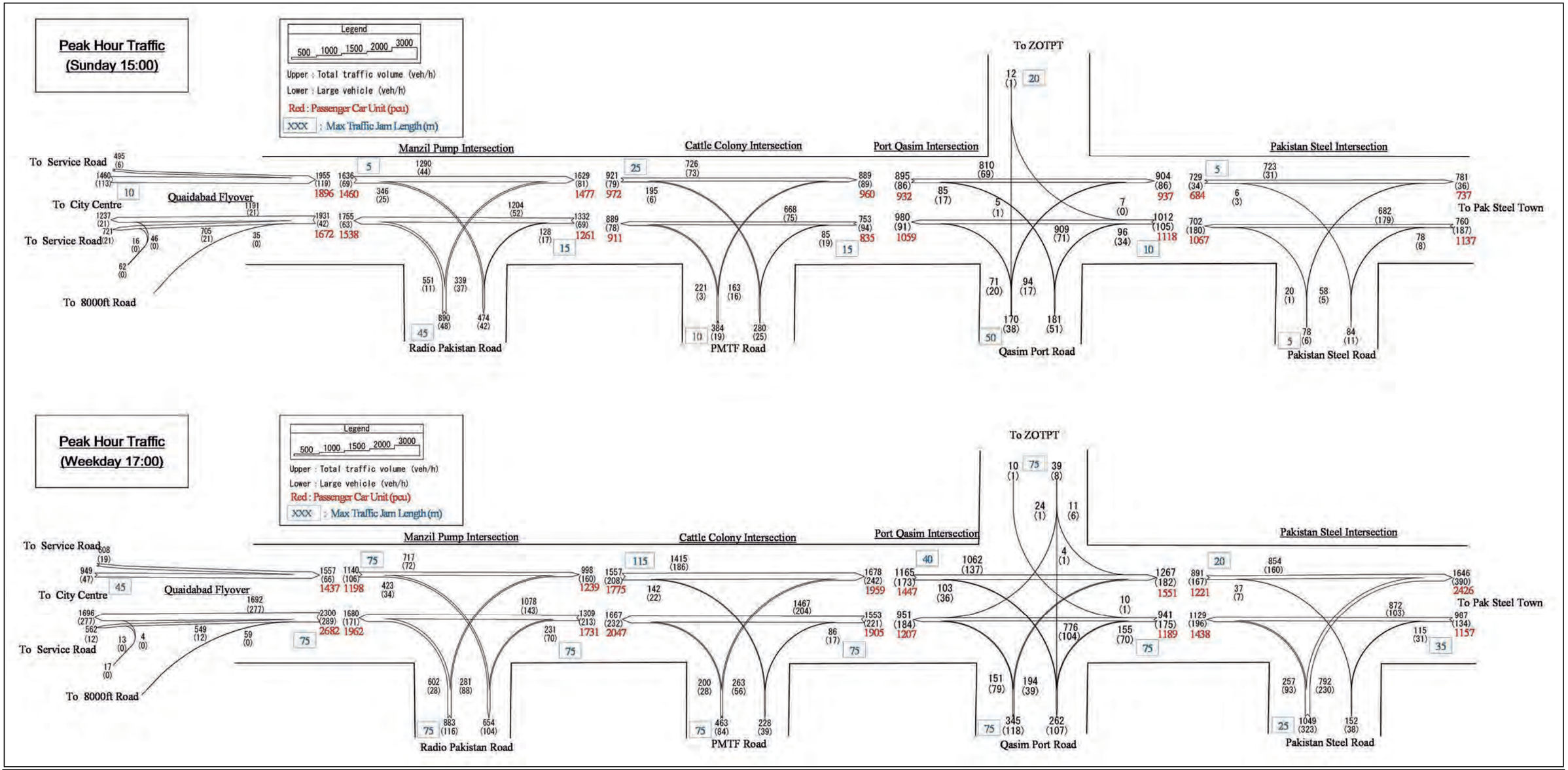


Source: Survey Team

Figure 2-2-5 Hourly Fluctuation of Intersection Traffic Volume

Present traffic flow at each intersection on peak hour

Figure 2-2-6 shows the present traffic flow at each intersection on peak hour.

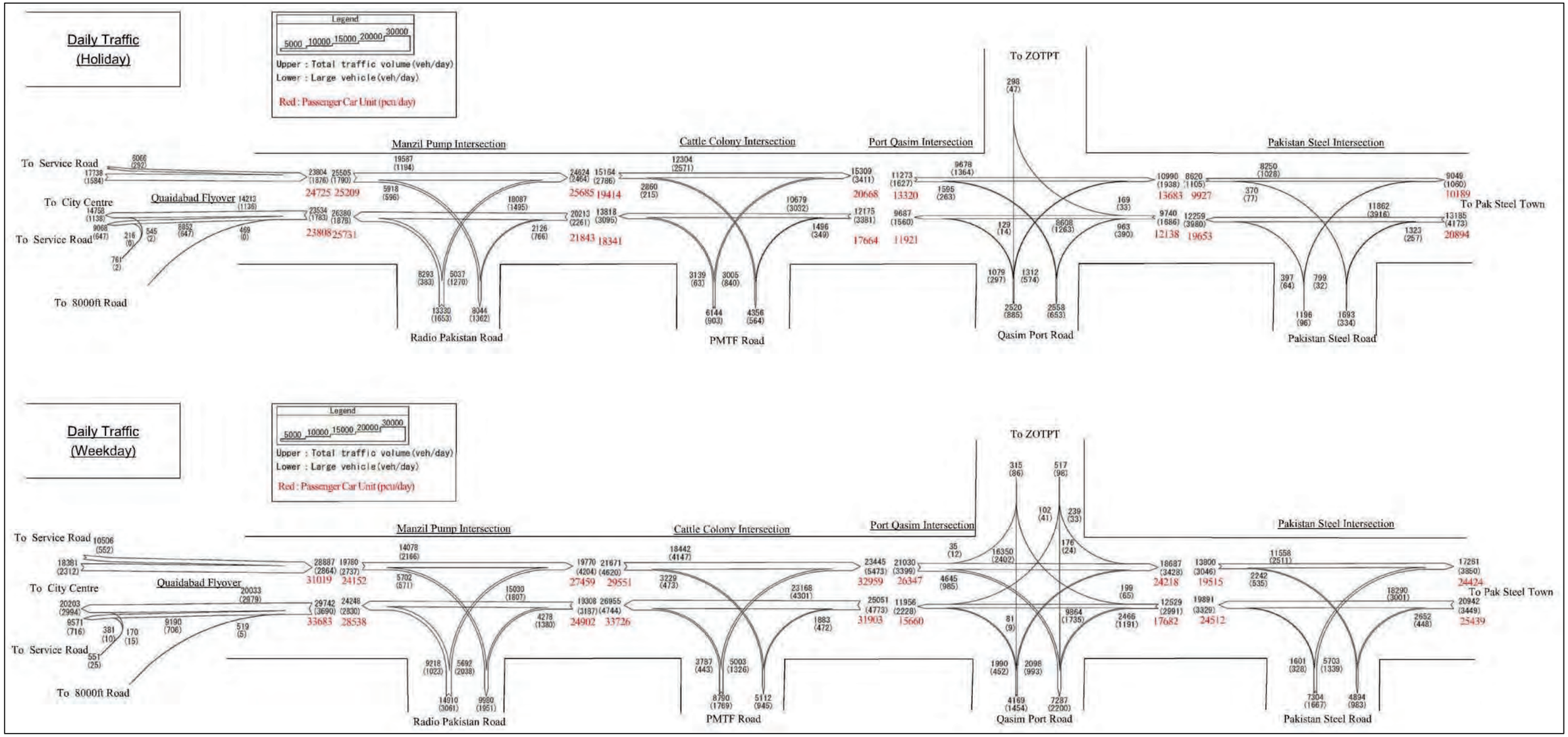


Source: Survey Team

Figure 2-2-6 Present Traffic Flow at each Intersection on Peak Hour

Present daily traffic flow at each intersection

Figure 2-2-7 shows the present traffic flow at each intersection.



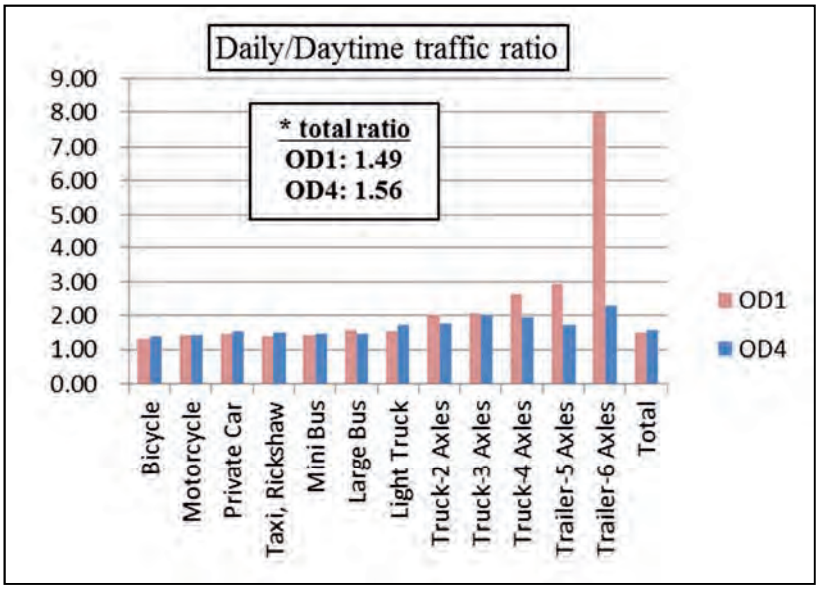
Source: Survey Team

Figure 2-2-7 Present Daily Traffic Flow at each Intersection

2) Classified traffic count survey

Ratio of daily traffic to daytime traffic

Figure 2-2-8 shows the daily traffic to daytime traffic calculated by the result of classified traffic count survey for 24 hours at OD1 (approx. 1.3km, starting point side of the Project) and OD4 (approx. 8.7km, ending point side of the Project). The ratios of most types of vehicles are around 1.5 and the ratio at OD4 is slightly higher than that at OD1. The daily traffic volume at each intersection shown in Figure 2-2-7 is calculated based on the ratio of daily traffic to daytime traffic below Figure.



Source: Survey Team

Figure 2-2-8 Ratio of Daily Traffic to Daytime Traffic

3) Roadside OD interview Survey

3-1) Origin and destination of the trip

Figure 2-2-9 - Figure 2-2-16 show the desire lines which describe the origin and destination of vehicles passing each survey point.

Major findings from the desire line at each survey point are as follows;

OD1 (approx. 1.3km, starting point side, near Radio Pakistan Intersection)

- Most of the vehicles travel within Karachi City
- Most trips of commercial vehicles are between Karachi City and Qasim Port

OD4 (approx. 8.7km, ending point side, near Port Kasim Road Intersection)

- Long trips related to Hyderabad and Punjab Province increase compared with OD1

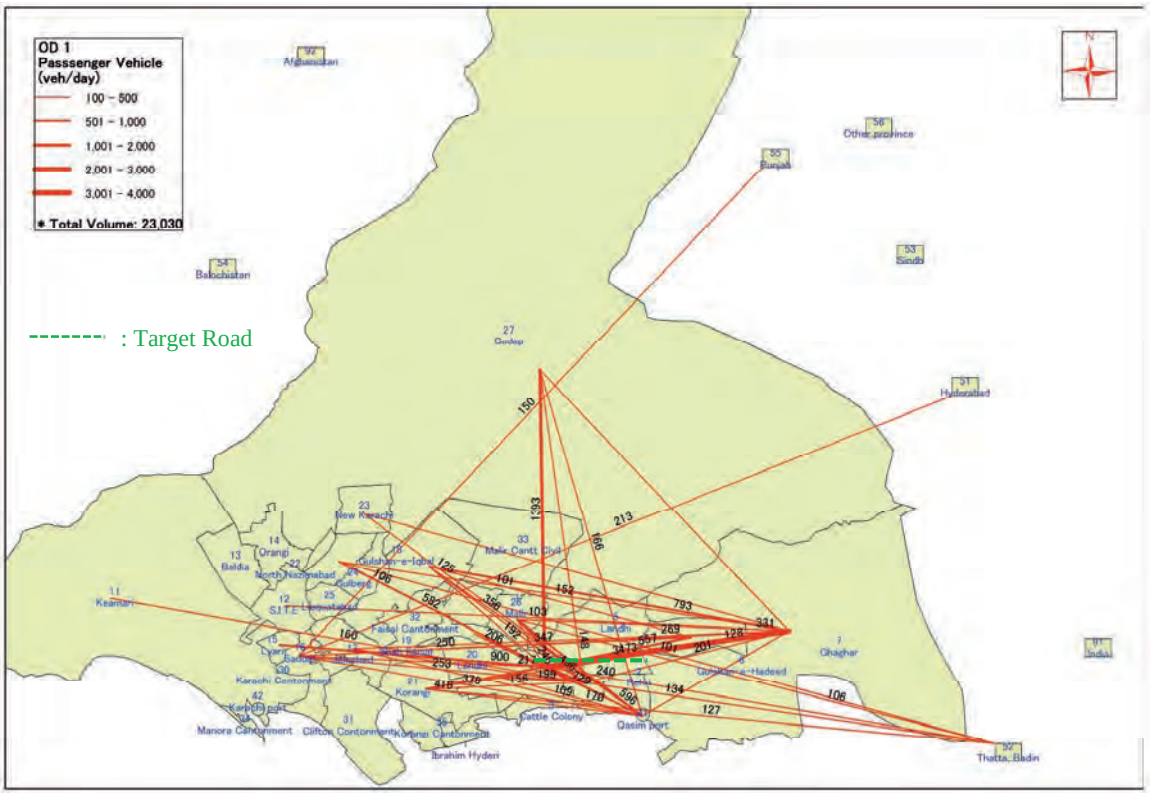
OD2 (on Mehran Highway)

- Most trips are between Karachi City and Qasim Port

OD3 (on M-9 Super Highway)

- Many long trips between Karachi City and Hyderabad and north of Pakistan were observed

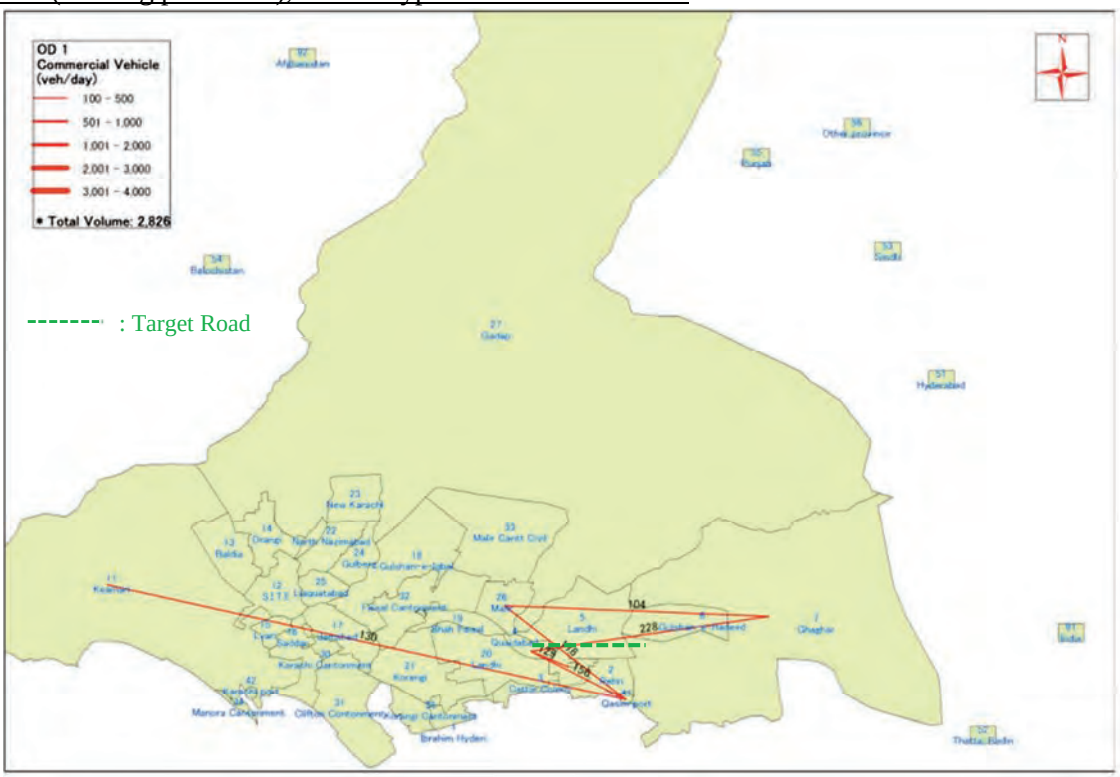
OD1 (Starting point side), vehicle type: passenger vehicle



Source: Survey Team

Figure 2-2-9 Desire Line of Passenger Car at OD1

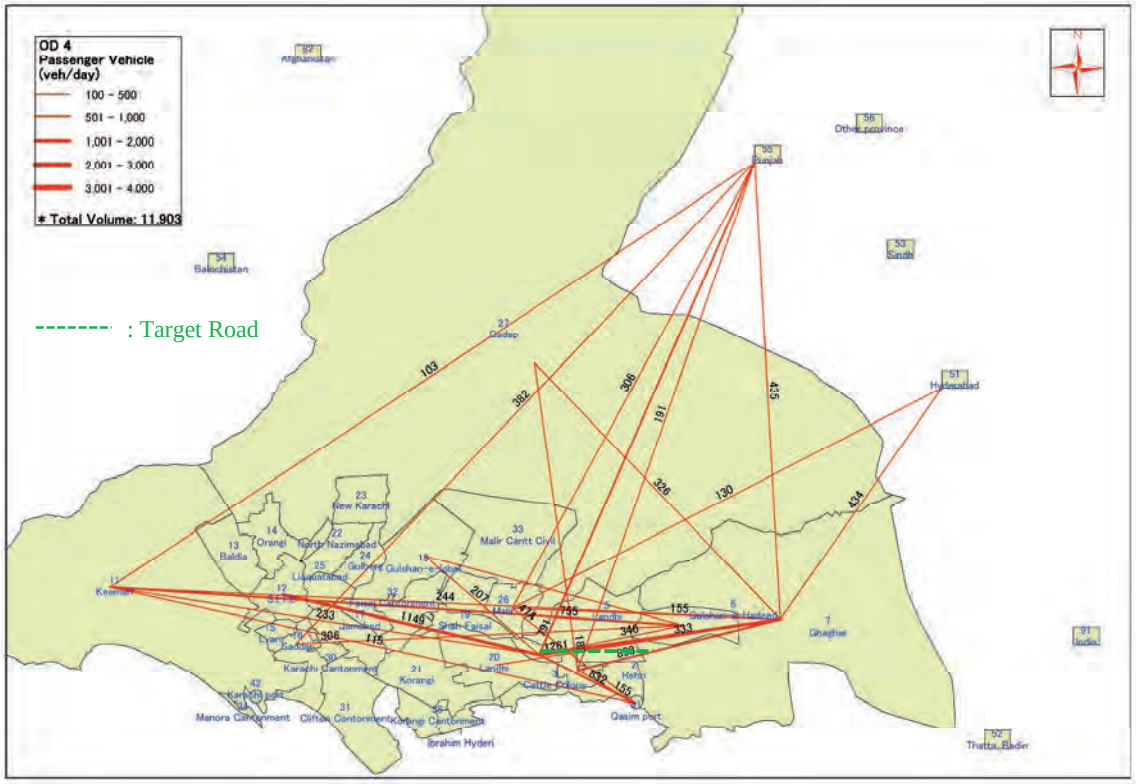
OD1 (Starting point side), vehicle type: commercial vehicle



Source: Survey Team

Figure 2-2-10 Desire Line of Commercial Vehicle at OD1

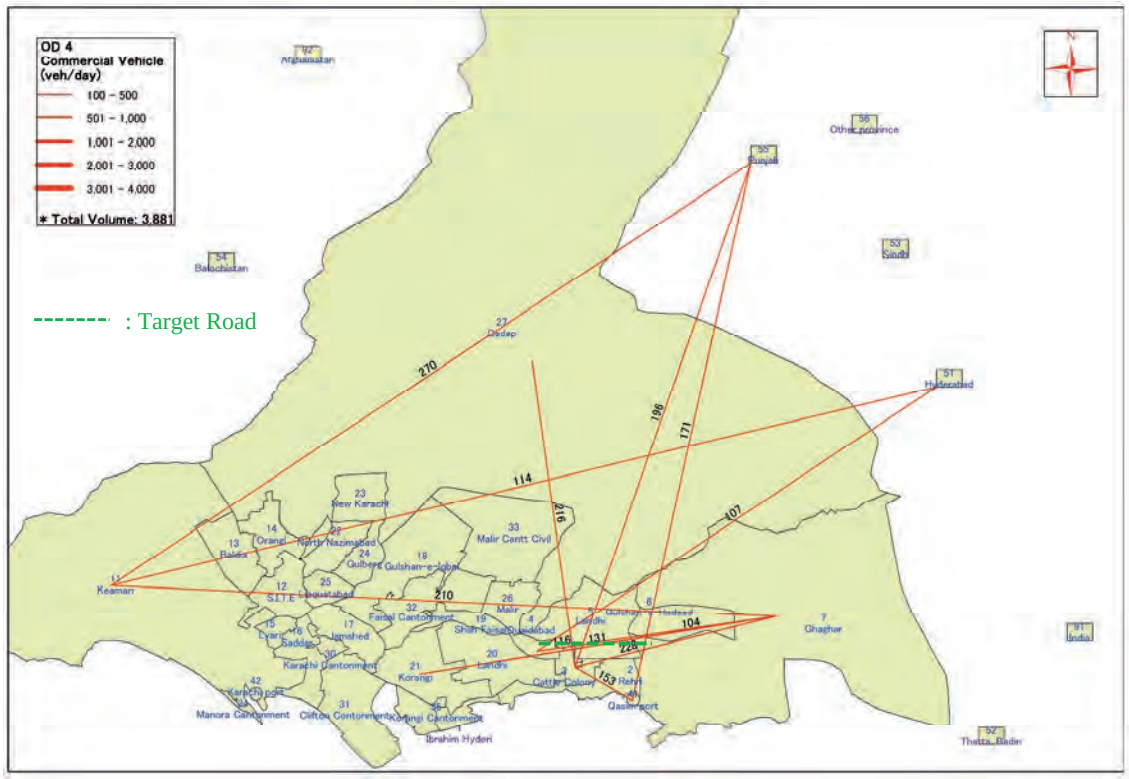
OD4 (Ending point side), vehicle type: passenger vehicle



Source: Survey Team

Figure 2-2-11 Desire Line of Passenger Car at OD4

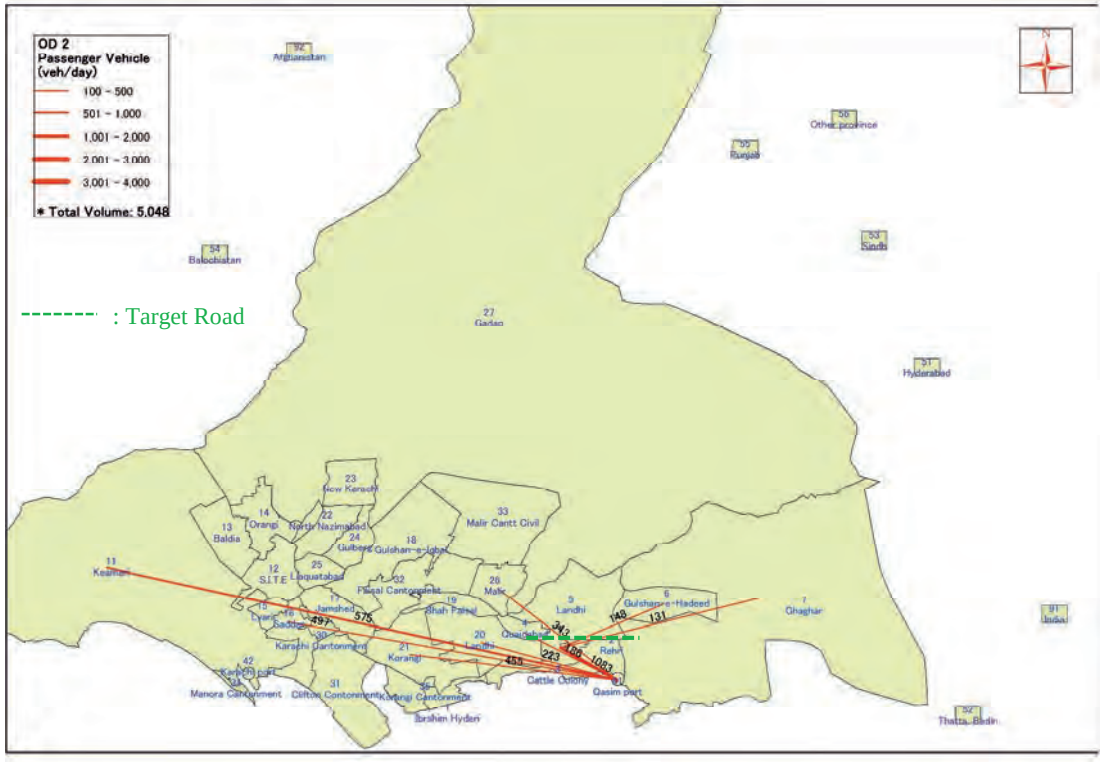
OD4 (Ending point side), vehicle type: commercial vehicle



Source: Survey Team

Figure 2-2-12 Desire Line of Commercial Vehicle at OD4

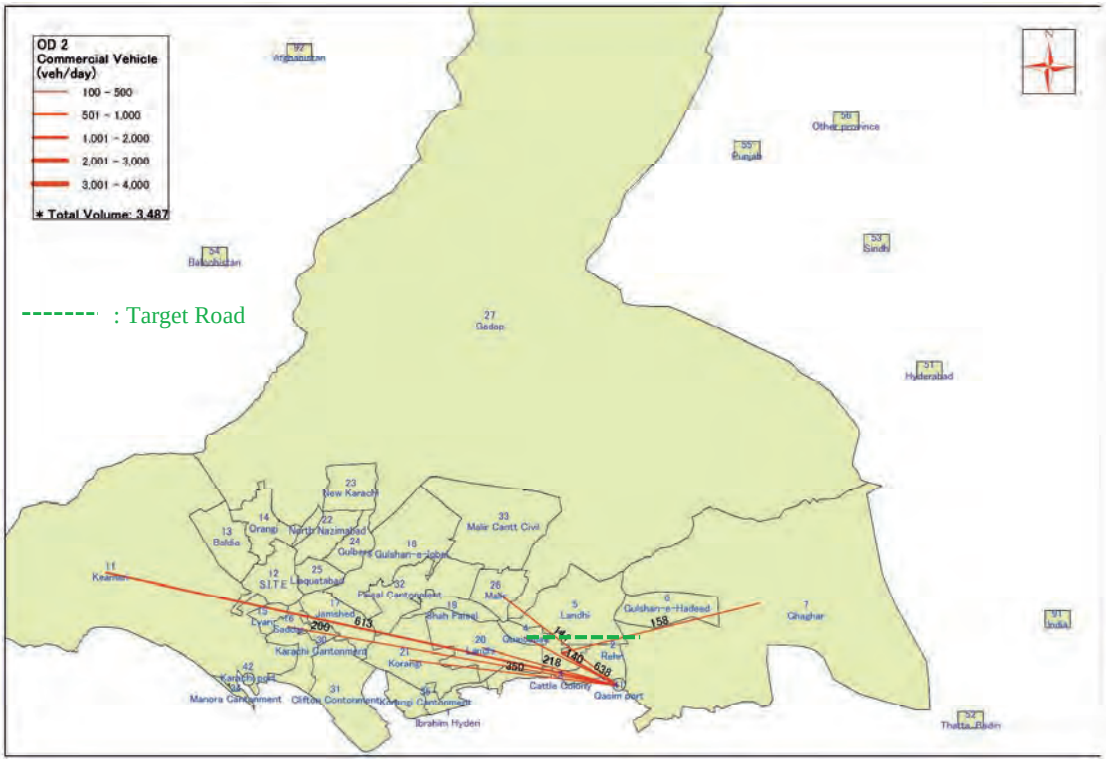
OD2 (on Mehran highway), vehicle type: passenger vehicle



Source: Survey Team

Figure 2-2-13 Desire Line of Passenger Car at OD2

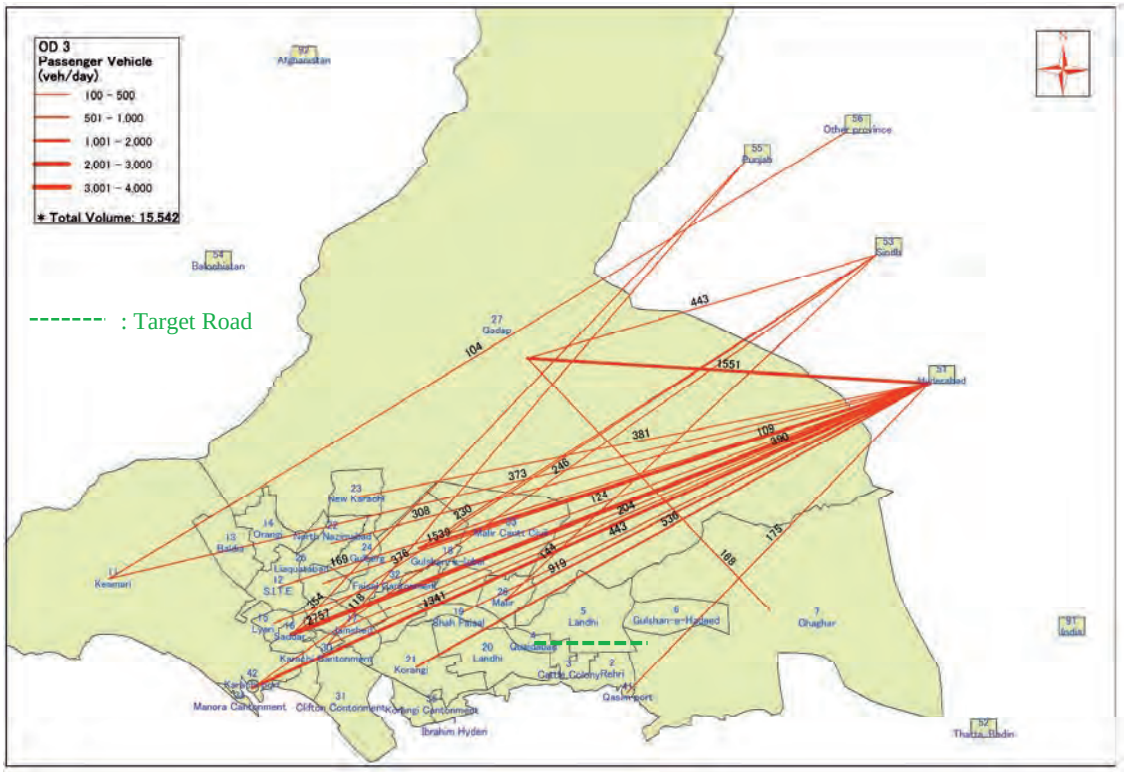
OD2 (on Mehran highway), vehicle type: commercial vehicle



Source: Survey Team

Figure 2-2-14 Desire Line of Commercial Vehicle at OD2

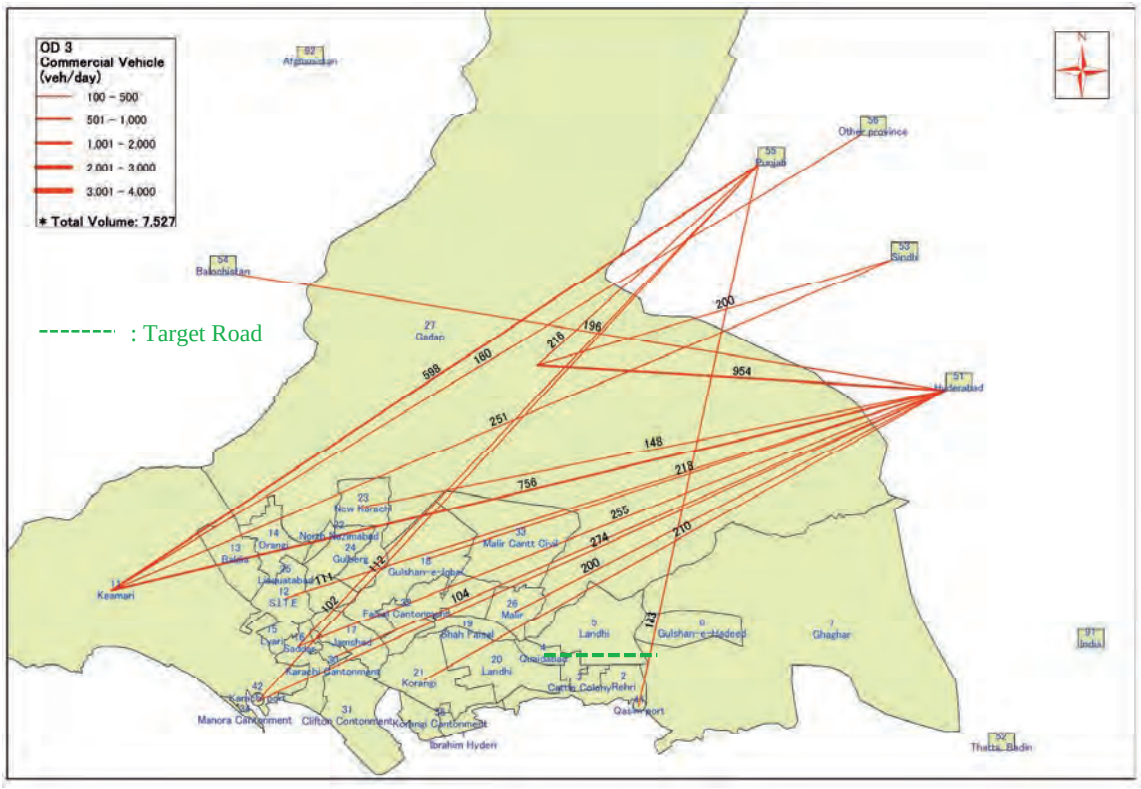
OD3 (on M-9), vehicle type: passenger vehicle



Source: Survey Team

Figure 2-2-15 Desire Line of Passenger Car at OD3

OD3 (on M-9), vehicle type: commercial vehicle

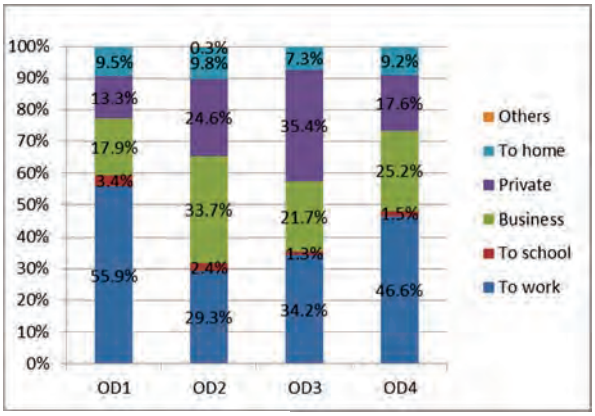


Source: Survey Team

Figure 2-2-16 Desire Line of Commercial Vehicle at OD3

3-2) Trip purpose of passenger vehicle

Figure 2-2-17 shows the proportion of trip purposes of the passenger vehicle obtained by the interview to drivers. To work (Commuting) has the highest proportion , approximately 50 %, at OD 1 and OD 4 on the target road. Business and Private have relatively higher proportion at OD 2 on Mehran Highway and OD 3 on M-9.

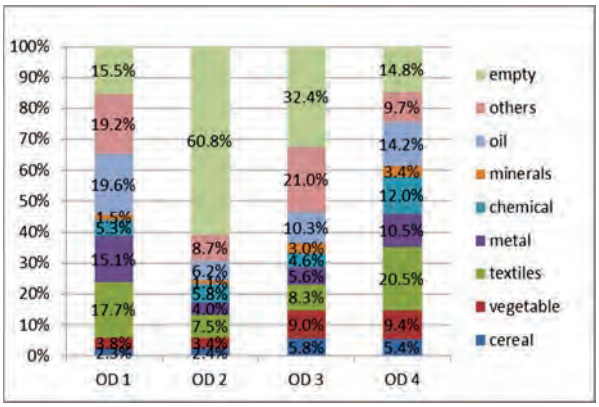


Source: Survey Team

Figure 2-2-17 Trip Purpose of Passenger Vehicle

3-3) Commodity type transported by commercial vehicle

Figure 2-2-18 shows the proportion of commodity types transported by the commercial vehicle obtained by the interview to drivers. Empty rate is approximately 15 % at OD1 and OD 4 on the target road, while 60% at OD 2 on Mehran Highway. It is found that the target road is used for the transportation of textile,metal, oil and so on.



Source: Survey Team

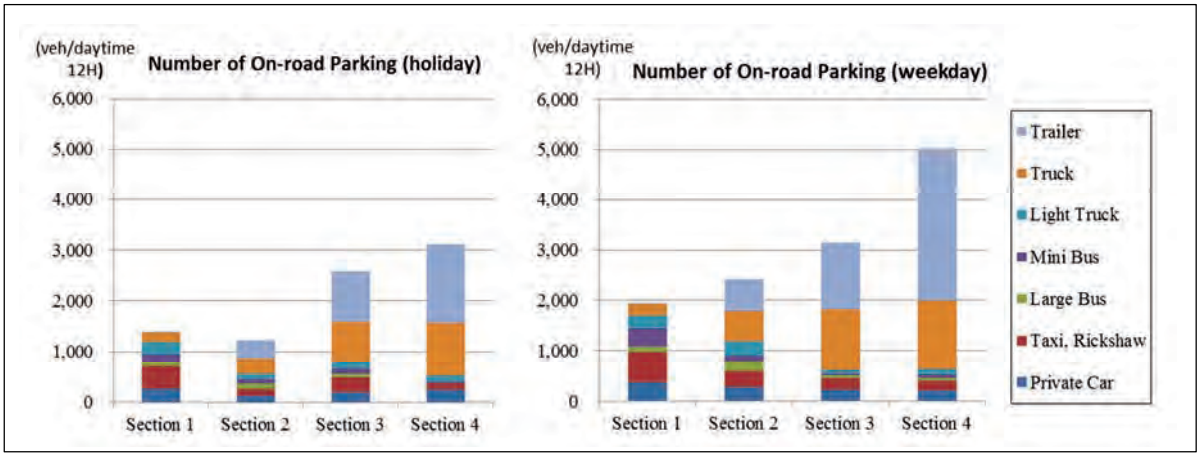
Figure 2-2-18 Commodity Type Transported by Commercial Vehicle

4) On-road Parking Survey

The Survey Team analysed the results of on-road parking survey about the number of on-road parking and hourly fluctuation as well as the purpose and duration of parking to figure out the parking situation in the Study Area.

4-1) Number of on-road parking by vehicle type

Figure 2-2-19 shows the number of on-road parking by vehicle type and survey sections. There are more on-road parking vehicles on weekday than holiday and the parking number tends to increase as it goes eastward. Section 4 has the highest number of parking (approx. 5,000 veh/ daytime 12 hours on weekday) and more than 80% of them were commercial vehicles such as truck and trailer that are supposed to wait for the container disembarked at Qasim Port.

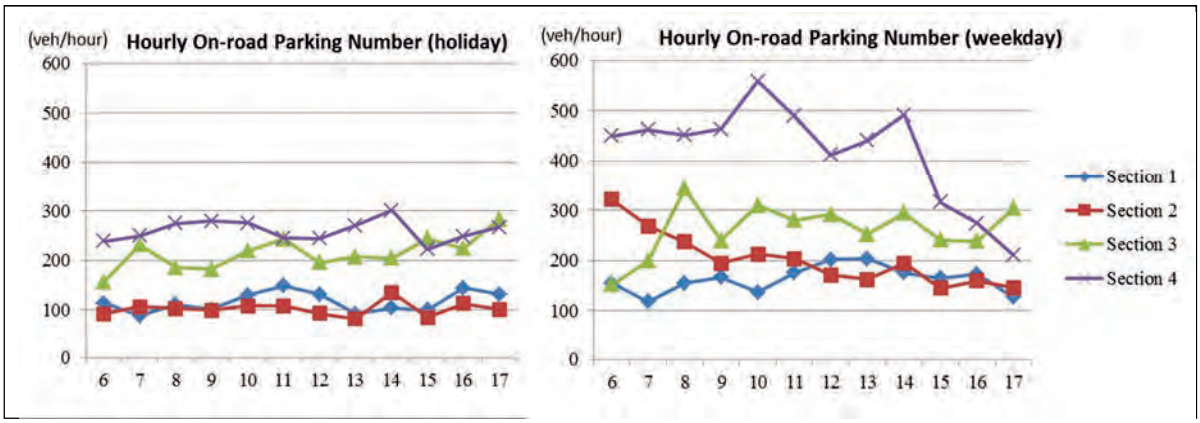


Source: Survey Team

Figure 2-2-19 Number of On-road Parking by Vehicle Type

4-2) Hourly fluctuation

Figure 2-2-20 shows the hourly fluctuation by section. The number of parking on weekday showed the fluctuation and peak hours in the morning time, but that on holiday displayed relatively flat profiles over the 12-hour day and did not have specific feature.

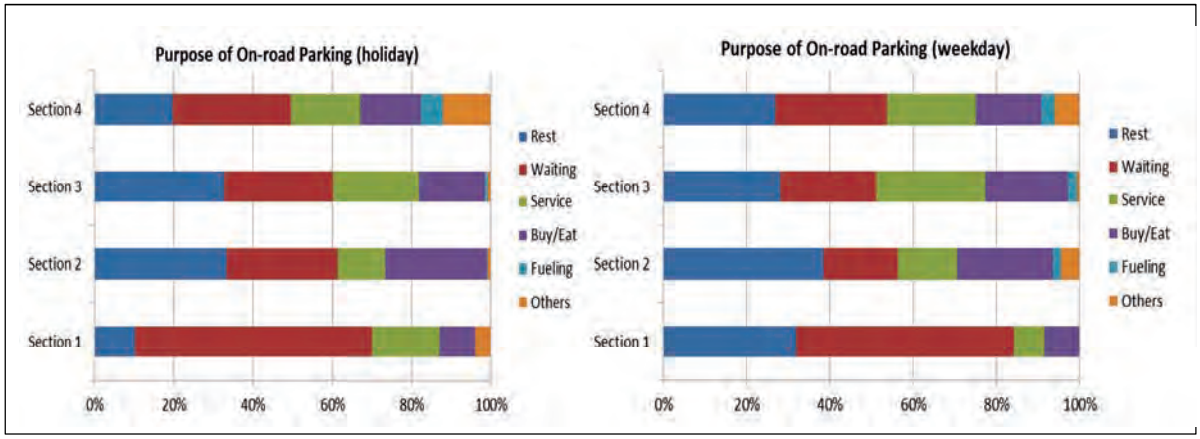


Source: Survey Team

Figure 2-2-20 Hourly Fluctuation of On-road Parking

4-3) Parking purpose

Figure 2-2-21 shows the proportion of the parking purpose by each section obetained by the interview to drivers parking. Waiting has the highest proportion ,more than 50 %, in Section 1, while rest has the highest proportion in Section 2 and Section 3. Service has relatively high proportions in Section 3 since there are many car service shops at the roadside in Section 3.

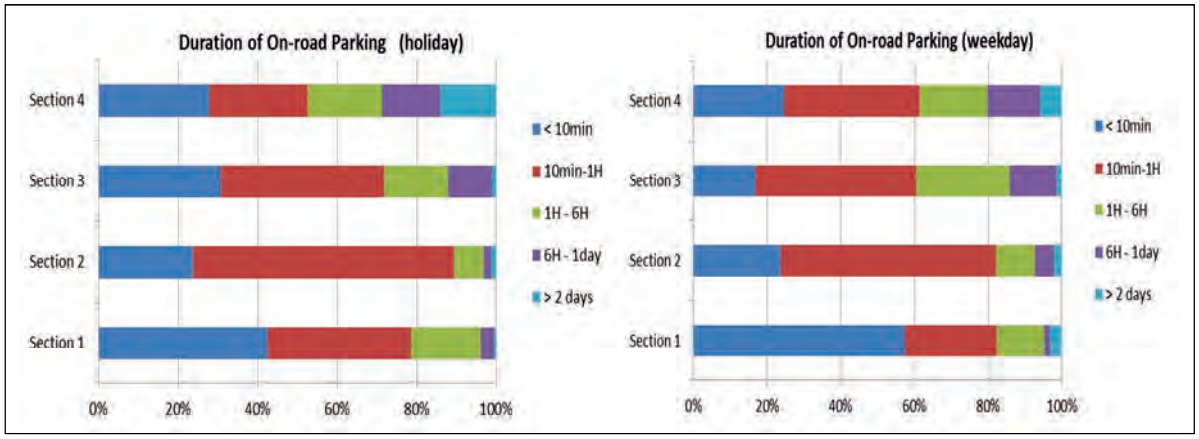


Source: Survey Team

Figure 2-2-21 Proportion of Parking Purpose

4-4) Parking duration

Figure 2-2-22 shows the proportion of the parking duration by each section obetained by the interview to drivers parking. Less than 10 minutes has the highest proportion in Section 1, while 10 minutes - 1 hour has the highest proportion in Section 2, Section 3 and Section 4. Parking duration tends to be long as it goes eastward.



Source: Survey Team

Figure 2-2-22 Proportion of Parking Duration

5) Axle Load Survey

The Survey Team conducted the axle load survey at the weigh bridge in the private facilities along the target road and sampled 25 large vehicles composed of trucks with 2 and 3 axles, trailers with 4 and 6 axles. Table 2-2-2 shows the average and maximum axle load by axle and by vehicle type. It is found that most of the average axle load of trailers exceed the 12 tons ruled by the NHA regulation.

Table 2-2-2 Result of Axle Load Survey

Vehicle Type	Sampling Number		Axle Load (kg)						Gross Weight (kg)
			Front Axle	Rear1	Rear2	Rear3	Rear4	Rear5	
Truck-2 Axles	8	Average	3,713	8,972					12,685
		Maximum	4,310	12,610					16,380
Truck-3 Axles	12	Average	7,892	17,493	16,861				42,246
		Maximum	10,450	23,330	24,065				57,845
Trailer-4 Axles	4	Average	4,819	14,945	12,059	10,139			41,961
		Maximum	5,900	20,860	15,030	14,700			56,490
Trailer-6 Axles	1	Average	-	-	38,100	23,420	19,160	15,090	95,770
		Maximum	-	-	38,100	23,420	19,160	15,090	95,770
Total	25	Average	5,987	14,228	16,981	12,795	19,160	15,090	34,882
		Maximum	10,450	23,330	38,100	23,420	19,160	15,090	95,770

Source: Survey Team

Note: Axle load of Rear 2 of Trailer- 6 axle, 38,100 kg, is a sum of Front, Rear 1 and Rear 2

(3) Traffic Demand Forecast

1) Methodology of traffic demand forecast

Firstly, the traffic survey result shown above has been converted to Annual Average Daily Traffic (AADT) considering the coefficients of monthly and daily variation published by National Transport Research Centre (NTRC) in Pakistan.

Future traffic demand in the target section is forecasted by adding the following 3 traffic demands to the present AADT as shown in Figure 2-2-23.

a) Natural growth

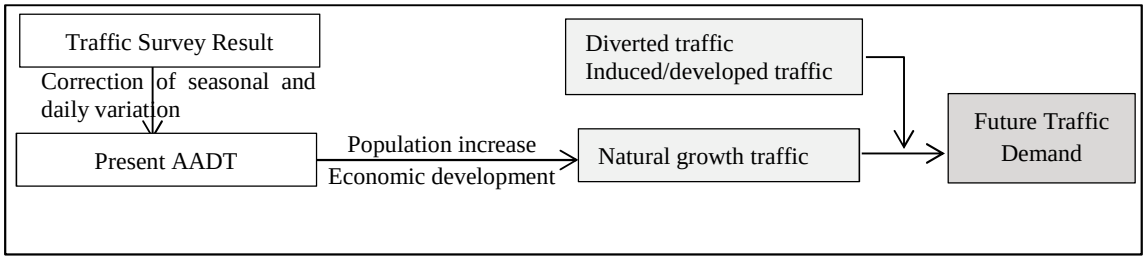
Naturally increasing traffic demand brought by population increase and economic development, which generally accounts a major share of future traffic demand.

b) Diverted traffic

Traffic demand diverting from other roads which is arising by the promotion of road conditions after the Project implementation.

c) Induced and developed traffic

Traffic demand brought by the development and facility construction at the roadside which the Project could accelerate. In the Project, traffic demand additionally brought by the development in Bin Qasim Industrial Area is considered.



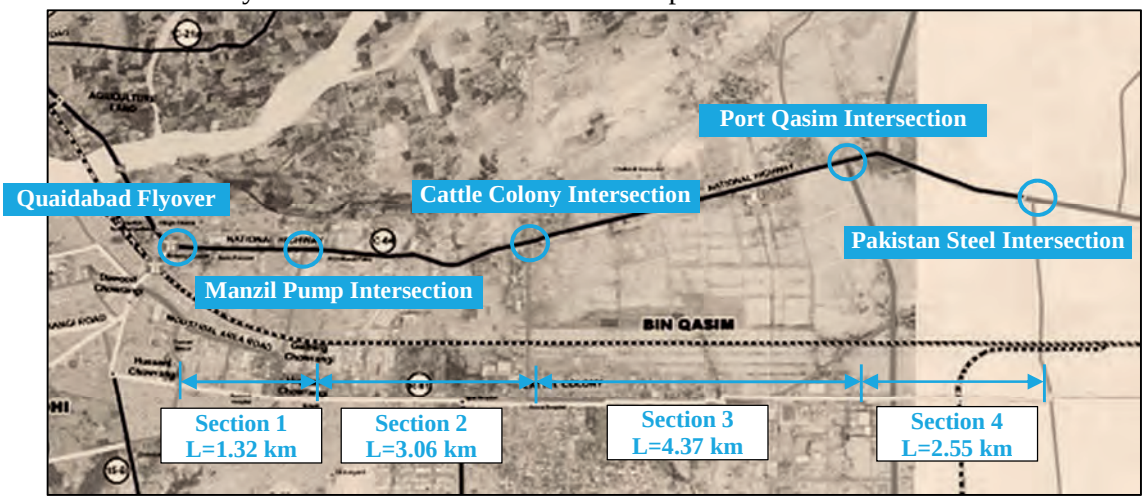
Source: Survey Team

Figure 2-2-23 Methodology of Traffic Demand Forecast

2) Conversion of traffic survey results to AADT

Daily traffic volume in the target road is calculated using the result of Intersection Traffic Count Survey by the divided section between major intersections as shown in Figure 2-2-24 (Section 1~4). As the traffic volume counted in the survey is for daytime 12 hours, the Ratio of daily traffic to daytime traffic shown in Figure 2-2-8 is used to calculate daily traffic volume.

Then the coefficient of monthly variation 0.960 in March and the coefficient of daily variation 1.003 on Tuesday are used to convert to AADT. The present AADT is shown in Table 2-2-3.



Source: KMC

Figure 2-2-24 Sections in the Target Road

Table 2-2-3 Present AADT

Section	Section 1	Section 2	Section 3	Section 4
AADT(pcu※/day)	56,657	54,601	49,108	41,256

※ pcu：passenger car unit

3) Natural growth of traffic demand

Population, GDP and vehicle registration number are considered as indicators affecting natural growth of traffic demand. Comparing the trend of each socio-economic indicator with actual traffic growth found by the past traffic data, traffic volume is estimated to increase according to the indicator's trends which have a close relation to the traffic growth.

As a result of the analysis for the motorcycle, passenger vehicle and commercial vehicle taking the difference of utilisation characteristics by vehicle type, indicators affecting the traffic growth are set as shown in Table 2-2-4.

Table 2-2-4 Indicators affecting Traffic Growth

Vehicle Type	Indicators
Motorcycle	Vehicle registration number in Karachi City
Passenger vehicle(including taxi, bus and light truck)	Population in Karachi City
Commercial vehicle	GDP growth rate in Pakistan

3-1) Traffic growth rate in past years

Comparing the traffic survey result Port Qasim Authority (PQA) conducted near the Port Qasim Intersection on the target road in 1997 with the traffic survey result in the Survey, the annual average growth rate (AAGR) in the past by vehicle type is shown in Table 2-2-5.

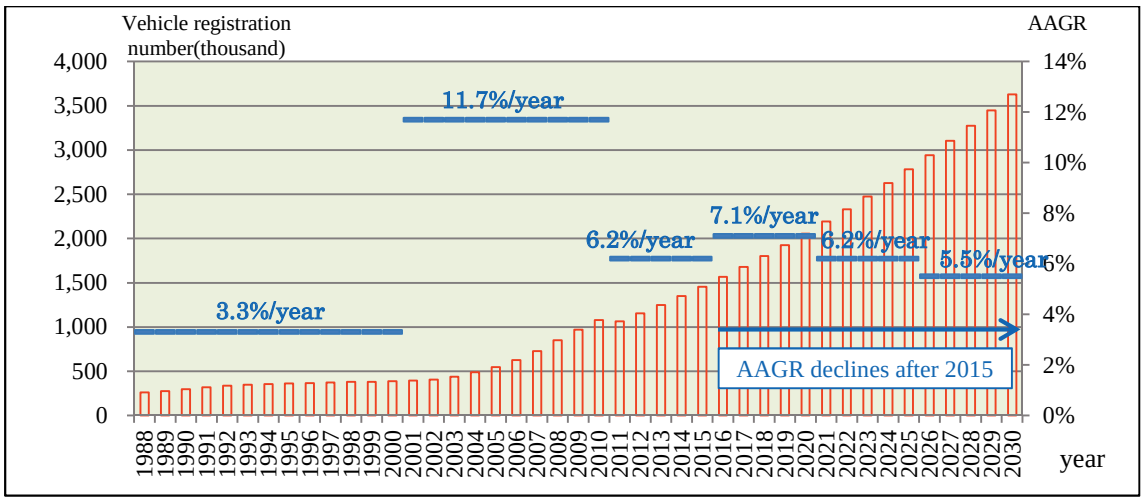
Table 2-2-5 AAGR of Traffic on the Target Road

Vehicle Type	AAGR(1997-2015)
Motorcycle	12.6 %/year
Passenger vehicle(including taxi, bus and light truck)	4.8 %/ year
Commercial vehicle	2.1 %/ year

3-2) Vehicle registration trend and traffic growth rate of motorcycle in the future

The actual record and future forecast of motorcycle registration in Karachi City mentioned in KTIP are shown in Figure 2-2-25.

Since the AAGR of registration number, 11.7%/year, between 2001 and 2010 is considered to have a close relation to the actual AAGR 12.6%/year of the motorcycle traffic in the Table 2-2-5, the motorcycle traffic on the target road is forecasted to increase according to the AAGR of registration number in the future. As shown in Figure 2-2-25, the AAGR of motorcycle registration number in the future is expected to be 7.1%/year between 2015 and 2020, 6.2%/year between 2020 and 2025, and 5.5%/year after 2025. Accordingly, the motorcycle traffic is forecasted to increase in accordance with the AAGR of registration number.



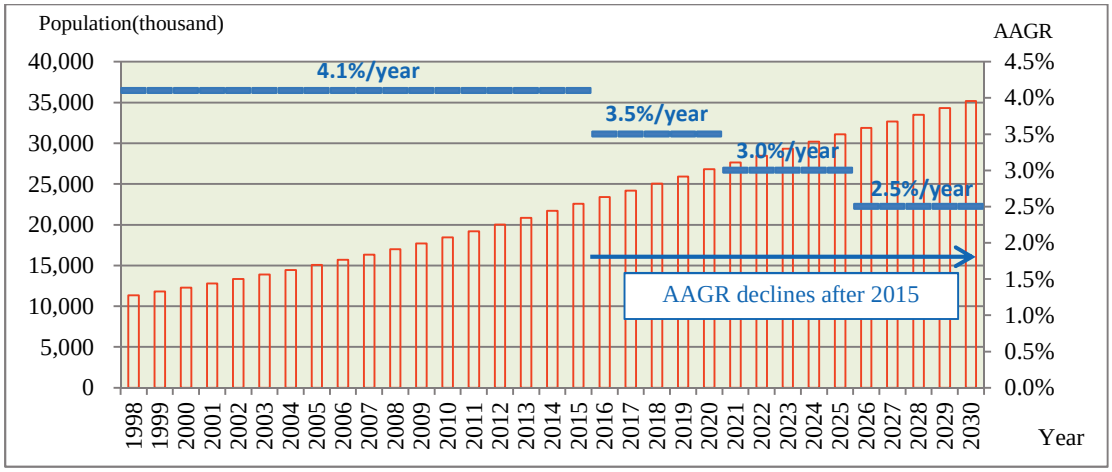
Source: KTIP

Figure 2-2-25 Vehicle Registration Trend of Motorcycle in Karachi City

3-3) Population trend in Karachi City and traffic growth rate of passenger vehicle in the future

Population trend and future forecast in Karachi city mentioned in KTIP are shown in Figure 2-2-26.

Since the AAGR of population, 4.1%/year, between 1998 and 2015 is considered to have a close relation to the actual AAGR 4.8%/year of the passenger vehicle in the Table 2-2-5, the passenger vehicle on the target road is forecasted to increase according to the AAGR of population in the future. As shown in Figure 2-2-26, the AAGR of population in the future is expected to be 3.5%/year between 2015 and 2020, 3.0%/year between 2020 and 2025, and 2.5%/year after 2025. Accordingly, the passenger vehicle is forecasted to increase in accordance with the AAGR of population.



Source: KTIP

Figure 2-2-26 Population Trend in Karachi City

3-4) GDP growth trend and traffic growth rate of commercial vehicle in the future

GDP growth rate by sector in Pakistan is shown in Table 2-2-6. According to KTIP, GRDP growth rate in Karachi City is expected to be equivalent to GDP growth rate in Pakistan and the traffic demand forecast in KTIP refers to the GDP growth rate in Pakistan. In addition, the traffic demand forecast in KTIP adopts AAGR of GDP for past 10 years 2.5%/year because of the unstable fluctuation of GDP growth in each year.

Since the AAGR of GDP, 2.5%/year, is considered to have a close relation to the actual AAGR 2.1%/year of the commercial vehicle in the Table 2-2-5, the commercial vehicle on the target road is forecasted to increase according to the AAGR of GDP 2.5%/year. In addition, as the AAGR of the annual handling volume of cargo in Qasim Port for recent 10 years (2004-2013) is 2.17%/year, the above -mentioned 2.5 % could be regarded as proper.

Table 2-2-6 GDP Growth Rate in Pakistan (2001-2010)

	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09R	2009-10P	Average (10 years)	Average (8 years)
Gross Domestic Product	2.0	3.0	4.7	7.5	9.0	5.8	6.8	3.7	1.2	4.1	2.5	4.7
- Agliculture	-2.2	0.1	4.1	2.4	6.5	6.3	4.1	1.0	4.0	2.0	1.5	2.2
- Manufacturing	9.3	4.5	6.9	14.0	15.5	8.7	8.3	4.8	-3.7	5.2	3.9	7.7
- Commodity Producing Sector	0.8	1.4	4.3	9.2	9.5	5.1	6.6	1.3	0.8	3.6	2.2	4.0
- Service Sector	3.1	4.8	5.2	5.9	8.5	6.5	7.0	6.0	1.6	4.6	2.8	5.4
Source: Economic Survey 2009-10												

Source: Economic Survey 2009-10

4) Diverted traffic demand from other roads

In the Survey, the Survey Team has conducted Roadside OD Interview Survey on the target road as well as Mehran Highway and M-9 to identify the trip characteristics of each vehicle and the intensity to change the trip route after the Project.

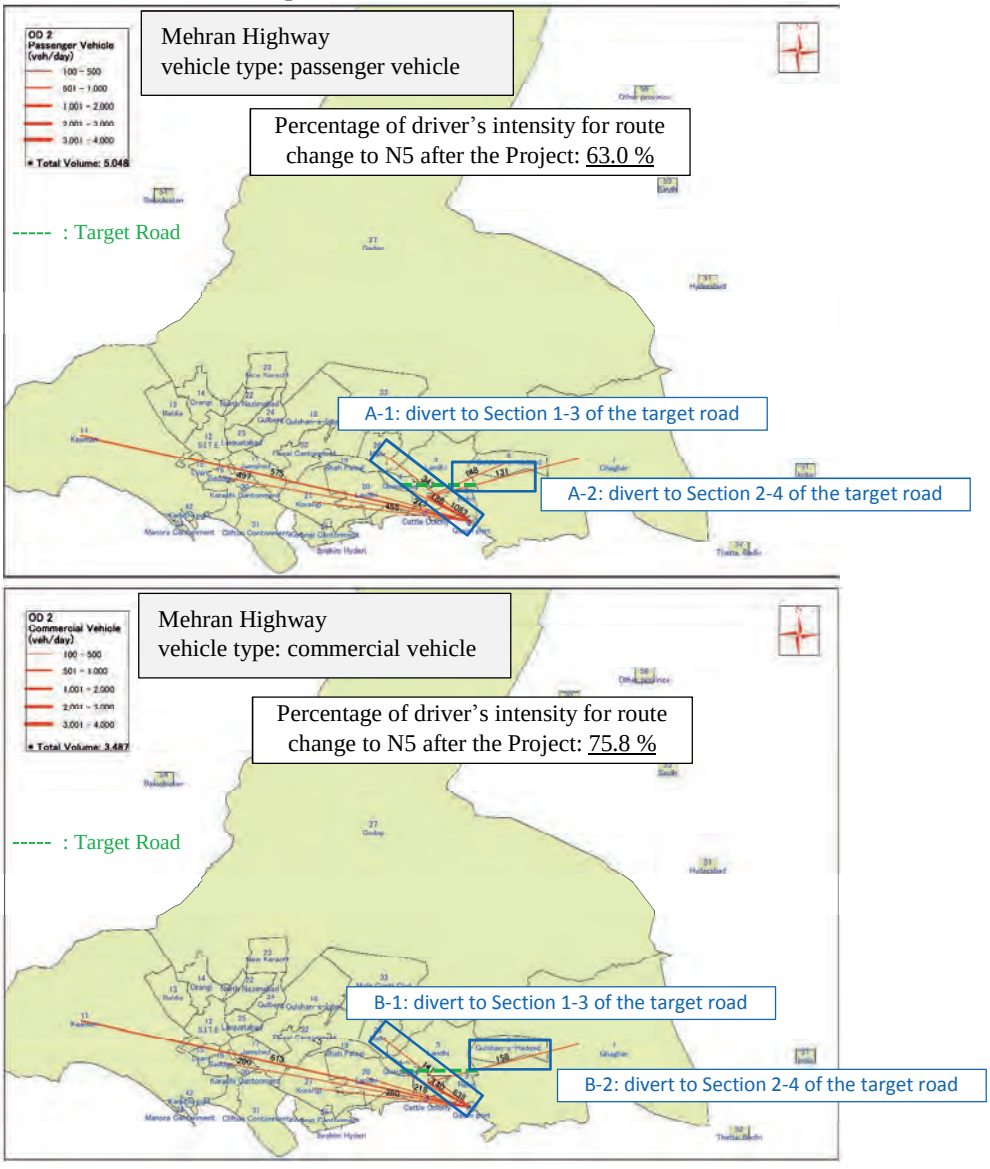
The survey result shows that most of the vehicles passing M-9 are the long-trip vehicles between Karachi City and outside the city such as Hyderabad and Punjab Province. Hence, the few diverted traffic from M-9 are expected after the Project.

On the other hand, the Survey Team confirmed that most of the vehicles passing Mehran Highway are coming from and going to Karachi City Centre, Qasim Port and Bin Qasim Town.

In addition, the parking facility for the large vehicles, ZOTPT, will operate at the north of Qasim Port Intersection in the near future. Therefore, some of them are expected to divert to the target road after the Project.

Figure 2-2-27 shows the desire line of the passenger vehicle (upper) and the commercial vehicle (lower) of Mehran Highway obtained from the OD Survey and the diverted traffic expected. The vehicles coming from and going to the west of Karachi City and Qasim Port are expected to use 8,000 ft road and Mehran Highway in the future, while the OD distributions of A-1,A-2,B-1 and B-2 shown in Figure 2-2-27 are expected to either section of the target road.

Table 2-2-7 shows the diverted traffic demand from Mehran Highway in the operation year of the target road taking the driver's intensity for the route change into consideration. The diverted traffic is also expected to grow in accordance with the growth rate mentioned in 3) Natural growth of traffic demand after the operation.



Source: Survey Team

Figure 2-2-27 Desire Line of Mehran Highway and Diverted Traffic

Table 2-2-7 Diverted Traffic from Mehran Highway

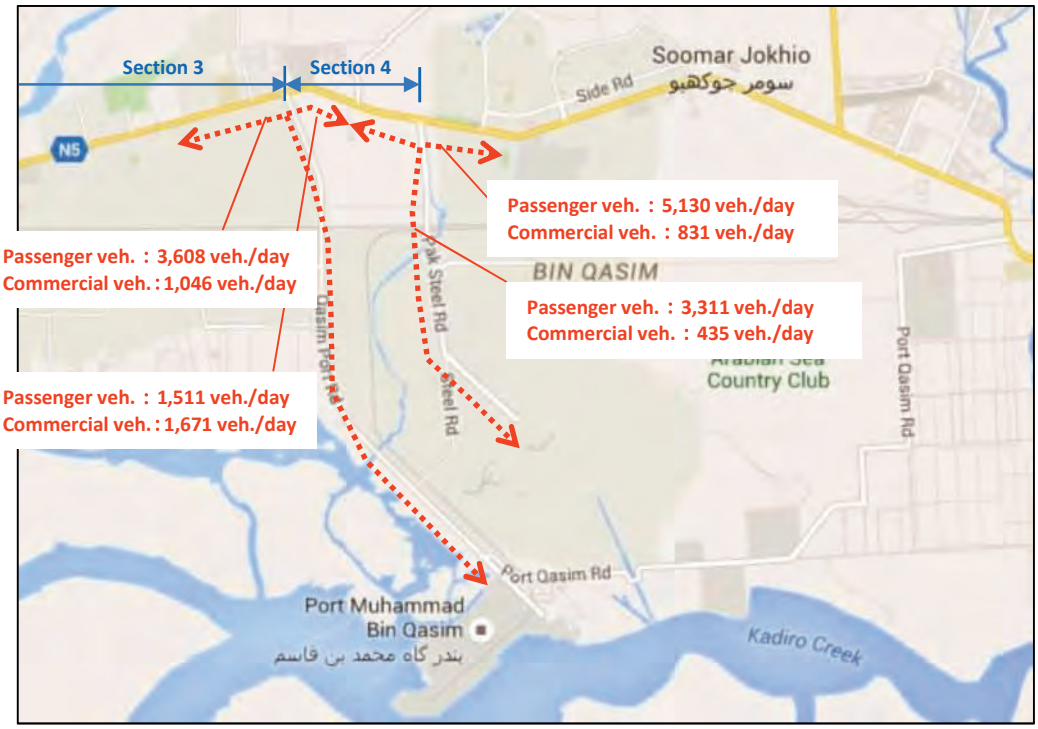
Vehicle Type	Diverting Section	Diverted traffic in operation year
Passenger Vehicle	Section 1-3 (Figure 2-2-27 A-1)	978 veh./day(1,552 veh./day x 63.0%)
	Section 2-4 (Figure 2-2-27 A-2)	169 veh./day (269 veh./day x 63.0%)
Commercial Vehicle	Section 1-3 (Figure 2-2-27 B-1)	671 veh./day (885 veh./day x 75.8%)
	Section 2-4 (Figure 2-2-27 B-2)	115 veh./day (152 veh./day x 75.8%)

5) Induced and developed traffic demand brought by roadside development

The newly generated and attracted traffic caused by the industrial development in Bin Qasim Area is forecasted through the following steps as the induced and developed traffic brought by the development around the Project site due to the promotion of the road condition.

5-1) Present generated and attracted traffic related to the industrial area

Assuming that all of the generated and attracted traffic related to the industrial area use the Qasim Port Road and Pakistan Steel Road, the traffic volume going to and coming from both roads is forecasted as the generated and attracted traffic at present as shown in Figure 2-2-28.



Source:Survey Team

Figure 2-2-28 Present Generated and Attracted Traffic related to the Industrial Area

5-2) Forecast of induced and developed traffic in the future

In addition to the natural increase of the traffic demand in accordance with the population increase and economic development shown in 3), the development of the industrial area is expected to accelerate furthermore because of the Project implementation. So, the AAGR 6%/year which PQA sets on the study for the Project for Improvement/ Upgradation of PQA Main Access Road is adopted as the traffic growth rate for Qasim Port Road and Pakistan Steel Road after the implementation of the Project. Then, the difference between the above-mentioned 6% and the natural growth rate adopted as the generated and attracted traffic on the target road. Table 2-2-8 shows the generated and attracted traffic on the target

road in the 1 year, 5 years and 10 years after the operation of the target road.

Table 2-2-8 Generated and Attracted Traffic after the Operation

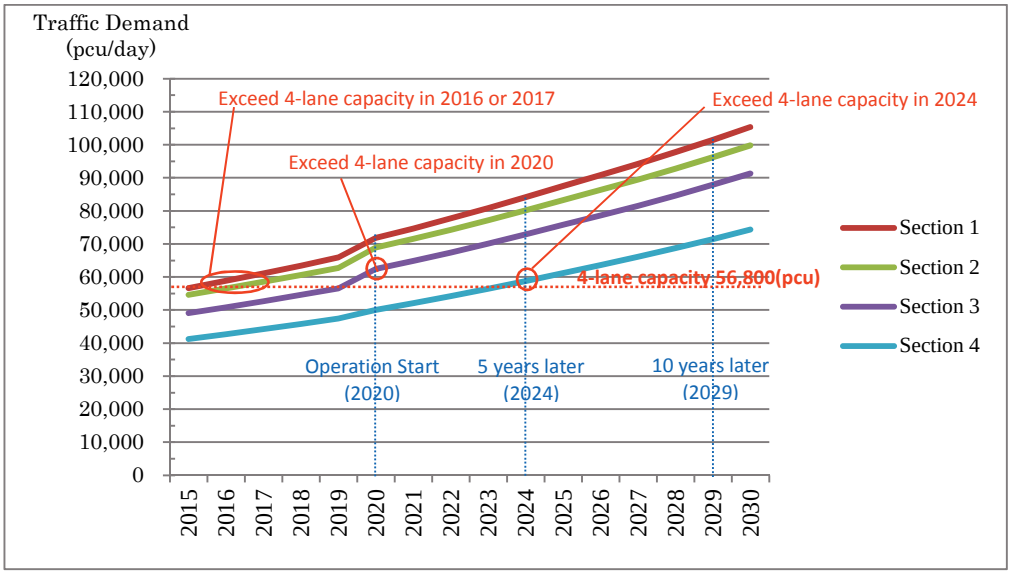
Year after operation	Section	Generated and Attracted Traffic(veh./day)	
		Passenger Vehicle	Commercial Vehicle
1 year	Section 1-3	199	58
	Section 4	139	82
5 years	Section 1-3	1,378	340
	Section 4	960	482
10 years	Section 1-3	3,708	838
	Section 4	2,584	1,190

6) Future traffic demand on the target road

Table 2-2-9 and Figure 2-2-29 show the future traffic demand of the each section of the target road based on the above examination. The future traffic demand is a sum of the natural growth traffic, the diverted traffic and the developed/induced traffic. As a result, the future traffic demand is expected to exceed the 4-lane traffic capacity 56,800pcu[1] in 2016 on Section 1, in 2017 on Section 2, in 2020, the operation-start year, on Section 3 and in 2024 on Section 4.

Table 2-2-9 Future Traffic Demand

Section	Future Traffic Demand (pcu)															
	Present(2015)				Operation start(2020)				5 years after operation(2024)				10 years after operation(2029)			
	Natural growth traffic	Diverted traffic	Induced/ developed traffic	Total	Natural growth traffic	Diverted traffic	Induced/ developed traffic	Total	Natural growth traffic	Diverted traffic	Induced/ developed traffic	Total	Natural growth traffic	Diverted traffic	Induced/ developed traffic	Total
Section 1	56,657	-	-	56,657	68,461	2,991	373	71,825	78,401	3,323	2,398	84,122	91,518	3,764	6,222	101,504
Section 2	54,601	-	-	54,601	65,028	3,509	373	68,910	73,861	3,896	2,398	80,155	85,591	4,415	6,222	96,228
Section 3	49,108	-	-	49,108	58,538	3,509	373	62,420	66,562	3,896	2,398	72,856	77,254	4,415	6,222	87,891
Section 4	41,256	-	-	41,256	49,090	517	385	49,992	55,766	572	2,406	58,744	64,673	645	6,154	71,472



Source:Survey Team

Figure 2-2-29 Future Traffic Demand

[1] 1,280(pcu/hour/lane, average speed 80 km/hour) x 4 lane / peak factor 0.09(pcu・hour/day)≒56,800(pcu/day) in accordance with Highway Capacity Manual(HCM)

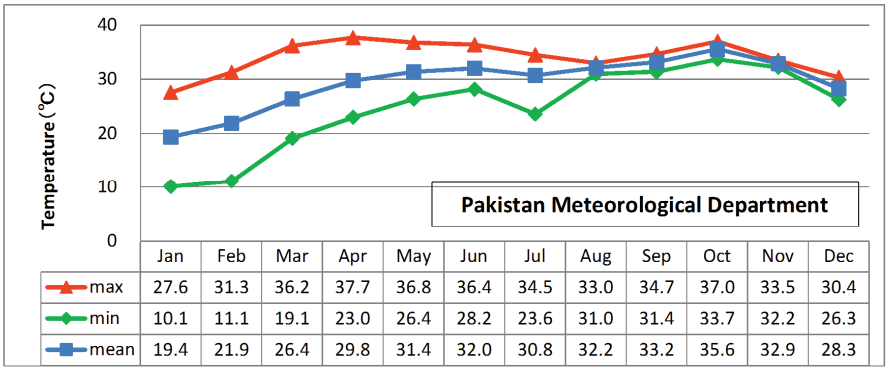
2-2-3 Natural Conditions

(1) General Conditions

Karachi city is having high needs of river improvement and rainwater drainage measures, because it has a big difference of the rainfall intensity in addition to the flat topography and low-permeable geology.

(2) Temperature

Facing onto the Arabian Sea, Karachi has a maritime climate that is milder than the climate in other parts of Pakistan. The months of May and June before the start of the monsoon are the hottest and driest, while the winter season of December and January is slightly cooler and more pleasant. The monthly average maximum temperature between 2001 and 2009 ranged from 27.6 to 37.7 degrees, and the monthly average lowest temperature was 10.1 degrees in January.



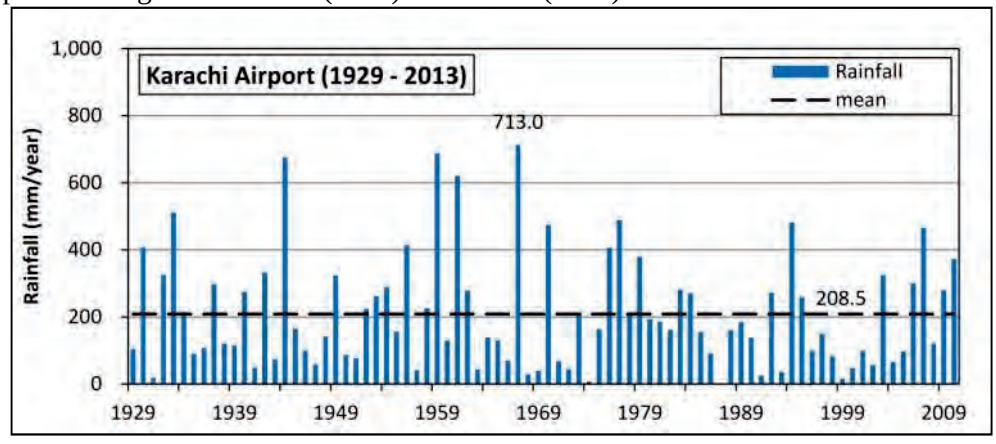
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
max	27.6	31.3	36.2	37.7	36.8	36.4	34.5	33.0	34.7	37.0	33.5	30.4
min	10.1	11.1	19.1	23.0	26.4	28.2	23.6	31.0	31.4	33.7	32.2	26.3
mean	19.4	21.9	26.4	29.8	31.4	32.0	30.8	32.2	33.2	35.6	32.9	28.3

Source: Pakistan Meteorological Department

Figure 2-2-30 Temperature in Karachi (2001~2009)

(3) Precipitation

Since Pakistan is located on the western edge of the Asian monsoon region, it has a typical monsoon continental climate, although rainfall is low in almost all parts of the country. There is little rainfall for most of the year, but rain is concentrated into the summer months of July and August when the tropical monsoon blows. Therefore, because annual precipitation in Karachi is largely determined by the strength and frequency of the tropical monsoon, there are large fluctuations in annual precipitation. According to observation records from 1929 to 2010, annual precipitation ranges from 0 mm (1978) to 713 mm (1967).



Source: Pakistan Meteorological Department

Figure 2-2-31 Annual Precipitation in Karachi (1929~2013)

(4) Topography and Geology

The topography of Karachi city consists of three groups of (i) Hill area in west region and (ii) Alluvial area in central region and (iii) Delta area in east region, and generally it slopes gently towards the south from the north. Indus delta area spreads out in the eastern Karachi and it has flat topography where a water system is complicated. On the other hand, the western Karachi is located on the foot of Hab Mountain and Kirthar Mountain and it has an undulating topography. The two major rivers of Malir river and Liyari river are flowing down Karachi city towards the south, and therefore the surface water flows down towards the south from northwest.

The Tertiary period sedimentary rock layer is predominating in Karachi city and large area of the city, except the lowland area having high groundwater level, consists of weathered sedimentary rock that is peculiar to dryland. The surface soil in large area of central Karachi consists of Quaternary period sedimentary layer, and in general the geology of around 10m below ground forms relatively hard clay layer, therefore its permeability is low.

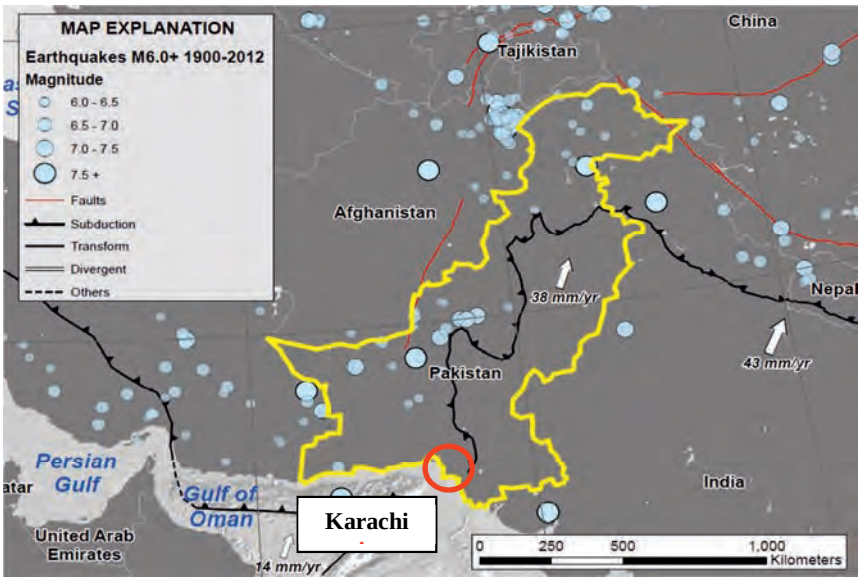
(5) Earthquakes

Figure 2-2-32 shows the distribution of earthquakes of magnitude 6 or higher in Pakistan from 1990 onwards. Also, Table 2-2-10 shows the record of earthquakes of magnitude 6 or higher over the past 10 years (October 2005 - February 2015). According to this, most of the earthquakes occurring in Pakistan have their epicentre in the west or north of the country, however, there have been no earthquakes of magnitude 6 or higher in the Karachi area.

Table 2-2-10 Record of Earthquakes in Pakistan
(magnitude 6 or higher; October 2005 ~ February 2015)

Event Time	Location	Magnitude
2013.09.28	PAKISTAN	6.8
2013.09.24	PAKISTAN	7.7
2013.04.16	IRAN-PAKISTAN BORDER REGION	7.7
2011.1.18	SOUTHWESTERN PAKISTAN	7.2
2008.10.29	PAKISTAN	6.4
2012.10.28	PAKISTAN	6.4
2005.10.23	PAKISTAN	6.0
2005.10.8	PAKISTAN	6.4
2005.10.8	PAKISTAN	7.6

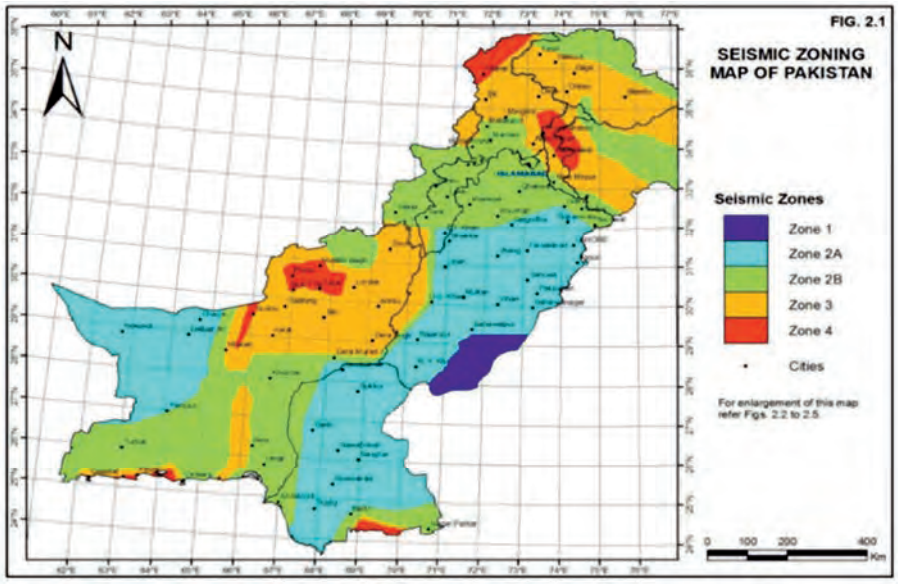
Source: USGS



Source: Map of Tectonic Summary Region, USGS (with additions by the Study Team)

Figure 2-2-32 Distribution Map of Earthquakes in and around Pakistan (magnitude 6 or higher, 1990~2012)

As is shown in Figure 2-2-33 and Table 2-2-11, the target road is located in seismic zone 2B. The horizontal ground acceleration is 0.16-0.24 as shown in Table 2-2-11.



Source: Building Code of Pakistan

Figure 2-2-33 Seismic Strength Distribution Map

Table 2-2-11 Seismic Zones of Tehsils of Pakistan

Tehsil	Seismic Zone
Karachi Central	2B
Karachi East	2B
Karachi South	2B
Karachi West	2B

Source: Building Code of Pakistan

Table 2-2-12 Seismic Zones

Seismic Zones	Peak Horizontal Ground Acceleration
1	0.05 to 0.08g
2A	0.08 to 0.16g
2B	0.16 to 0.24g
3	0.24 to 0.32g
4	>0.32g

Where "g" is the acceleration due to gravity
The acceleration values are for rock site condition with shear wave velocity (v_s) of 760 m/s (Soil profile type S_B).
Source: Building Code of Pakistan

(6) Site Survey for Design and Construction

Outline of the natural condition survey conducted in the Survey is shown below.

1) Topographic Survey

Topographic survey for the target section of N5 and major crossing road with N5 and up/down stream of crossing drainage structures were conducted around the Project road. Table 2-2-13 shows the outline of topographic survey.

Table 2-2-13 Outline of Topographic Survey

Survey Item		Q'ty	Unit	Remarks
Control Survey		25	No.	Interval at 500m
Topographic Feature Survey	N-5	71.4	ha	L=11,900m, W=60m
	Branch road	17.5	ha	L=3,750m, W=40～60m

※ Datum：WGS 84、Coordinate system：UTM Zone 42N

2) Construction Material Investigation

Soil material tests were conducted for the purpose of quality confirmation as road material. Locations of material pit are Nooriabad (about 50-90km to the northeast of Karachi city) and Manghopir (about 20km to the northwest of Karachi city, along Hub river). From Table 2-2-14 to Table 2-2-16 and Figure 2-2-34 show the result of material test. Each material meets the standard criteria for road construction material[2] and is equivalent to the "A-1-b" rank in the soil classification of the AASHTO standard.

Table 2-2-14 Test Result of Subbase Course Material

Pit location	Specific gravity	CBR (95%MDD)	OMC (%)	MDD (gm/cc)	Organic matter content
Manghopir	2.654	61	7.9	2.201	2.78
Nooriabad	2.667	45	6.5	2.224	0.28

* Manghopir: 25.01116Deg-N, 66.88825Deg-E Nooriabad: 25.10427Deg-N, 67.52721Deg-E

Table 2-2-15 Test Result of Quarry and Base Course Material

Pit location	Specific gravity	Water absorption (%)	Los Angeles abrasion (%)	Sodium sulfate soundness (%)
Nooriabad	2.695	0.82	20	1.4

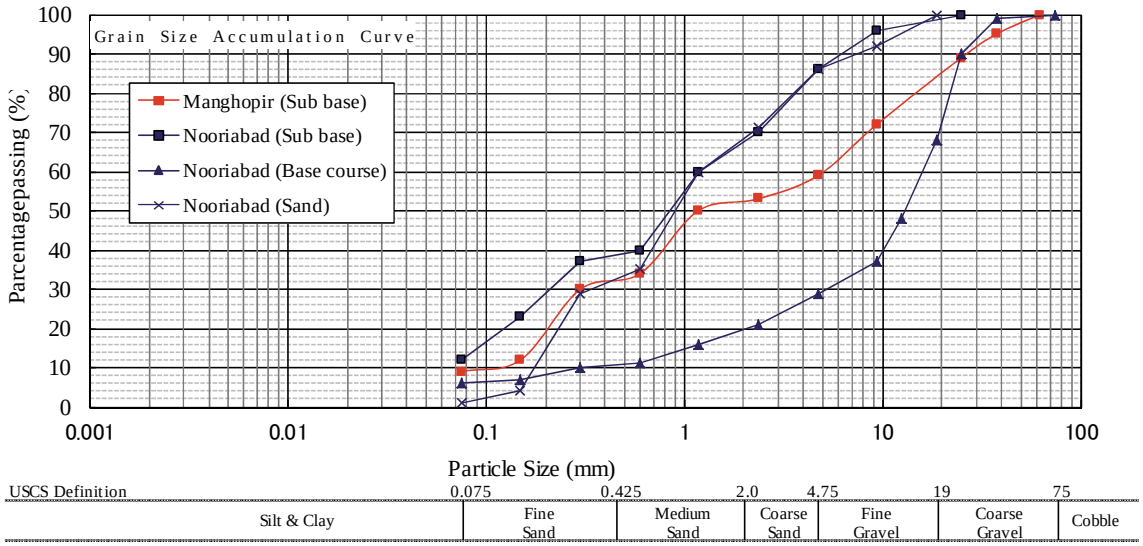
* Nooriabad: 25.21460Deg-N, 67.90883Deg-E

[2] Subbase material: Modified CBR > 20
Quarry: Specific gravity > 2.45, Water absorption < 3.0, Los Angeles abrasion < 30, Sodium sulfate soundness < 12
(Standard Specification for Civil Works, Kanto Regional Bureau, MLIT, Japan)

Table 2-2-16 Test Result of Sand

Pit location	Specific gravity	Water absorption (%)	Plastic index (%)	Sand equivalent
Nooriabad	2.667	1.24	NP	94

* Nooriabad: 25.28110Deg-N, 67.80554Deg-E



Source: Survey Team

Figure 2-2-34 Grain size Accumulation Curve

Photo Nooriabad (Subbase course)

Photo Manghopir (Subbase course)

Photo Nooriabad (Quarry and Base course)

Photo Nooriabad (Sand)

3) Structure Condition Survey

The Survey Team conducted the structure condition survey in order to confirm soundness and drainage capacity of the existing drainage structures which across the target section. The soundness of structures was examined by visual and by strength measurement using the Schmidt hammer. The drainage capacity was confirmed by hearing to the residents living in the vicinity.

Figure 2-2-35 shows the location of the structures surveyed and Table 2-2-17 shows the results

of soundness.

Source: Google Map

Figure 2-2-35 Location Map of Structure Condition Survey

Table 2-2-17 Summary Result of Structure Condition Survey

No.	Sta.	Dimension	Damege level*	Strength (MPa)		Flow capacity
				North	South	
Str. No.1	0+865	W3.0m x H1.5m x 2cell	C	---	---	NG
Str. No.2	3+140	Unknown	D	21	12	NG
Str. No.3	3+440	Unknown	D	33	---	NG
Str. No.4	6+525	W3.0m x H1.5m x 2cell	B	23	38	NG
Str. No.5	11+370	W2.75m x H3.5m x 4cell	A	---	---	OK

* A: Sound condition, B: Minor damage, C: Some damage, D: Intensive damage
Source: Survey Team

4) Geotechnical Investigation

The Survey Team conducted a geotechnical investigation in order to understand outline of the geological features along the target section. Figure 2-2-36 shows the location of 4 sites.

a) BH No.1

1st layer consists of Sand which extended up to -2.0m depth. 2nd layer consists of Silt with N-value of less than 30 which extended up to -6.0m depth and it partially has Clay with N-value of 6. 3rd layer consists of Shale which extended up to -10.0m depth and more. Ground water was encountered at -2.4m depth.

b) BH No.2

1st layer consists of Silty Sand with N-value of 13 which extended up to -1.0m depth. 2nd layer consists of Sand which extended up to -5.0m depth. 3rd layer consists of Sandstone which extended up to -10.0m depth and more. Ground water was encountered at -2.4m depth.

c) BH No.3

1st layer consists of Silty Sand and Sandy Silt which extended up to -7.0m depth. N-value of less than 10 is measured up to -4.0m depth. 2nd layer consists of Sandstone which extended up to -10.0m depth and more. Ground water was not encountered at the time of investigation.

d) BH No.4

1st layer consists of Sand with N-value of more than 30 which extended up to -4.0m depth. 2nd layer consists of Clay which extended up to -6.0m depth. 3rd layer consists of Silt which extended up to -10.0m depth. Ground water was not encountered at the time of investigation.

Source: Google Map

Figure 2-2-36 Location Map of Geotechnical Investigation

5) Existing Road Material Investigation

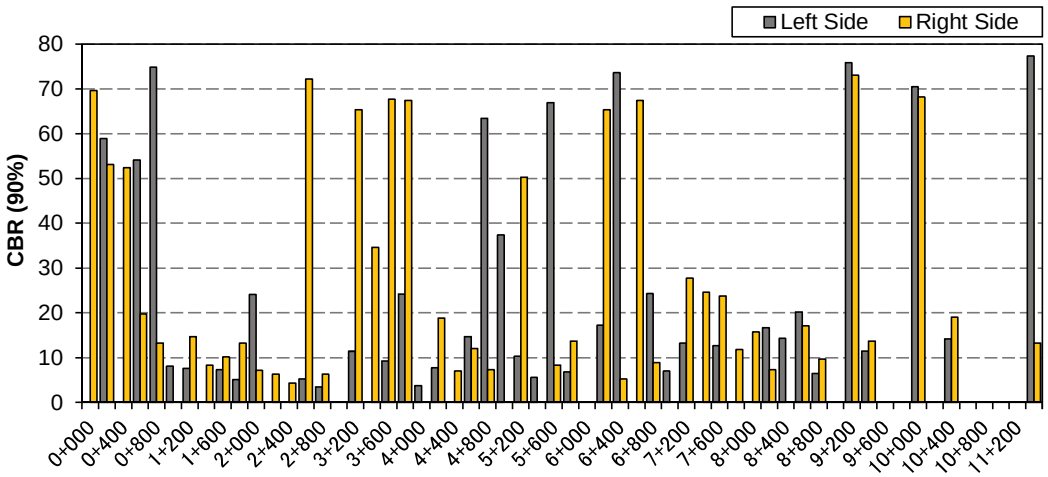
The Survey Team conducted a trial pit excavation, road material sampling, FWD test and DCP test within the ROW in order to examine the bearing capacity and soil characteristics of the existing road material in the target section. Table 2-2-18 shows the outline of existing road material investigation and Figure 2-2-37 shows the distribution chart of CBR value in each station. CBR value is small in a section from Sta.1+000 to 3+000 and a section from Sta.7+000 to 9+000, the point where CBR value is less than 5 was observed in spots.

Table 2-2-18 Outline of Existing Road Material Investigation

Survey Item	Q'ty	Unit	Remarks
Trial pit sampling	104	No.	Interval at 200m/500m, both lane, Depth 1.5m Laboratory test
Asphalt surface core sampling	24	No.	Interval at 1000m, both lane Laboratory test
FWD test on existing pavement	100	No.	Interval at 200m/1000m, both lane
Portable DCP test	164	No.	Interval at 200m, 2or3point/line

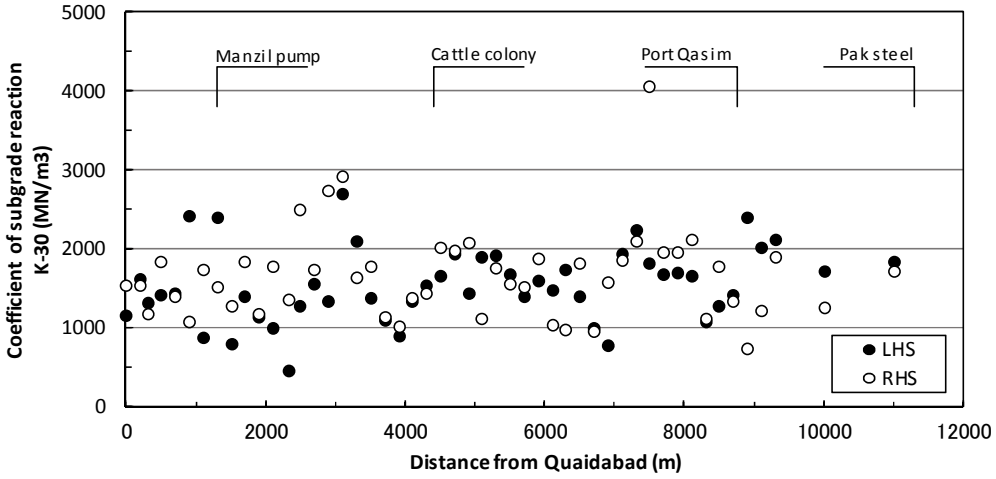
Photo-1 Trial pit sampling

Photo-2 Field density test



Source: Survey Team

Figure 2-2-37 Distribution Chart of CBR Value



Source: Survey Team

Figure 2-2-38 Distribution Chart of Subgrade Reaction Coefficient

6) Underground Utility Survey

In order to confirm the types, locations, depths of underground public utilities such as electricity, waterworks, communication infrastructure and gas pipelines in the target section, the Survey Team had series of interviews to the utility companies to identify the location of them and conducted the geophysical exploration using the specific equipment and trial excavation within the ROW. Following Table 2-2-19 shows the outline of underground utility survey and following Table 2-2-20 shows the summary of survey results.

Table 2-2-19 Outline of underground utility survey

Survey Item	Q'ty	Unit	Remarks
Geophysical exploration survey	11.3	km	Interval at 100m, across the road
Trial pit excavation	24	No.	Interval at 1000m, both lane

Table 2-2-20 Summary of underground utility survey results

Type of Utility	Size (inch)	Depth (m)	Administrator

Water Pipe	8 – 48	Unknown due to water logging	Karachi Water and Sewerage Board
Electric Line	2 – 4	0.2 – 1.8	K- Electric, Karachi
Gas Pipe	2 – 16	0.6 – 1.9	SSGC Limited Pakistan
Telecommunication (Optical Fiber Cable)	2	0.49 – 1.55	Various Telecom companies (Wateen, Multi-net, PTCL and others)
Unknown Cables/Pipes	0.5 - 4	0.3 – 1.88	Unknown

2-2-4 Environmental and Social Considerations

2-2-4-1 Environmental and Social Considerations

(1) Project components which possibly cause environmental and social impacts

The summary of the project is described below.

Name of the Project	The Preparatory Survey on the Project for Construction and Rehabilitation of National Highway N-5 in Karachi City
Implementing Agency	Karachi Metropolitan Corporation：KMC
Target area and section ：	National Highway N-5: The exact section is From approximately 100m east from the edge of Quaidabad Flyover to Pakistan Steel Intersection
Target length：	Approx.11km
Main components :	a) Rehabilitation and Improvement of Pavement: Existing pavement is demolished and new pavement layer is constructed on the existing ground b) Widening of Carriageway: The existing 4-lane carriageway is widened to 6 lane for the whole section c) Installing service road: installed on either side and are each approximately 6km in length d) Traffic Management Facility: Traffic signals and pedestrian crossings are installed at major 4 intersections in the Project site. e) Drainage Facility: Drainage facilities are installed along the whole section since there are few drainage facilities on the existing road. f) Ancillaries: Bus stops, Pedestrian bridges, Street Light
Bridges and specific structures	No bridges and specific structures in the target section

Project component which will have a possibility to impact on the target area environmentally and socially, therefore, environmental and social consideration needs to be reviewed thoroughly.

(2) Environmental and Social Conditions for the Project Area

1) Socioeconomic Situation

Summary of basic socioeconomic situation in Pakistan is as follows.

Table 2-2-21 Summary of basic socioeconomic situation

Political System:	Federal Parliamentary Republic
Legislative System:	Senate (the upper) and the National Assembly(lower houses)
Capital:	Islamabad
Religion:	Islam (Official religion)
Ethnic:	Punjabis, Singh, Pakhtun and Balochi
Literacy Rate:	58% (FY 2012/2013)
Financial Year:	1st July ~ 30th June
Currency:	Pakistani Rupee (Rs)
Federal Budget:	3,578,192 million Rs (FY 2014/2015)

Source：Basic data in Ministry of Foreign Affairs and Federal budget in the Ministry of Finance

Major industry in Pakistan is agriculture, which accounts for 21% of GDP and 45% of the working population. In addition, cotton made in Pakistan, the major material for the textile industry,

has a worldwide reputation for its high quality, and it has been contributing to boosting the GDP rate. GDP growth rate is 3.8%, 3.7% and 4.1% for the Fiscal Year (FY) 2011/12, FY 2012/13 and FY 2013/14 respectively. Steady GDP economic growth at the rate of 3.9% in heavy and light industries including the textile industry is one of factors to let the GDP growth rate in FY 2013/14 exceed 4% after all these years, even though the economic growth rate was 2.1% in FY 2012/2013. Major economic indicators estimated by the National Bank of Pakistan and the Ministry of Finance are shown in Table 2-2-22.

Table 2-2-22 Economic Indicators（FY 2013/2014）

(Nominal) GDP	Approximately 25,401,895 Million Rs
GDP Per capita	Approximately 1,386 US$
(Actual) GDP Growth Rate	4.1%
Inflation Rate	8.0%
Foreign-Currency Reserves	Approximately 9,817 Million US$

Source: The National Bank of Pakistan and the Ministry of Finance

1-1) Local Administration

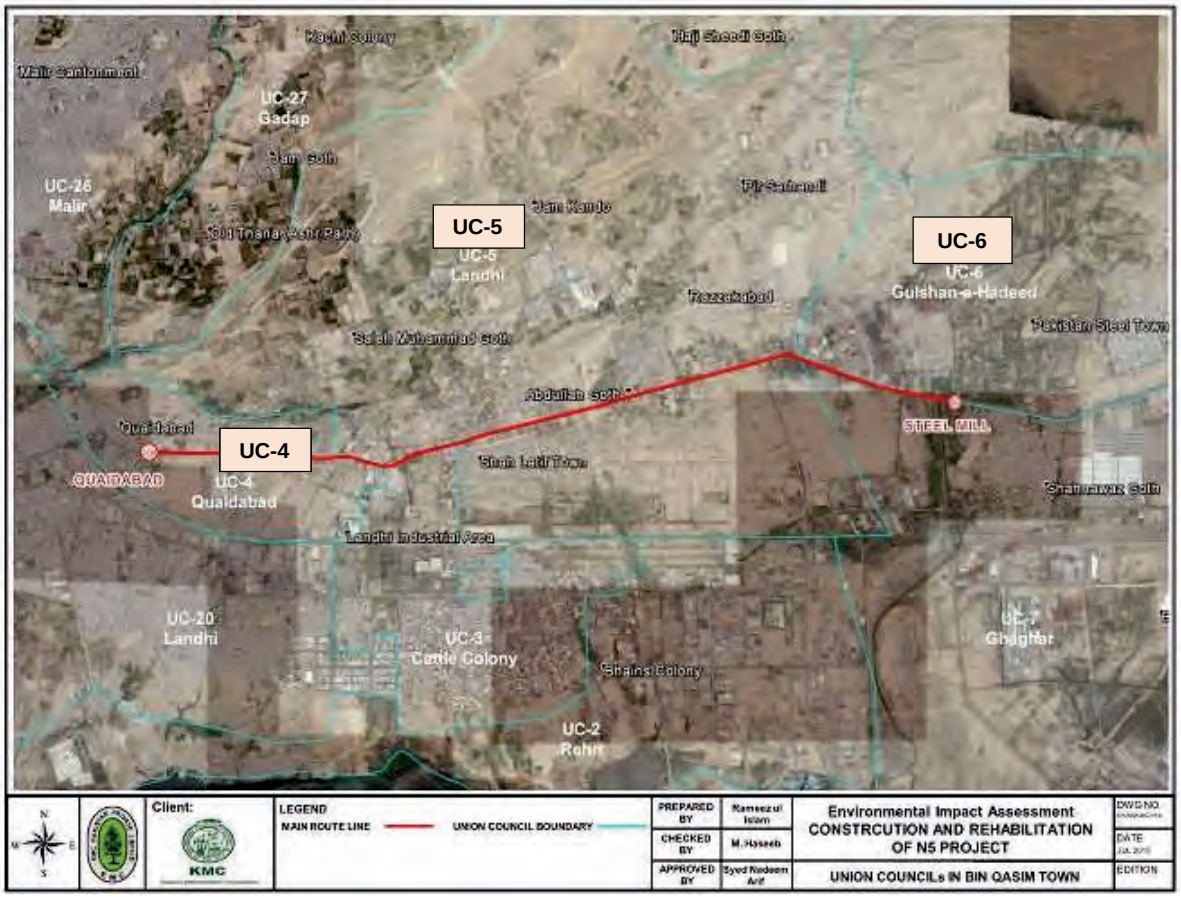
The project area is located in the Bin Qasim Town in the east of Karachi. The town is located adjacent to Port Qasim which is fully functional with cargo handling on larger scale thereby shifting the load from Karachi Port to Bin Qasim Port.

Bin Qasim Town was formed as a result of the introduction of local government reforms in 2000 which resulted in dissolution of all former Divisions to form a New Karachi City District along with 18 autonomous constitute towns including the Bin Qasim Town. The towns are further divided in Union Councils (UCs) and all Union Council (UC) offices are under control of Town Administration.

Bin Qasim Town comprises following 7 Union Councils:

- Ibrahim Hyderi (UC-1)
- Rehri (UC-2)
- Cattle Colony (UC-3)
- Quaidabad (UC-4)
- Landhi Colony (UC-5)
- Gulshan-e-Hadeed (UC-6)
- Gaghar (UC-7)

Out of the 7 UCs, 3 UCs namely Quaidabad, Landhi and Gulshan-e-Hadeed are important since these three UCs are located right along N5 and constitute the microenvironment as shown in Figure 2-2-39.



Source: EIA Report for the Project

Note: The red line is the target road

Figure 2-2-39 Project Location Map showing the seven UCs and the three UCs included in the microenvironment (Draft)

Table 2-2-23 Summary of UCs located along the N5 Project

UC. No.	Name Union	Areas/Description	Population (1998)	Famous land mark and characteristics
4	Quaidabad	Gulstan Society, Liaquatabad, Khuldabad, Kohati Colony, Afridi Colony, Umer Marvi Goth, Zafar Town, Qazafi Town etc.	58,060	・ Quaidabad flyover ・ Abbott Laboratories ・ The Pakistan Swedish Institute of Technology
5	Landhi	Deh Landhi, Deh Sanro, Deh Khanto, & Khakar	39,201	・ FAST-National University ・ Masjid Usman Ghani ・ Agriculture is common income source ・ Most of the industrial units do not have facilities to treat their waste water and discharge their highly hazardous effluents in open channels that lead to Malir River.
6	Gulshan-e-Hadeed	Nashtarabad, Steel Town, and Gulshan-e-Hadeed from Zulfiqarabad oil Terminal to link road to Deh Jhoreji (Part) in the North of National	65,242	・ A large population here belongs to middle income group with majority linked with the Pakistan Steel Mills.

		Highway		

Source: JICA Basic Survey

1-2) Demography

Bin Qasim town covers an area of over 825 km^2 and is the second largest among the 18 towns of the city. In recent years, it has experienced rapid population growth and industrial development without adequate provision of urban infrastructure. The area is now home to about 1.5 million people, including 200,000 temporary inhabitants, as well as about 5,000 manufacturing establishments.

According to the results of 1998 census, the Bin Qasim Town had a population of about 318,684 people which is estimated to have been increased to 390,610 by 2008. Addition of more facilities in the area like education and health units is seen as major driving force for this increase in population in the Town.

The projected population growth estimates of Bin Qasim town are presented in the following Table2-2-24.

Table 2-2-24 Population estimates for Bin Qasim Town

Items	Population			
	2005	2010	2015	2020
Bin Qasim Town	480.9	1,038.4	1,596.0	2,153.6
Growth Rate	1.27	1.22	1.18	NA
Yearly Growth Rate (%)	5.0	4.0	3.3	NA

Source: KSDP-2020 (August 2007)
Note: NA: Not Available

1-3) Ethnicity

Various ethnic groups can be seen to dwell in the Bin Qasim Town which accounts for its social and cultural diversity. The population mix includes mainly the Sindhis, Bloch families, Punjabis, and Pakhtuns. There is also a small representation of other ethnic groups in the Town.

The area is culturally rich since there is a representation of the norms and values of all four provinces. The communities living here believe in strong social values and are tied in strong family structures. They are strict followers of religious faith and have close cultural marriage system.

1-4) Economic Activities

Landhi Industrial Estate and Industrial Zone of Port Qasim are the two major industrial establishments in the Bin Qasim Town which include almost all major type of industrial units including textile, steel manufacturing, chemicals, automotive industry etc. Tanneries in the form of small to medium sized establishments are also located therein.

Landhi Industrial Area is one of the pioneer industrial estates in Pakistan and was established in 1949. Covering approximately 5,000 acres (20 sq km), LIE is the closest to Juma Goth. Jurisdiction of this estate begins from Farooq Textile Mill to Port Qasim including Karachi Export Processing Zone and all industries located at National Highway to Ghaghar Phatak. It encompasses about 11,000 acres (45 km^2) of land. Landhi Industrial Area consists of medium and

large size industries. The industrial area houses many industries like Textile, Steel, Pharmaceutical, Automobile, Chemical, Engineering and Flour Mills. The industrial areas lie on both sides of the railway line and there is no integrated drainage system exists to serve the area. A number of large textile processing industries that generates major portion of the pollutants are situated on the southern side of the railway line where the drains are either connected or situated close together and flow southwards into the Korangi Creek.

Infrastructure has been accordingly developed in view of the demands of industrial development. They are therefore functioning as a hub of economic development in the region. The industrial estates located here are helping to stimulate the domestic economy.

In the Cattle Colony located in the Bin Qasim Town, more than 235,000 cattle are reared in the cattle pens (baras) and provide over 2.5 million litters of milk to the city on daily basis. The city district government collects a tax of Rs. 250 per cattle head. A slaughterhouse is also located near the Cattle Colony and little is done for the sanitation of this area. Only a fraction of the cattle dung is removed while the rest keeps on piling up in the vicinity and the town has to launch an operation clean-up every now and then to keep the area inhabitable for people and cattle.

Skilled labour from the neighboring Union Councils mainly Quaidabad is available to work in these industrial estates. Skilled Labour consisting of drivers, mechanics, water pump attendants and others, joins factories to earn a living for their families.

1-5) Employment

A large proportion of the residents of macroenvironment are employed as industrial labour in Landhi Industrial Estate (LIE), Port Qasim Authority (PQA), and Pakistan Steel Mills with an average earning between Rupees 7,500 to 12,500 per month, depending on the industry and the level of skill involved.

Employees working at Pakistan Steel earn a handsome salary with an average of Rupees 10,000 per month. A small number of people work in various government departments such as the education sector and police department.

The cluster of industries and organization employs approximately 25,000 workers; the employment density in LIE is about 15.6 persons per acre as compared with an employment density of 2.3 persons per acre for Karachi.[3]

Skilled labour is rare and includes mostly drivers, welders, plumbers and electricians. A large proportion of the residents of Pipri Colony and coastal area are employed as unskilled industrial labour at Port Qasim Industrial Area, and Pakistan Steel Mill.

1-6) Literacy Rate

The macroenvironment of Project site[4] is home to lower middle class and middle class people.

[3] Source: Techno-Economic Feasibility Study For Establishment of Four Combined Effluent Treatment Plants For Karachi, 2000

4 Macroenvironment of the project site/area comprises the Bin Qasim Town, a trip generating area located in the northeast of Karachi. The town is located adjacent to Port Qasim which is fully functional with cargo handling on larger scale thereby shifting the load from Karachi Port to Bin Qasim Port.

The Literacy rate in the three UCs is about 50 percent. Educational facilities in the surrounding area of the Project are satisfactory. Availability and access to all levels of education is well provided because of efficient and effective management system to facilitate and promote higher education. Literacy rate among females is comparable with males. However, tendency towards education is disappointing due to prevailing social culture in the area which encourages youth to start earning at an early age and therefore majority quits their education after matric (first 10 years) or even before that. The scenario is even worst for the female particularly the women of the tribal families.

1-7) Gender Issues

Most women form part of the informal labour market, working to supplement inadequate household incomes. Female segregation is therefore comparatively rare and largely confined to the more conservative migrants from Sindh, Baluchistan and KPK. In the communities that fall in the Bin Qasim Town, women do not enjoy a good and free status and this is due to a number of factors, most important of them being the:

1. Conservative norms that prevail in these areas for decades
2. Culture that is male dominated and
3. Low education status

The 3 noticeable cultural entities that dwell in the Bin Qasim Town (Sindhi, Balochi and Pakhtuns) share this commonality of low women status. Women mostly stay at home and serve their families. Some of them spare time and do the handicraft to earn extra money for family. Where families rely on agriculture, women also help their family heads in the fields. In some areas, women also work in factories for a living.

Literacy rate among the women of project area is very disappointing. Only a handful of them have got education above metric level and majority is illiterate. There were very few girls' schools and in most of the villages girls have to attend boys' schools where male teachers were appointed. Therefore the ratio of school going girls was very low compared to boys.

1-8) Poverty

Poverty is also a feature of the overall socioeconomic picture of the Bin Qasim Town. People living in the area are mostly unskilled or at best semiskilled and work on daily basis. Due to the ever growing inflation rate, people find it hard to make it through with their limited income. This is particularly a problem with the daily wage labourers who suffer the most from the unpredictable law and order situation in the city.

1-9) Political Scenario

Almost 80% of the Bin Qasim Town comprises rural areas which are dominated by the Sindhi and Baloch communities. The Nationalist Groups are active here and hold the overall goings in their areas. Their activities often lead to serious clashes between the parties resulting in loss of property and even lives.

1-10) Electricity and Gas

K-Electric is the sole supplier of electric power here like in other parts of Karachi. Electricity and natural gas connections are available to most parts of the Bin Qasim town. Similar to other areas, the problem of load shedding is worst in this Town as well. Normal load shedding duration is 6-8 hours.

People in Bin Qasim Town use natural gas supplied by Sui Southern Gas Company for cooking and heating purposes. During recent past, gas supply has also reduced and now there is shortage of gas too. When gas supply is not available, people also use wood as fuel for cooking which is bought from wood sellers in the local bazaars. This situation is also seen in areas where gas lines have not yet been.

1-11) Water Supply

Clean and safe water is one of the major problems faced by the residents of the Town. Though the Karachi Water and Sewerage Board's pipelines bring in approximately 580 million gallons of water daily from the Indus river and Hub Dam to Karachi and route the bulk of it through Bin Qasim Town, yet majority of the villages have not been given water connections and have to depend on ground water and other sources for drinking as well as domestic purposes.

The water supply is made on alternate days and the same potable water is also used by locals for drinking purpose. In many cases people have to purchase water through tankers. Very few people use boiled water and majority of population uses un-boiled water.

1-12) Health Facilities

Like poor education facilities available in this town, the state of health services and facilities is also poor. Two hospitals along with town health centre are providing the basic health facilities to the locals. One of these hospitals is being run by an NGO.

There is lack of full capacity and proper health facilities with all the basic requirements available for the people of the area. The available health facilities in the area are just enough to address common health problems. For advanced treatment of severe and complicated disease people have to move to city centre where advanced medical units are located.

1-13) Archaeological, Historical and Religious Sites

There is no historical, archaeological or religious site in the immediate vicinity of N5. The graveyard of Choukundi is located more than 500 m north of the NO 6+000 point of the N5 road. The Chaukhandi Tombs contains tombs of certain warriors of Saloch families settled in this area some time during the 17th and 18th centuries A.D. Owing to the scarcity of dated inscriptions on Chaukhandi tombs, it is difficult to assign exact dates to them. The Tombs are listed as National Monument in 1922 by the Ancient Monuments Preservation Act 1904. Then, in 1993, they are added to the Tentative List of the UNESCO World Heritage Sites.

Source: Survey Team

Figure 2-2-40 View of Chaukhandi Tombs

Source: JICA Basic Survey, 2014

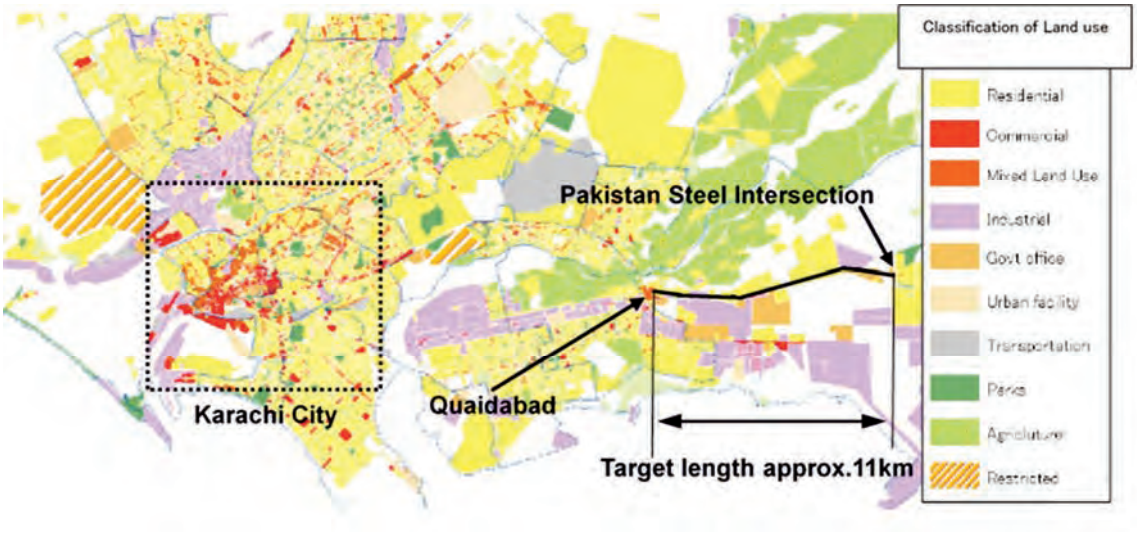
Figure 2-2-41 Choukundi Graveyard

2) Land Use

The target road of this Project is located in Bin Qasim Town, which is in the southeast of Karachi. Residential and industrial districts, shops, commercial facilities such as gas stations and government, medical, educational and religious facilities are clustered along its roadside. Some areas in the town are being used by the local population for agricultural purpose where seasonal vegetables are cultivated and sold in the town and other areas.

There are major industrial zones/towns in Karachi called “Landhi Industrial Town” and “North Western Zone” in the south side of its start point and its end point respectively.

The land use around the target road can be classified into three zones. From its start point to Cattle Colony Junction, small shops, commercial buildings and factories are lined. Then, past Cattle Colony Junction packed with residential buildings, most of lands are vacant lots until Port Qasim Junction. From Port Qasim Junction to Pakistan Steel Junction, the end of the target road, there are seven gas stations in the north side, where many tanker lorries park. Just north of Port Qasim Junction, a parking facility for oversized vehicles is under construction, which has been completed by 80%.



Source: Karachi Transportation Improvement Project Report, 2012

Figure 2-2-42 Land Use

3) Hydrology and Water Regime

There is no significant natural freshwater source in the project area. The Indus River about 120 km to the east of Karachi city and the Hub River, a perennial stream that originates in Baluchistan and marks the boundary between Karachi Division and Baluchistan are the sources of water in Karachi.

Approximately 89% (2.02 million m^3/d or 445 MGD (million gallon per day)) of the total supply to Karachi is from the Kotri Barrage on the Indus River through a system of canals and conduits. Hub River located north of Karachi, which supplies about 0.13 million m^3/d (29 MGD) of water to the city. In addition to these surface water sources, an estimated 0.09 million m^3/d (20 MGD) is supplied from private and public groundwater wells in and around Karachi. Except for a few Karachi Water and Sewerage Board's (KWSB) wells, all of which are connected to the piped supply system, the water from the groundwater wells is distributed through water tankers to various parts of the city.

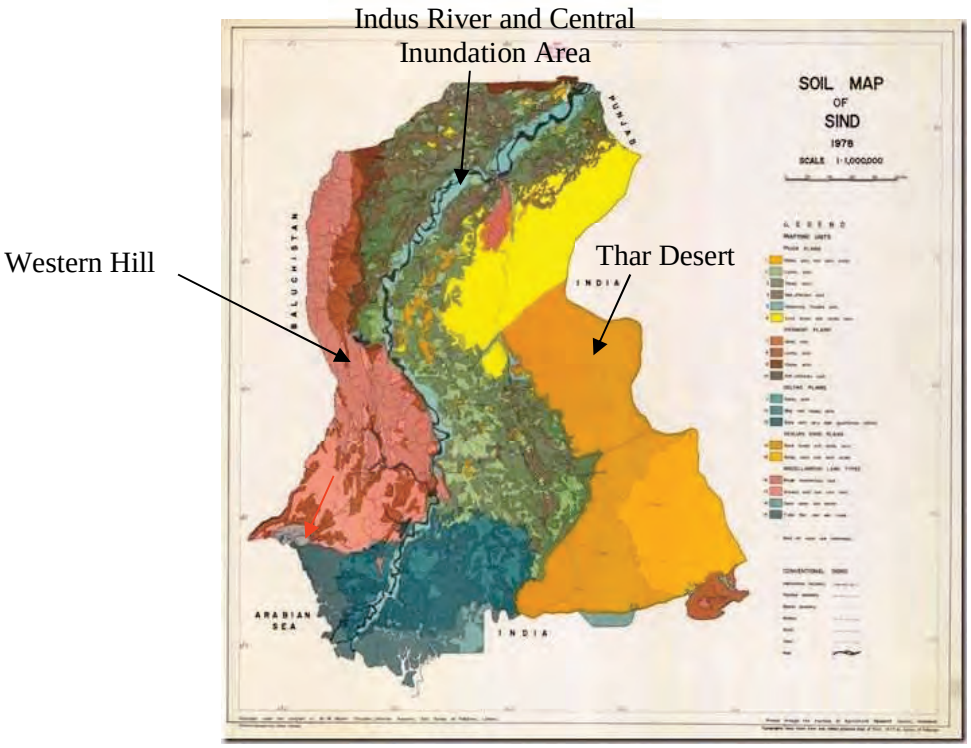
The Lyari and Malir Rivers that passes through Karachi City do not have any natural flow, except during the monsoons. Malir River is ephemeral and is constituted from 2 major tributaries, i.e. Mol and Khadeji as well as some minor tributaries. Khadeji is a perennial stream that originates at Khadeji falls and gains flow as it travels across the Malir Basin.

4) Ecosystem

This section describes about the regional context of the Project Area. Field survey results on Ecosystem are described in (5) <Ecosystem>.

According to the Soil Map of Sindh, shown in Figure 2-2-43, Karachi is located at the southwestern corner of the western hill area of Sindh Province. Karachi and the Project Area is classified as urban area in the Soil Map published in 1978. In the interview with local wildlife expert, Dr.Syed Ali Ghalib, on September 10, 2015, and at the Scoping Meeting attended by

IUCN, Sindh EPA, Wildlife Department, and Forest Department, all experts confirmed that the Project Area is 'Urban Area' in the context of Sindh Province.



Source: http://citypulse.com.pk/pakistangis/category/gis-raster-data/
Direction of Dt. M. Bashir Choudhri. Director General. Soil Survey of Pakistan, 1978

Figure 2-2-43 Soil map of Sindh

Vegetation type and flora

According to Sindh Forest Department[5], the vegetation type of the Project Area is classified as tropical thorn scrub and woodland in dry tropical climate. Typical landscape of such thorn scrub forest is shown in Figure 2-2-44.

Source: http://sindhforests.gov.pk/fauna-and-flora-of-sindh

Figure 2-2-44 Typical landscape of such thorn scrub forest

[5] http://sindhforests.gov.pk/fauna-and-flora-of-sindh

According to Forest Department of Sindh, a notable feature is the predominance of plants and trees with small leaves, or none at all, and the large proportion of thorny species.

The apparent contrast between the verdure of the riverine and irrigated tracts on the one hand, and the hilly and desert tracts on the other; is largely a matter of its intensity and distribution.

The dwarf palm, Kher (*Acacia ruprstris*), and Lohirro (*Techoma undulata*) are typical of the western hill region as are Khip (*Periploca aphylla*) and Phog (*Calligonum polygonides*) of the eastern sandy desert.

The coastal strips and the creeks abound in semiaquatic and aquatic plants, and inshore deltaic islands have mangrove forests of Timmar (*Avicennia marina*) and Chaunir (*Ceriops tagal*) trees. Water lilies grow in abundance in the numerous lakes and ponds, particularly in the Lower Sindh region.

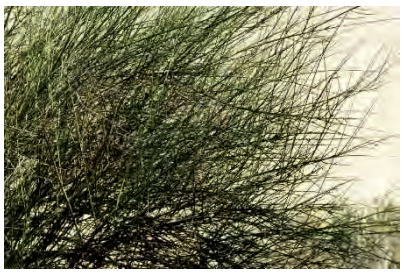
		
Dwarf palm (Nannorhops ritchieana)	Kher (*Acacia rupestris or Acacia senegal*)	Lohirro (*Techoma undulata*)
		
Tree of Province : Kair (Capparis decidua)	Khip (*Periploca aphylla*)	Phog (*Calligonum polygonides*)
		
Timmar (*Avicennia marina*)	Chaunir (*Ceriops tagal*)	

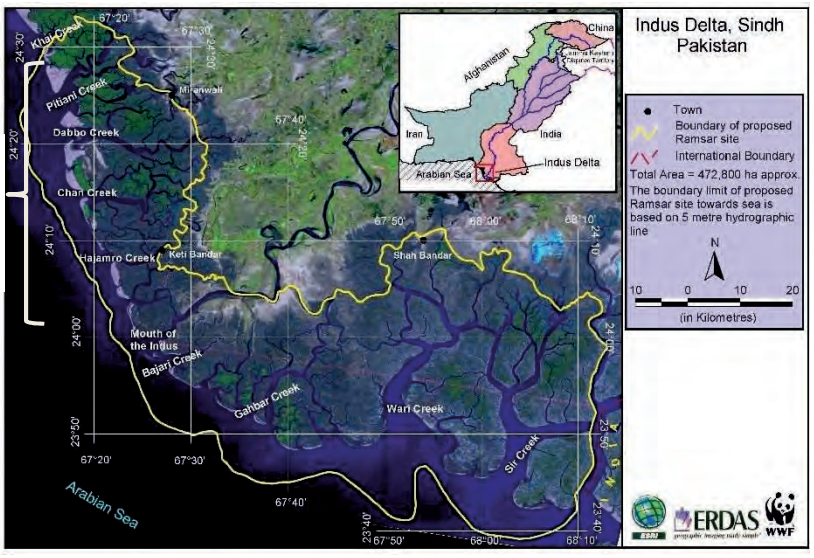
Figure 2-2-45 Most typical flora in lower Sindh Province

Mangrove forest on Arabian Sea coast

The mangrove forest at the mouth of Indus River was designated as Ramsar Convention Site in 2002. The area spreads 472,800 ha. The northern part is designated by the Government of Pakistan as Marho Kotri Wildlife Sanctuary.

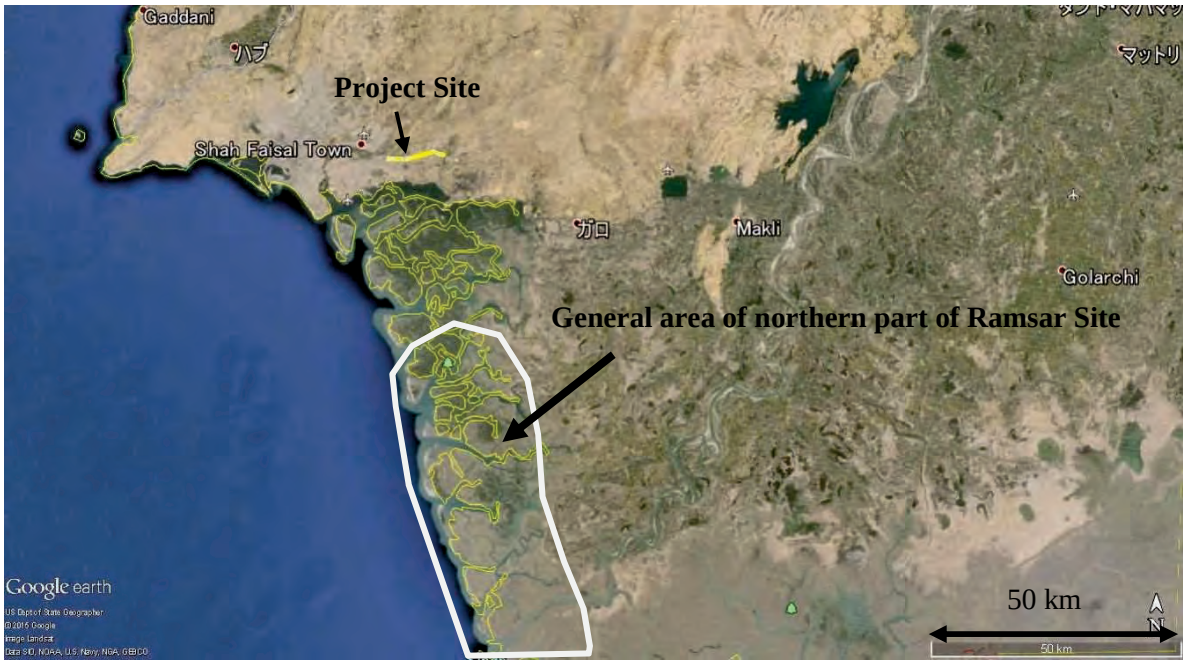
As shown in Figure 2-2-46, the northern boundary of the Ramsar Site or the Wildlife Sanctuary is located about 30 km southeast of the Project Area, and similar mangrove forest spreads between the two areas.

Area shown in next figure



Source : Ramsar Sites Information Service, https://rsis.ramsar.org/ris/1284

Figure 2-2-46 Ramsar Convention Designated Protected Wetland Area : Indus Delta



Source: Survey Team

Figure 2-2-47 The Project Area and the Indus Delta Ramsar Site

Source: Survey Team

Figure 2-2-48 The Project Area and Mangrove Forest between Malir River and Port Qasim

According to the Information Sheet on Ramsar Wetlands[6], eight species of Mangroves occurred in the Pakistan by only four are found now. The most abundant species in the Indus delta is Avicennia marina, which composes about 95% of the mangrove population of the delta. The other species occur mostly around the present Indus delta in small number and are absent from the Karachi region. The mangrove forests lining the banks of the farmer delta creeks near Karachi are relics of the estuarine conditions which once prevailed in this area. Since fresh water from the Indus is not reaching the creeks near Karachi, the mangroves living there may be experiencing some salt induced stress.

Fauna

According to Forest Department of Sindh, among the wild animals, species listed in Table 2-2-25 are either commonly or rarely seen in each area.

Table 2-2-25 Fauna in Sindh Province

Habitat and location	Fauna
The western rocky range	Sareh (Sindh ibex), Urial or Gadh (wild sheep), black bear
The eastern desert plains	Pirrang (large tiger cat or fishing cat)
The lower rocky plains and in the eastern region	Deer, Charakh (striped hyena), jackal, fox, porcupine, common grey mongoose, hedgehog, The Sindhi phekari (red lynx or caracal cat)
The central inundation belt	Pharrho (hog deer), wild boar
Thar region	Variety of bats, lizards, and reptiles, including the cobra, Lundi (viper), and the Peean

[6] https://rsis.ramsar.org/ris/1284

The backwaters of the Indus and its eastern Nara channel.	Crocodiles, the Pallo (sable fish), the Bulhan (Indus dolphin)
The Sindh coast	A large variety of marine fish, the plurnbeous dolphin, the beaked dolphin, rorqual or blue whale, and a variety of skates

Source : http://sindhforests.gov.pk/fauna-and-flora-of-sind

Protected species

The Second Schedule of the Sindh Wildlife Protection Ordinance (1972, last amended in 2009) defines the Protected Animals in Sindh. The list aims to conserve hunting animals and does not include plant species. The Federal Government assigns Provincial Governments for wildlife protection, and does not have its own list of protected species

6) Waste Water

The large and small industrial units in the Landhi and Korangi Industrial Areas discharge their waste water into Korangi Nallah which terminates into the Malir River at the Gizri Creek. But for the disposal into the storm water drains, which are poorly maintained, the waste water handling in these industrial areas is not that unsystematic as in the SITE whose effluent is discharged into the Lyari. Here the major polluting units pertaining to textile and leather goods production but other diversified industries producing pharmaceuticals, food products, glass, refractories, ultramarine blue, and refineries processing petroleum are also carrying out their activities equally effectively. Textile factories consume a large amount of fresh water and generate 12.5 million gallon per day (4.7 million m3) of effluents. Their waste water contains organic matter comprising the degraded cellulosic material, unused chemicals, dyes and auxiliaries and hence the high BOD load of over 10,000 tons per year. The waste water containing toxic materials is degraded during its flow in the channels outside the factory.

(3) Legislation and Institution for Environmental and Social Considerations in Pakistan

1) Agencies concerned with the environmental and social considerations in Pakistan

1-1) Implementing Agency

As mentioned in "2-1 Implementation Structure of the Project", Design & Contract Management Section, with the Project Director who plays a centre role in, will be in charge of the detail design as with this preparatory survey. This section also will involve in the Environmental and social consideration work. Approximately 3 engineers will be assigned under him in the construction phase. Roads/Bridges/Flyovers Zones in Malir District will be in charge of the operation and maintenance after the completion of the Project. Implementation structure of KMC is refer to "Figure 2-1-2 Organization Chart of Technical Service Department, KMC".

1-2) Environmental Administration in Pakistan

The Ministry of Environment undertook roles and responsibilities of environmental administration such as an environmental policy implementation at the federal level. In 2010, the Ministry amended its roles and responsibilities significantly under the 18th amendment to the

constitution and as a result, environment is now under the exclusive domain of the provincial government. The functions related to the federal environmental management including an approval of Environmental Impact Assessment (EIA) and Initial Environmental Examination (IEE) have been transferred to the Provincial Environmental Protection Agency (EPA) at the provincial level.

The Pakistan Environmental Protection Act 1997 (PEPA 1997) is technically no longer applicable to the provincial EPA and a legislation for environmental protection is newly enacted by EPA at provinces. EPAs at the provinces are required to enact their own legislation for environmental protection.

No proponent of a project shall commence construction or operation unless it has filed with the Agency an EIA and has obtained from Agency approval in respect thereof. SEPA (Sindh Environmental Protection Agency) shall review the EIA and accord approval subject to such terms and conditions as it may prescribe or require. Institutional framework of SEPA is shown in Figure 2-2-48. SEPA would be headed by Director General (DG) with the aim to exercise the powers and perform the functions assigned to it under the provisions of this Act and the rules and regulations made there under. The Agency shall have technical and legal staff and may form advisory committees. The Agency shall administer and implement the provisions of this Act and regulations. It shall also prepare environmental policies, take measures for implementation of environmental policies, prepare Sindh Environment Report and prepare or revise Sindh Environmental Quality Standards. SEPA shall also establish systems and procedures for surveys, surveillance, monitoring, measurement, examination, investigation research, inspection and audit to prevent and control pollution and to estimate the costs of cleaning up pollution and rehabilitating the environment and sustainable development. SEPA would also take measures for protection of environment such as to promote research; issues licenses for dealing with hazardous substances, certify laboratories, identify need for or initiate legislation, specify safeguards etc. SEPA would also encourage public awareness and education regarding environmental issues.

The operational members who communicate with an implementing agency of projects and an environmental consultant in EIA preparation procedure including provision feedback of the EIA draft to the implementing agency, arrangements for public hearing and expert committees are the Environmental Impact Assessment with the Director of Technical who plays a centre roll in.

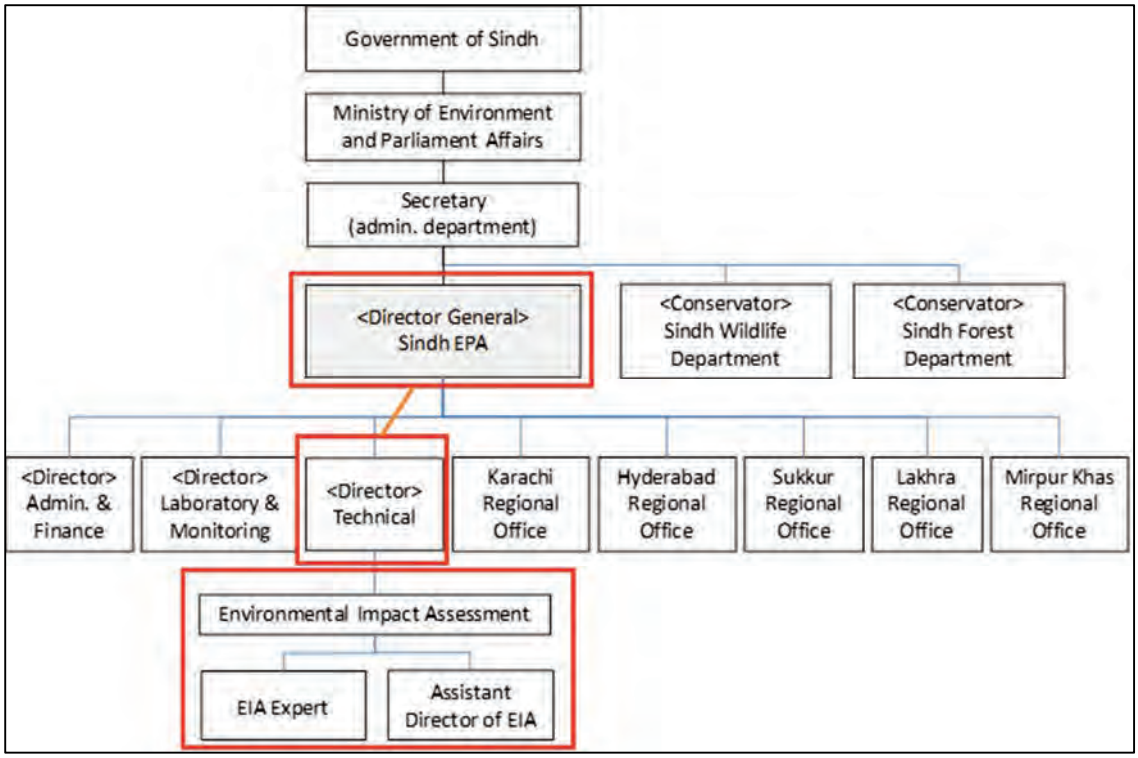


Figure 2-2-49 Institutional Framework of SEPA

1-3) Organization/NGOs which involve in activities of environmental conservation/protection in Pakistan

International Union for Conservation of Nature (IUCN)-Pakistan is a major organization which has undertaken many environmental conservation projects in various locations in Pakistan. IUCN-Pakistan has been trying to integrate the environment and development, to facilitate for the creation of a supportive policy and legal framework, support to institutional and human resource development for environment and increase popular support for the environment since the ICUN was established in Pakistan. IUCN Red List as Near Threatened (NT) mentioned above is published by IUCN. Furthermore, important organization to remember is World Wide Fund for Nature (WWF)-Pakistan. WWF-Pakistan recommended that KMC must formulate a replantation plan to compensate for the loss of canopy of the mature trees that would be cut for the expansion WWF-Pakistan carries out conservation work according to the Global Programme Framework. The Framework includes biodiversity and human footprint meta-goals and has an average of 30 active projects implemented throughout Pakistan to achieve nature conservation and sustainable development goals.

2) Environmental Legislations in Pakistan

2-1) Environmental Protection laws and Regulations

As the all project components to be implemented are within Sindh Province, therefore, Sindh Environmental Protection Agency (SEPA) authorizes an approval of the environmental impact assessment of the Project. The major legislation relevant to the environmental and social consideration in Pakistan are as follows.

- Sindh Environmental Protection Act 2014 (Act 2014)
- Sindh Environmental Protection Agency Regulations 2014 (Regulations 2014)

Legislative assembly of Sindh Province passed the bill on February 2014 to enact the Act 2014. It envisages protection, improvement, conservation and rehabilitation of environment of Sindh with the help of legal action against polluters and green awakening of communities. The Regulations 2014 provides the necessary details on the preparation, submission, and review of the IEE and the EIA. The regulation categorizes projects based on anticipated degree of environmental impact.

2-2) Other Environmental Legislation

Major environmental laws and decree are confirmed and summarized except Act 2014 and Regulations 2014 in Table 2-2-26.

Table 2-2-26 Environmental Laws and Decree by Category

Category	Title	Outline
Natural Resource	National Conservation Strategy (NCS)	Encouraging sustainable development, conserving natural resources, and improving efficiency in the use and management of resources.
Protection of wildlife and bio diversity	Sindh Wildlife Protection (Second Amendment) Ordinance, 2001	Preservation, protection, and conservation of wildlife by the formation and management of protected areas and prohibition of hunting of wildlife species in these areas under the ordinance (national park, wildlife sanctuary, or game reserve).
Forest resources	Forest Act 1927	Protection and conservation of natural vegetation/habitat and declaration of protected and reserved forest areas and maintaining the same.
	Cutting of Trees (prohibition) Act, 1992	Prohibition of cutting of trees in and near external frontier of Pakistan.
Mining	Mines Act 1923	Mainly provide the administrative set-up required for regulating mining operations, the power to the national and appropriate provincial governments to regulate the mining sector and provisions for health and safety of mining staff.
Coastal marine	Coastal Zone Regulations 1991	Declaration of coastal stretches of seas, bays, estuaries, creeks, rivers and backwaters
Waste disposal	Sindh Solid Waste Management Board Bill 2014	Establishment of a Board called as the Sindh Solid Waste Management Board for the collection and disposal of solid and other waste in the Province of Sindh
Land use and resettlement	Karachi Building and Town Planning Regulations 2002	For building and development works and changes in the land use shall be regulated by these regulations.
Conservation of historical cultural assets	Antiquities Act 1975	Ensures the protection of Pakistan's cultural resources and obligates the project proponents to ensure that no activity is undertaken within 61 m (200 ft.) of a protected antiquity.
	Sindh Cultural Heritage (Preservation) Act, 1994	Provincial law for the protection of cultural assets. Its objectives are similar to those of the Antiquities Act
Environmental assessment	Sindh Environmental Protection Act 2014 (Section 17)	Main law for the environmental protection in Sindh and section 17 mandates the proponent of any project to file environmental assessment report.
National integrated protected area	Guidelines for Sensitive and Critical Areas - GoP	Provide guidance to the project proponents in the environmental assessment process that the planned projects are planned and sited in a way to protect the values of sensitive and critical areas

system		(heritage sites, reserved forest, wildlife sanctuaries etc.)

Source: Survey team

2-3) Institution of EIA in Pakistan

According to the Act 2014 (Part-VI), either IEE or EIA is mandatory for development projects that could have an effect on the environment prior to the commencement of the Project. More specifically, a project falling in any category listed in Schedule-I attached to the Regulations 2014 shall file an IEE with the SEPA will be required an IEE, on the other hand, a project falling in any category listed in Schedule-II shall file an EIA with the SEPA. The Project is fallen into the category, which requires EIA entitled to "E. Transport 2. Federal or Provincial highways or major roads including rehabilitation or rebuilding or reconstruction of existing roads" in Schedule-II. Table 2-2-27 shows type of projects which are required to prepare the EIA.

Table 2-2-27 List of Projects requiring an EIA

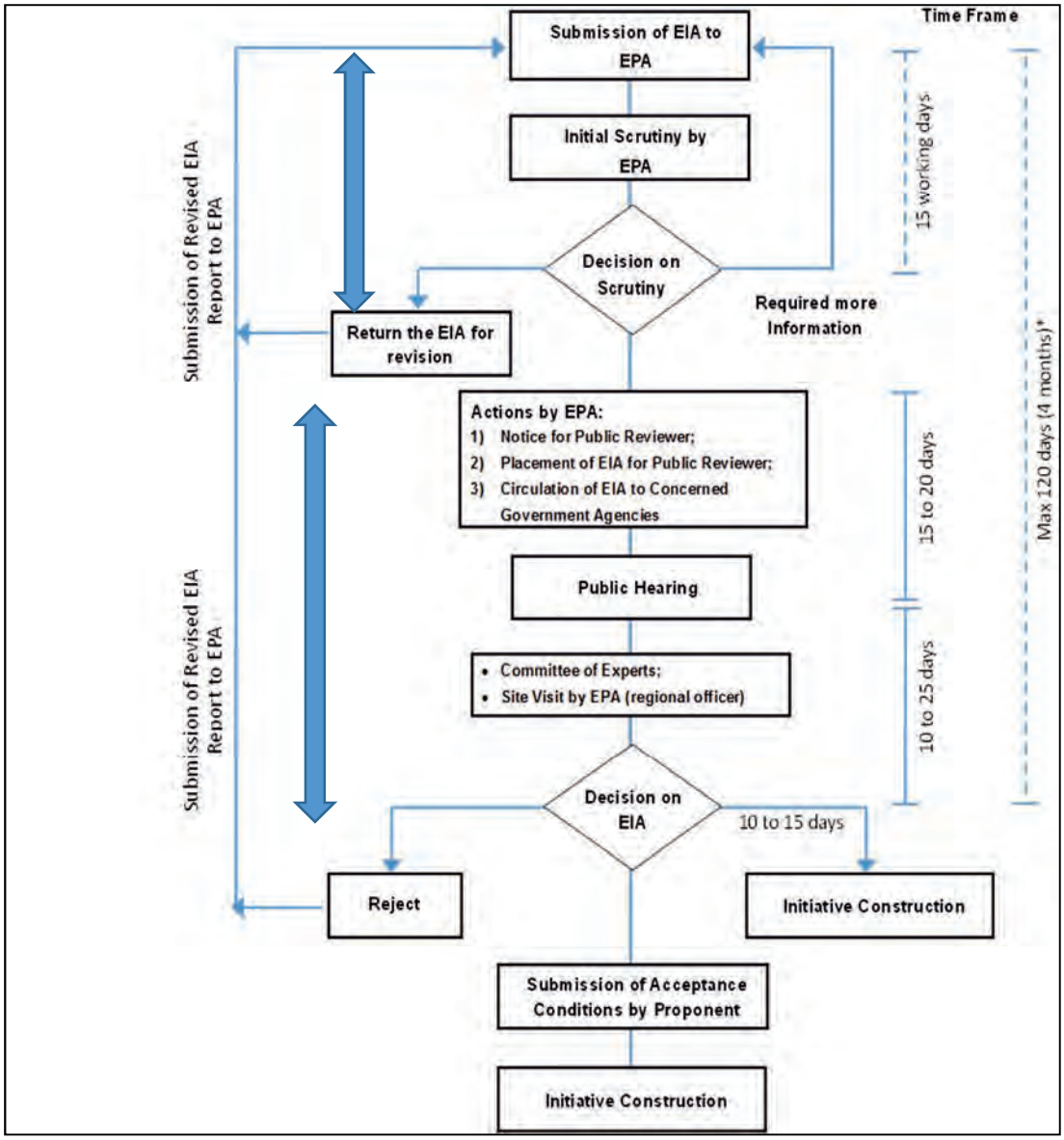
A. Energy
1. Hydroelectric power generation over 50 MW 2. Thermal power generation over 100MW 3. Coal power projects above 50 MW 4. Transmission lines (11 KV and above) and distribution projects. 5. Nuclear power plants 6. Wind energy projects if falls under any sensitive, protected area.
B. Oil and Gas projects
1. Petroleum refineries. 2. LPG and LNG Projects(including LNG Terminals, re-gasification units) except LPG filling stations 3. Oil and gas transmission systems 4. Oil and gas gathering system, separation and storage.
C. Manufacturing and processing
1. Cement plants 2. Chemical manufacturing industries 3. Fertilizer plants 4. Steel Mills 5. Sugar Mills and Distilleries 6. Food processing industries including beverages, dairy milk and products, slaughter houses and related activities with total cost more than Rs. 200 Million 7. Industrial estates (including export processing zones) 8. Man-made fibers and resin projects with total cost of Rs 200M and above 9. Pesticides (manufacture or formulation) 10. Petrochemicals complex 11. Synthetic resins, plastics and man-made fibers, paper and paperboard, paper pulping, plastic products, textiles (except apparel),printing and publishing, paints and dyes, oils and fats and vegetable ghee projects, with total cost more than Rs.10 million 12. Tanning and leather finishing projects 13. Battery manufacturing plant
D. Mining and mineral processing
1. Mining and processing of coal, gold, copper, sulfur and precious stones 2. Mining and processing of major non-ferrous metals, iron and steel rolling 3. Smelting plants with total cost of Rs. 100 million and above
E. Transport
1. Airports 2. Federal or Provincial highways or major roads (including rehabilitation or rebuilding or reconstruction of existing roads) 3. Ports and harbor development 4. Railway works

5. Flyovers, underpasses and bridges having total length of more than 500m
F. Water management, dams, irrigation and flood protection
1. Dams and reservoirs with storage volume of 25 million cubic meters and above having surface area of 4 square kilometers and above 2. Irrigation and drainage projects serving 15,000 hectares and above 3. Flood Protection
G. Water supply and filtration
1. Large Water supply schemes and filtration plants.
H. Waste Disposal and treatment
1. Handling, storage or disposal of hazardous or toxic wastes or radioactive waste (including landfill sites, incineration of hospital toxic waste) 2. Waste disposal facilities for municipal or industrial wastes, with total annual capacity of 10,000 tons and above. 3. Waste water treatment facility for industrial or municipal effluents.
I. Urban development and tourism
1. Housing schemes above 10 acres 2. Residential/commercial high rise buildings/apartments from 15 stories and above. 3. Land use studies and urban plans (large cities) 4. Large scale public facilities. 5. Large-scale tourism development projects
J. Environmentally Sensitive Areas
1. All projects situated in environmentally sensitive areas
K. Other projects
1. Any other project for which filing of an EIA is required by the Agency under sub-regulation (2) of Regulation 5. 2. Any other project likely to cause an adverse environmental effect

Source: Regulations, 2014

The Regulations 2014 indicates that 4 months are generally required for the EIA approval as well as an issue of the environmental certificate after the submission of the EIA to SEPA. According to the result of the interview with SEPA, as an exceptional case, the issuance of the environmental certificate takes only 3 months as long as Sindh Province recognizes the implementation of a project as high priority. In addition, the components of the Project are the widening and rehabilitation of National Highway N5, so that the Project will have fewer environmental and social impacts than those to develop roads, which also contributes for shortening the period of the EIA approval process.

Figure 2-2-50 shows the entire process for EIA approval by Pakistan side based on the Regulation 2014.



Source: Regulations 2014 and the result of the interview with EMC

Figure 2-2-50 EIA Approval Process

2-4) Gaps between Legislations in Pakistan and the JICA Guidelines

Projects fallen into Category A and B under the JICA Guidelines for Environmental and Social Considerations (April 2010) (hereinafter referred to as the JICA Guidelines) are requested to compare and review gaps between Legislations in Pakistan and the JICA Guidelines. Through the EIA preparation procedure, gaps which the JICA Guidelines request to consider was well examined. The result of the review is shown in Table 2-2-28. Gaps to be filled up are, in particular, not identified.

Table 2-2-28 Gaps between Legislations in Pakistan and JICA Guideline

NO	JICA Guideline (JICA GL) (April, 2010)	Act (2014) and Regulations (2014), Sindh province, Pakistan	Gaps	Policy to fill up gaps in this study
Environmental Legislations				
1	Basically, the environmental and social considerations are based on the JICA Guideline. Moreover, it is confirmed that whether the project do not deviate significantly from the World Bank's safeguard Policy (JICA GL8).	The process for EIA is based on the Act 2014 and Regulations 2014 documented/issued by Sindh government	While legislations and standards applied are different, no big difference is confirmed.	-
Category Classification (Screening)				
2	Proposed projects are classified as Category A if they are likely to have significant adverse effects on the environment and society (JICA GL6).	Instead of the category classification, projects need to prepare the EIA are listed in Schedule –II Regulations 2014. The Project is required to prepare the EIA and it needs to be approved before the commencement of the project (Regulations 1 and Schedule I).	No difference	-
EIA report				
3	Concerning projects classified as Category A, EIA prepared needs to be submitted by project proponents (JICA GL12).		No difference	-
Survey items for environmental considerations				
4	Items for environmental considerations are ambient air, noise& vibration, water quality, soil, waste, accidents, water use, climate change, ecosystem and natural environment (JICA GL6).	Items for environmental considerations are not mentioned in the Act and the Regulations	Items for environmental considerations are mentioned in the JICA Guidelines but not mentioned in Act 2014 and Regulations 2014 of Sindh government.	Based on the consultation among relevant agencies, all items pointed out by JICA Guidelines were selected and examined.
Consultation with local stakeholders				
5	Project proponents consult with local stakeholders about their understanding of development needs, the likely adverse effects on the environment and society, and the analysis of alternatives at an early stage of the project (JICA GL7).	Prior to the EIA survey, project description/summary, EIA survey method, potential project effects, EIA approval procedure are share with persons related to the Project, and opinions and ideas for the Project are collected during the stakeholder meeting. After the disclosure	No difference	-

NO	JICA Guideline (JICA GL) (April, 2010)	Act (2014) and Regulations (2014), Sindh province, Pakistan	Gaps	Policy to fill up gaps in this study
		of the draft of the EIA, the discussion with stakeholders is held during the public hearing and its feedback will reflect on the draft.		
Advice from JICA Advisory Committee on Environmental and Social Considerations				
6	The Advisory Committee for Environmental and Social Considerations gives advice on environmental and social considerations in preparatory surveys. JICA reports to the Committee, and the Committee gives advice as needed at the environmental review and monitoring stages (JICA GL8)。	After the submission of the EIA report to SEPA, is held and the EIA report is reviewed during the Expert committee. (based on the Regulations 4-5 and the result of the consultation with the environmental consultant and SEPA)	No difference	-

Source: Survey Team

2-5) National Environment Quality Standards（NEQS）in Pakistan and Vibration Standard in aother country

According to the interviews with SEPA and the local environmental consultant, it was confirmed that the environmental standards are not enacted in Sindh Provinces of August 2015. Therefore, the Project evaluated the results of the environmental survey based on the NEQS. Impacts of vibration was evaluated in accordance with the standard in Denmark since the NEQS as well as the environmental standard in the most countries do not specify the vibration standard and Denmak is the one which specifies the vibration standard in residencial area and public facilities. Furthermore, the Denmark standard converts the level of acceleration on vibration into dB, and the conversion manner will make it easier for the project monitoring. NEQS was enacted in 1993 based on the Pakistan Environmental Protection Agency Ordinance (1983). Parts of standards in NEQS were revised and finally issued as " NEQS（1993）and its revised NEQS（2000）" in 2000. NEQS（2000）was revised in 2010 and the following standards are described in NEQS (2010). The chronological list of NEQS is shown in Table 2-2-29.

Table 2-2-29 Chronological List of NEQS

Year	Name of standard
1993	Liquid Industrial Effluent Industrial Gaseous Emission Vehicle Exhaust and Noise
1995	Industrial Gaseous Emission from Power Plants operating on coal and oil (added)
2000	Liquid Industrial Effluent (amended) Industrial Gaseous Emission (amended)
2010	Ambient Air

	Drinking Water Quality Noise

Source: JICA Study team

According to Section 22(1) of SEPA Act 2014, NEQS has the force of law, and agencies that do not take countermeasures appropriately can be punished by SEPA.

SEPA will monitor whether countermeasures are taken appropriately or not through the monitoring report prepared by IMC. If it is confirmed that the countermeasures are applied, SEPA concludes the agencies as the compliant, otherwise SEPA will issue an Environmental Protection Order (EPO). Furthermore, if EPO is issued by SEPA and agencies will not answer the EPO, SEPA will issue the court orders.

NEQS does not cover the standards for vibration so Denmark Environmental Vibration Guidelines are applied. Table 2-2-30, Table 2-2-31 and Table 2-2-32 show the NEQS for Ambient Air and noise, and Denmark Standard for Vibration. The survey items for ambient air includes dust for the survey.

Table 2-2-30 NEQS for Ambient Air

Survey Item	Pakistan		Japan	
	Time-weighted Average	Concentration in Ambient Air	Time-weighted Average	Concentration in Ambient Air
SO2	1year	80ppb		
			24hours	40ppb
	1hour	120ppb	1hour	100ppb
NO	24hours	40ppb		
NO2	24hours	80ppb	24hours	60ppb
O3	1hour	130ppb	1hour	60ppb
SPM	24hours	0.50mg/m^3	24hours	0.10mg/m^3
			1hour	0.20mg/m^3
PM10	24hours	150ppb		
PM2.5	1year	15μg/m^3	1year	15μg/m^3
	24hours	35μg/m^3	24hours	35μg/m^3
	1hour	15μg/m^3		
Pb	24hours	1.5μg/m^3		
CO			24hours	10ppm
	8hours	5ppm	8hours	20ppm
	1hour	10ppm		

Source: Pakistan NEQS: Basic Survey of Environmental and Social Consideration for Project Improvement of N5, Japanese Standards: Ministry of Environment, Japan, http: //www.env.go.jp/kijun/taiki.html and http: //www.env.go.jp/kijun/oto1-1.html

Table 2-2-31 NEQS for Noise

Area	Pakistan		Japan	
	Duration	Noise level	Duration	Noise level
Residential area	6: 00 - 22: 00	55dB	6: 00 - 22: 00	55dB
	22: 00 - 6: 00	45dB	22: 00 - 6: 00	45dB
Commercial area	6: 00 - 22: 00	65dB	6: 00 - 22: 00	60dB
	22: 00 - 6: 00	55dB	22: 00 - 6: 00	50dB
Industrial area	6: 00 - 22: 00	75dB	6: 00 - 22: 00	60dB
	22: 00 - 6: 00	65dB	22: 00 - 6: 00	50dB
Silence zone *1	6: 00 - 22: 00	50dB	6: 00 - 22: 00	50dB
	22: 00 - 6: 00	45dB	22: 00 - 6: 00	40dB

(Source: Pakistan NEQS: Basic Survey of Environmental and Social Consideration for Project Improvement of N5, Japanese Standards: Ministry of Environment, Japan, http: //www.env.go.jp/kijun/taiki.html, http:

//www.env.go.jp/kijun/oto1-1.html）
(*1: An area comprising not less than 100 meters around hospitals, educational institutions and courts.)

Table 2-2-32 Vibration Standard in Denmark

Area	Standard in Denmark	
	Duration	Vibration level
Residential area in the daytime and nighttime	24 hours	75 (dB)

(Source: ISO/DIS2631-2-1989, Denmark Standard)

(4) Comparison of Alternative Plans (Including Zero-option)

National Highway N5 as the Project target road is a major arterial road between Karachi city and entire cities in Pakistan, and it undertakes an important role in terms of commodity distribution. Therefore, KMC is planning to widen the existing 4-lane N5 to 6 lanes up to the Quaidabad Flyover, where is the beginning point of the Project, and KMC is also constructing the flyovers at the congested intersections on N5 in the city centre according to increasing traffic demand. Also, since the road rehabilitation eastward from the Project end point in 12 km length has been completed, the road condition and accessibility from N5 to the Eastern Bypass connecting to M-9 has substantially been improved. These projects are planned by utilising the existing ROW and tracing the existing alignment specified in City Master Plan as the regional development along N5 proceeds based on the ROW.

Considering the connectivity with neighbouring sections, coordination with the development plan as well as minimising the environmental and social impacts, this Project utilising the existing ROW is regarded as optimal.

In order to evaluate the necessity and relevance of the Project, however, the Option-1, which is proposed to be implemented, is compared to Option-0 which a project is not undertaken in terms of environmental and social consideration as well as technical and economic aspects. Results of the comparison 0-1 are shown in Table 2-2-33.

Table 2-2-33 Comparison of Option-0 and Option-1

Name	Option-0: No Project undertaken (Zero-option)	Option-1: Widening and rehabilitation of the target road
Description of Option-0 and Option-1	No project undertaken	In order to secure smooth traffic flow for possible traffic volumes, the target road is expanded from 4 to 6 lanes. In addition, highway geometric design is undertaken and drainage systems are constructed.
Social Impact	○ There is no social impact due to no project being undertaken and no change to the status of illegal occupation within the ROW No project undertaken, so resettlement will not be necessary.	○ Some vendors and stall keepers are obliged to change where they do business, but land acquisition and resettlement are not involved in this process.
Effect on Land Use	△ If boundaries between public and private land remain vague for a long time, there is a possibility that illegal occupation in the ROW will be	○ Clearance of illegal occupation along with the construction of the Project will clarify the ROW and land boundaries.

	encountered. The implementation of a future road expansion project would be difficult and an influence on the regional plan around the target road is expected.	
Environmental Impact	◎ There is no environmental impact due to no project being undertaken	○ There is a slight and limited environmental impact due to the construction work, such as excavation and cutting of trees.
Effect on living life / Environmental Pollution	△ There is a high probability that traffic congestion will increase due to an increase in the traffic volume. As drainage culverts are not developed, the target road will be submerged when it rains.	○ Even though the future traffic volume increases, the number of the traffic lanes will be expanded from 2 to 3, which can relieve traffic congestion. As driving speeds increase, the amount of exhaust emissions is stable. The living conditions around the target road are improved due to the development of drainage culverts.
	The road is submerged when it rains, because drainage culverts are not developed.	The standard of living is improved by the development of drainage culverts.
	An increase in exhaust emissions is expected due to the use of aging vehicles	An increase in exhaust emissions is expected due to the use of aging vehicles
Traffic safety	△ As there are various vehicle types approaching the roadsides at different speeds, such as low-speed heavy vehicles and high-speed light vehicles they pass, there is a high possibility of a traffic accident.	○ In the part of the target road with many vehicles approaching the roadsides, the development of service roads separates low-speed vehicles from others, so that a probability of a traffic accident is low.
	Risk of pedestrian accidents is increased because pedestrian crossings are not developed.	Risk of pedestrian accidents is decreased due to the development of pedestrian crossings and signals at intersections.
Function of road traffic	△ Since traffic congestion increases with an increase in the traffic volume, smooth and safe traffic flow are not ensured.	◎ The target road has sufficient traffic capacity for the actual traffic volume, so smooth and safe traffic flow is ensured.
Impacts on socioeconomic activities and regional development	△ Traffic flow is disturbed, which hinders social and economic activities.	◎ Smooth and safe traffic flow is ensured and vehicles have more access to areas along the road via the service roads. Improved traffic flow contributes to improved socioeconomic activities, regional development and logistical efficiency. The improvement of the urban environment by developing street lights and pedestrian roads contributes to improved public security.
	City environment and security situation will not be changed.	City environment is improved due to the development of roadside trees and pedestrian roads, which contribute improving the security situation.

	As no project activities are undertaken, local economy is not improved and new employment opportunities are not generated around the target area.	Local people have employment opportunities during the construction phase and local economy is improved around the target area, so the income of local people is increased.
Cost for Construction	◎ There are no construction costs for road widening.	△ There are construction costs for road widening and relocation costs for structures in the ROW.
Cost for operation and maintenance	△ As pavement damage has been observed, the urgent repair and maintenance of roads are necessary. Moreover, the maintenance cost will be high, because roads are easily damaged due to a lack of drainage culverts and a possible increase in the number of large vehicles.	◎ Even though there are periodic maintenance costs of roads, the road durability will be improved by paving roads and developing drainage culverts, which will result in long-term cost saving for road maintenance.
	As drainage culverts are not developed and the number of large vehicles is increased, the target road can be easily damaged. Therefore, road maintenance costs will be high.	The periodic road maintenance is necessary. However, durability of the road is improved through the improvement of pavement and development of drainage culverts. Thus, road maintenance costs will be moderate.
Accordance to needs and demands by local areas	△ Road function and environment are not improved, so the Option-0 does not match the needs and demands.	◎ Traffic congestion is mitigated and road accessibility is improved due to road extension and paving, so Option-1 does match the needs and demands of local areas.
Comparison to proposed option	△	Proposed
Points after the results of the comparison	There is no effect on the environment and no construction costs. On the other hand, there are negative effects on the standard of living, traffic safety, road functionality, socioeconomic activities and road maintenance.	Even though Option-1 incurs construction costs, there will be positive effect on the standard of living, traffic safety, road functionality, society, socioeconomic activities and road maintenance due to ensuring sufficient traffic capacity and development of roads.

Evaluation:
◎: Preferable
○: Less than preferable but no negative effects
△: Not preferable

(5) TOR for the Scoping Plan and Environmental and Social Considerations Survey

Potential effects of the Project in terms of environmental and social consideration are evaluated based on the information collected through the Preparatory Survey and results of the review of relevant documents such as JICA Basic report.

Table 2-2-34 Draft of Scoping

NO	Potential Impact	Rating		Evaluation
		Planning/ Construction Phase	Operational Phase	
1. Countermeasure for Environmental Pollution				
1	Air Quality	B-	B+/-	Construction Phase:

				● An increase in exhaust emissions is expected due to traffic congestion by traffic restriction and vehicles manoeuvring ● Dust and exhaust emissions are expected due to operation of construction vehicles, construction machinery and the transport of construction materials. Operational Phase: ● Dust is expected to be reduced due to there being more the paved road (of length). ● A decrease in exhaust emissions is expected due to the mitigation of traffic congestion and smooth traffic flow ● An increase in exhaust emissions is expected due to the increase in traffic volume, especially large-sized vehicles, caused by the improvement of road conditions, such as its expansion.
2	Water Quality	B-	B-	Construction Phase: ● There are some possibilities for water pollution due to the discharge from construction area including yard camp. ● There is a possibility that the discharge of turbid water from the construction operation, especially from the concrete plant, influences on the water quality of surface stream water (receiving water body). Operational Phase: ● An increase in the pavement area of roads and development of drainage will lead to the increase in rainfall outflows, which may overall result in the improvement of the area because it will wash out and dilute the effluent coming out from households and industrial zones (factories). ● Water quality from a sediment transport aspect can be improved by paving the currently bare land in the ROW, which will reduce erosion and discharge of sediment. ● An increase in sewage is expected due to the gradual small-scale development around the target road caused by the road expansion. ● Rainfall runoff might flow into rivers as effluent from the Project site due to the development of drainage channels to rivers by the Project.
3	Waste Management	B+/-	B-	Construction Phase: ● An increase in waste (general waste, construction soil waste and scrap wood) from the construction area including yard camp is expected. ● Places rubbish scattered along the target road are expected to clean up for the commencement of the Project Operational Phase: ● Amount of waste dumped from vehicles is expected to increase due to the increase in passing vehicles. ● Amount of waste generated is expected to increase due to the gradual small-scale development around the target road caused by the road expansion. ● The amount of waste is expected to increase due to the promotion of small-scale development along with the road development.
4	Soil	C	D	Construction Phase:

	Contamination			● Even though there are some possibilities for oil discharge from the construction vehicles, its amount is limited and not expected to trigger soil contamination. Operational Phase: ● No significant impacts are expected.
5	Noise and Vibration	B-	B-	Planning Phase/Construction Phase: ● Some noise and vibration are expected due to the construction activities by the construction vehicle in the adjacent resident area. Operational Phase: ● An increase in the amount of noise and vibration is expected due to a decrease in the distance between carriage way and private land prior to the commencement of the Project. ● Some noise and vibration are expected due to the increase in the traffic speed.
6	Subsidence	D	D	Planning Phase/Construction Phase: ● No significant effects are expected due to no groundwater pumping. Operational Phase: ● No effects that cause subsidence are expected.
7	Odour	C	C	Construction Phase: ● Even though emulsified asphalt and asphalt mixture may temporarily cause odour during construction, its impact is temporary and not expected to trigger soil contamination. ● An increase in exhaust emissions due to the operation of construction machinery may cause odour. Operational Phase: ● Odour is expected to increase due to the increase in exhaust emissions from passing vehicles.
8	Bottom Sediment	D	D	Planning Phase/Construction Phase and Operational Phase: ● Construction work that could influence on bottom sediment is not planned.
2. Natural Environment				
9	Conservation Area	D	D	Construction Phase: ● Conservation area is not identified around the target road. There is approximately 35 km between the target road and the nearest natural reserve that is the second largest national park called Kirthar National Park. Operational Phase: ● No significant impacts are expected.
10	Ecosystem	C	D	Construction Phase: ● According to the JICA Basic survey report, rare plants have not been confirmed but a few rare birds, including migrant birds, and a less common reptile have been confirmed around the target road in the macroenvironment. Therefore, the ecosystem including these species may potentially be affected. ● While trees planted within the ROW will be partially cut down, a significant effect on the ecosystem around the target road is not expected. Furthermore, trees found along

				roadside are common plant species and are not endangered. ● Mangroves growing in the downstream basins of rivers might be negatively affected through riverine systems. ● Bird species are expected to be affected. Operational Phase: ● No significant effects are expected due to road expansion and passage of vehicles
11	Hydrology	D	D	Construction Phase: ● Even though a part of the existing drainage will be changed provisionally, its change is not expected to affect the water flow in rivers ● Even though muddy water may be generated by the construction, there will be no effect on the water flow at the effluent outlet. Operational Phase: ● Water discharge from the target road will probably increase during rainfalls. The development of culverts to discharge water from the target road makes it possible to direct the discharge water to the river appropriately.
12	Topography and Geology	D	D	Construction Phase /Operational Phase: ● As the objective of the Project is widening and rehabilitation of existing arterial road within ROW, large-scale cut and fill of earthwork is not planned. Therefore, no significant impacts are expected.
Social Environment				
13	Involuntary resettlement and/or loss of properties	B-	D	Planning Phase: ● ROW is already designated as public land. No land acquisition will be necessary. ● Clearance of existing structures and private properties and prohibition of vending activities in ROW will be enforced based on the Anti-Encroachment Act. ● In the Basic Survey (2014), no residents were found on the ROW of the Target Section. Detailed and updated survey is ongoing as of August 2015. Construction Phase: ● Temporal lease of land, about 200 x 200 m, will be necessary for the Construction Yard. Operational Phase: ● No additional resettlement or land acquisition will be necessary.
14	Poor	C	D	Planning Phase/Construction Phase: ● If a PAP belongs to the Poor group, and if the negative effect of the Project on their livelihood is significant, it may be difficult to maintain their living. Further survey is necessary to understand the living status of the PAPs and the level of the Project impacts on their livelihood. Operational Phase: ● No impacts are expected exclusively on the Poor group.
15	Indigenous or minority groups	C	D	Planning Phase/Construction Phase: ● According to the JICA Basic Survey, indigenous or minority groups were not recognized among the PAPs. Further surveys are necessary to understand the tribes and the variety of languages spoken by the PAPs and the extent that the Project will affect their livelihood. Also, the effect on existing facilities used by indigenous or minority

				groups will be surveyed. Operational Phase: ● No impacts are expected exclusively on the indigenous or minority groups.
16	Local economy such as employment and livelihood	B+/-	B+/-	Planning Phase: ● Clearance of existing structures and private properties and prohibition of vending activities in ROW may require the PAPs to adapt their employment and livelihood to the new condition. Construction Phase: ● New opportunities for employment and income will be created by the construction works and purchasing activities of the workers. Operational Phase: ● Shorter travel time on the Target Section will contribute to the economic and industrial development in Karachi and surrounding area. ● Extension of the existing road is expected to make traffic vehicles smooth. ● With faster travelling traffic, there is possibility for pedestrians and cars to experience increased difficulty in crossing the N5 and difficulty to access to the existing infrastructures, especially in the areas where large population is located along the road and where social infrastructures and services are located without crossing facilities nearby. ● If the crossing facilities are not appropriately developed in areas where there are markets and businesses, pedestrians will have difficulty in crossing roads. It will have a negative effect on the regional economy, in areas such as employment and livelihood.
17	Land use, local resource use, communal/comm on resource use rights	D	B+	Construction Phase: ● The Project use the existing ROW of N5, and no change in land use will be caused by the Project. Operational Phase: ● Better transportation will contribute increased utilization of local resources such as port facilities.
18	Water rights/ water use	D	D	Construction Phase: ● No agricultural water channels or public water stations are located along the target section of N5. Therefore, no impacts are expected on water rights and water use by the Project. Operational Phase: ● No impacts are expected on water rights and water use by the existence of the road and traffic.
19	Existing traffic/public facilities, infrastructures, social services	B-	B+/-	Planning Phase: ● There is possibility that relocation and/or protection of the existing infrastructures are necessary. Such infrastructures include; electricity, gas, water, sewer/drainage, telephone, and traffic police post. Construction Phase: ● Temporal congestion will occur in the area around the Construction Works. Operational Phase: ● In general, access to the public facilities and services in Karachi will become easier by the road improvement. ● With faster travelling traffic and wider road, there is possibility for pedestrians and cars to experience increased difficulty in crossing the N5 and difficulty to access to the existing infrastructures, especially in the areas where large

				population is located along the road and where social infrastructures and services are located without crossing facilities nearby.
20	Social capitals, local decision making systems, social organizations	D	D	Construction Phase/Operational Phase: ● The Project use the existing ROW of N5, and no significant negative effect on the social organizations will be caused by the Project.
21	Uneven distribution of benefits and damages	D	D	Construction Phase/Operational Phase: ● The Project use the existing ROW of N5, and no uneven distribution of benefits and damages will be caused by the Project.
22	Local conflict of interests	D	D	Construction Phase/Operational Phase: ● The Project use the existing ROW of N5, and no local conflict of interests will be caused by the Project.
23	Physical splits of communities	D	D	Construction Phase/Operational Phase: ● The Project use the existing ROW of N5, and no physical splits of communities will be caused by the Project.
24	Historical and cultural resources	D	D	Construction Phase: ● A nationally designated Historic Monument, the Chaukhandi Tombs, is located about 500 m north of the Target Section. The Project will not affect the monument directly with the construction works or drainage from the work area. No indirect impacts such as a negative effect on access to the monument are expected. Operational Phase: ● No impacts are expected on the monument by the increase in traffic volume after the road improvement.
25	Landscape	D	D	Construction Phase/Operational Phase: ● The Project use the existing ROW of N5, so the Project will have no negative effects on the landscape.
26	Gender	C	B-	Construction Phase ● People affected by the Project may include women and in this case particular attention might be necessary. Operational Phase: ● If pedestrian crossings are not developed in areas where stations of public transport are located along the target road, there may be negative effects on women who are wearing clothes that make it slow to walk or who are with children.
27	Children's rights	D	C	Construction Phase: ● No negative effects on children's rights will be caused by the Project. Operational Phase: ● If local children commute to the kindergartens and elementary schools by crossing N5, and if safe crossing measures are not provided by the Project at appropriate locations, there may be negative effects on children's right for education.
28	Sanitation, public health condition, infectious diseases including HIV/AIDS	B-	B+	Construction Phase: ● Possibility of higher infection risk of infectious diseases including HIV/AIDS among the construction workers and the food and drink service providers. ● When the workers camp is constructed and when the environment of the camp was not kept in sanitary condition, the area could be a source of water-borne infectious diseases which may spread to surrounding environment.

				Operational Phase: ● The Project uses the existing ROW of N5. The Project will improve the drainage along the road and water discharge across the road. The water stagnation and inundation will be avoided in the Project Area. Such improvement will lead to decreased occurrence of infectious causes such as mosquitoes.
29	Industrial safety and health, working environment	B-	D	Construction Phase: ● Dust and emission gas from the construction works may negatively affect the workers' health. ● When the workers camp is constructed and when the environment of the camp was not kept in sanitary condition, the area could be a source of water-borne infectious diseases which may spread to surrounding environment. Operational Phase: ● No negative impacts on industrial safety and working environment will be caused by the Project.
Others				
30	Accidents, crime	B-	B+/-	Construction Phase: ● Possibility of increased risk of traffic accidents in the area around the construction works. Operational Phase: ● Vulnerable road users will enjoy better safety by the construction of sidewalks and separation from vehicle traffic. ● With increased traffic volume and speed, there is a possibility that traffic accidents of motorcycles and crossing pedestrians may increase.
31	Border-crossing impacts and global warming	D	D	Construction Phase/Operational Phase: ● An increase in CO_2 emissions is expected due to an increase in the number of vehicles; on the other hand, a proportional decrease in CO_2 emissions is expected to due to mitigation of traffic congestion. The project purpose is to extend the length of the road, by approximately 11 km, within the ROW and it is not intended to change drainage basins. Thus, it will not cause an increase in CO_2 emissions and the negative effects will be a minor.

Rating Category
A+: Significant positive impact is expected.
A-: Significant negative impact is expected
B+: Certain positive impact is expected.
B-: Certain negative impact is expected.
C: Impact is unknown. (as of preparatory survey phase)
D: No impact is expected.

Terms of reference (TOR) for environmental and social consideration is prepared and summarized in Table 2-2-35 based on the study for the survey items and methods for the extracted potential impacts.

Table 2-2-35 TOR of Environmental and Social Consideration

NO	Potential Impact	Rating		Survey Items	Survey Methods
		Construction Phase	Operational Phase		
1	Air Quality	B-	B+/-	1) National Environmental Quality Standards for air on Pakistan side	1) Examination of relevant documents 2) Measurement of air quality

NO	Potential Impact	Rating		Survey Items	Survey Methods
		Construction Phase	Operational Phase		
				2) Current air quality 3) Current and future traffic volume 4) Potential impacts by the Project during the construction phase	such as SO2 and NO2 along the target road 3) Examination of components and methods of construction 4) Calculation of the amount of pollutant discharge based on the forecast of the future traffic volume
2	Water Quality	B-	B-	1) National Environmental Quality Standards for water on Pakistan side 2) Quality of surface water in the target area 3) Status of utilization of surface water	1) Examination of relevant documents 2) Measurement of quality of surface water 3) Interview with persons related to the Project 4) Examination of components and methods of construction
3	Waste Management	B-	B-	1) Disposal methods of wastes around the construction site	1) Interview with persons related to the Project 2) Examination of components of similar projects
4	Soil Contamination	C	D	1) Available International Standards 2) Quality of soil in the target area	1) Examination of relevant documents 2) Measurement of soil quality 3) Interview with Interview with persons related to the Project
5	Noise and Vibration	B-	B-	1) National Environmental Quality Standards for noise on Pakistan side, for vibration on WHO standards 2) Current level of noise and vibration in the target area 3) Confirmation of places of hospitals and schools and distances between N5 and hospitals and schools 4) Potential impacts by the Project during the construction Phase	1) Examination of relevant documents 2) Measurement of noise and vibration along the N5 3) Forecast of noise level based on the forecast of future traffic volume 4) Examination of components and methods of construction
7	Odour	C	C	1) National Environmental Quality Standards for noise on Pakistan side 2) Potential impacts by the Project	1) Site survey
10	Ecosystem	C	D	1) Potential impacts by the Project during the construction phase	1) Interviews with government agencies, professional man/women (NGO and academian included) and neighbours 2) Site survey

NO	Potential Impact	Rating		Survey Items	Survey Methods
		Construction Phase	Operational Phase		
Social Environment					
13	Involuntary resettlement and/or loss of properties	B-	D	1) Types and number of the Project Affected Persons (PAPs) / Businesses. Scales and severity of the expected impacts. 2) Abbreviated resettlement plan 3) Plan for temporal lease of land in the Construction Phase.	1) Analysis of relevant laws and regulations 2) Census survey 3) Livelihood and business survey by interview 4) Replacement cost survey 5) Stakeholder interview survey 6) Study and analysis of similar activities in internationally funded projects
14	Poor	C	D	1) Existing livelihood condition of the PAPs and scales and severity of the expected impacts.	1) Census survey (Repeat) 2) Livelihood and business survey by interview (Repeat) 3) Stakeholder interview survey (Repeat) 4) Study and analysis of similar activities in internationally funded projects (Repeat)
15	Indigenous or minority groups	C	D	1) Types and number of the PAPs, scales and severity of the expected impacts.	1) Census survey (Repeat) 2) Livelihood and business survey by interview (Repeat) 3) Stakeholder interview survey (Repeat) 4) Study and analysis of similar activities in internationally funded projects (Repeat)
16	Local economy such as employment and livelihood	B+/-	B+/-	1) Types and number of the PAPs, scales and severity of the expected impacts 2) Locations of major employment and important social infrastructures in the Project Area 3) Locations of road crossing by pedestrians and vehicles in the Project Area 4) Project design for road crossing	1) Census survey (Repeat) 2) Livelihood and business survey by interview (Repeat) 3) Site survey (locations of employment, infrastructures/ services, road crossings) 4) Stakeholder interview survey (Repeat) 5) Study and analysis of similar projects
19	Existing traffic/public facilities,	B-	B+/-	1) Study of the plan for protection and/or	1) Site survey (Repeat) 2) Stakeholder interview

NO	Potential Impact	Rating		Survey Items	Survey Methods
		Construction Phase	Operational Phase		
	infrastructures, social services			relocation of existing infrastructures 2) Study of the construction plan and traffic management plan 3) Locations of major employment and important social infrastructures in the Project Area (Repeat) 4) Locations of road crossing by pedestrians and vehicles in the Project Area (Repeat) 5) Project design for road crossing (Repeat)	survey (Repeat) 3) Study and analysis of similar projects (Repeat)
26	Gender	C	B-	1) Potential impacts by the Project for socially vulnerable people 2) Places of pedestrian and vehicle crossing (Repeat) 3) Plan for the pedestrian crossing facilities (Repeat)	1) Site survey (Repeat) 2) Stakeholder interview survey (Repeat)
27	Children's rights	D	C	1) Confirmation of places of schools and school routes and the necessity of pedestrian crossing facilities 2) Places of pedestrian and vehicle crossing (Repeat) 3) Plan for the pedestrian crossing facilities (Repeat)	1) Site survey (Repeat) 2) Stakeholder interview survey (Repeat)
28	Sanitation, public health condition, infectious diseases including HIV/AIDS	B-	B+	1) Study of similar projects and workers camps	1) Stakeholder interview survey (Repeat) 2) Study and analysis of similar projects (Repeat)
29	Industrial safety and health, working environment	B-	D	1) Study of similar projects and workers camps for industrial safety and working environment 2) Data collection and case studies for past accidents in construction works.	1) Stakeholder interview survey (Repeat) 2) Study and analysis of similar projects (Repeat)
Others					

NO	Potential Impact	Rating		Survey Items	Survey Methods
		Construction Phase	Operational Phase		
30	Accidents, crime	B-	B+/-	1) Study of similar projects regarding the traffic safety measures 2) Study of past road improvement projects regarding the increases or decreases in the number of traffic accidents	1) Data collection and analysis on traffic accidents in existing condition, in the Construction Phase, and after completion of improvement works 2) Stakeholder interview survey (Repeat) 3) Study and analysis of similar projects (Repeat)

(6) Results of Survey for Environmental and Social Consideration

In order to prepare the EIA, the baseline data necessary for the EIA needs to be collected based on the result of the scoping. Prior to the commencement of the baseline data collection, JICA basic survey conducted in 2014 was reviewed. As the result of the review, it is confirmed that the report covers necessary survey items such as the land use and traffic characteristics as well as the results of the environmental survey around the target road required for the EIA. Therefore, the Survey team finally concluded that the results of the JICA basic survey was enough to be utilized as a baseline data for the EIA. The potential impacts that are evaluated as either A-, B- or C were surveyed and these results are shown below.

< Air Quality >

Air quality monitoring was conducted at 6 locations along N5. Figure 2-2-51 shows the location of each monitoring point. The criteria of site selection for air quality monitoring at N5 was based on representativeness of the location i.e. locations selected for monitoring are representative of the various type of activities (Industrial operations, traffic congestion etc.) in the microenvironment. Each sampling location lies within a radius of 40 m from roadside. The results of monitoring of the water quality are shown in Table 2-2-36.

Table 2-2-36 Results of Air Quality Monitoring at Selected Locations for N5

Item / Location	NO^2 (ppb)	NO (ppb)	SO^2 (ppb)	CO (ppb)	SPM ($\mu g/m^3$)	PM10 ($\mu g/m^3$)	PM2.5 ($\mu g/m3$)
1, Quaidabad Bridge	49.30	122.70	67.72	4.33	173.65	40.82	21.18
2, Kohi Goth Bridge	11.01	30.25	22.26	5.52	180.21	44.69	18.67
3, Benazir Bhutto Village	92.46	177.84	71.86	5.42	194.13	85.00	29.31
4, Port Qasim Roundabout	67.43	79.29	63.39	3.76	206.39	88.06	26.16
5, Pakistan Steel	94.07	123.55	69.28	5.02	205.96	80.20	27.12
6, Shah Latif Town	13.02	34.99	23.34	3.27	185.73	57.67	22.80
Average	54.5	85.7	52.2	4.6	191.0	66.1	30.04
NEQS	43	32	45	9	500	150	35

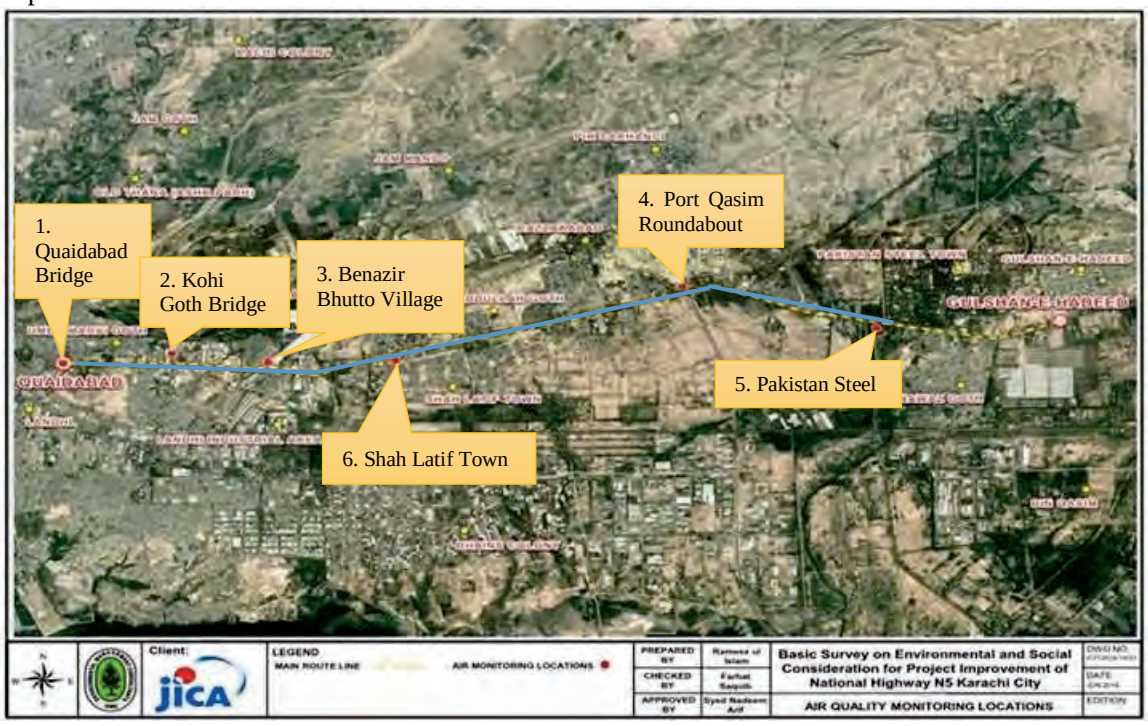
Source: JICA Basic Survey Report, 2014

Based on the result of the survey, the average values of NO_2, NO and SO_2 monitored in 6 locations exceeded the standards mentioned in NEQS. It is supposed that a number of heavy-typed vehicles

such as large and transport truck and tank lorries pass passed the location boosted the values. Exhaust fumes emitted by factories in the industrial areas also has an effect on boosting the values. On the other hand, values of CO, SPM, PM10 and PM2.5 were less than the standards.

The future traffic demand will increase by the natural growth due to the population and economic growth, regardless of the project implemented or not. Furthermore, diverted and induced traffic demand due to the improvement of road condition by the Project will boost the demand.

The amount of exhaust gases emitted from passing vehicles is predicted, with consideration of the increase of future traffic demand and improved road condition in two different cases, one is the project is implemented and the other is the project is not implemented. According to the result of the prediction, the amount of exhaust gases is increased than the present as the traffic volume increases. However, it is expected that the amount of exhaust gases would be decreased if the Project is implemented due to the improvement of road condition, compared with the case the Project is not implemented.



Source: JICA Basic Survey Report, 2014

Figure 2-2-51 Sampling Location for Air Quality

< Water Quality>

Water sampling was conducted in 5 locations and Figure 2-2-52 shows the location of water sampling.

Source: JICA Basic Survey Report 2014
Note: The target road is the red line

Figure 2-2-52 Sampling Location for Water

Water source of the hydrant (Location 1) is groundwater and the water is not used for drinking, but for domestic use[7]. It is important to note that Total Dissolve Solids (TDS) and Total Suspended Solids (TSS) in monitoring location 2-5 were less than the NEQS. Values of Biochemical Oxygen Demand (BOD) in Location 2-5 considerably exceeded the values of NEQS. As a factor to heighten those values, it is presumed that effluent is discharged from industrial factories and households.

Table 2-2-37 Results of Water Monitoring at Selected Locations for N5

NO	Survey Item	Unit	Survey result in each location					NEQS
			1	2	3	4	5	
1.	Temperature	°C	29.5	33.0	31.5	30.9	32.2	<3 °C
2.	pH Value	SU	7.8	7.6	8.9	7.6	9.12	6-9
3.	Color	App.	Clear	Sewage	Sewage	Sewage	Black	-
4.	Total Dissolve Solids (TDS)	mg/L	208	1375	1658	1303	2165	3,500
5.	Total Suspended Solids (TSS)	mg/L	21	391	576	432	394	150
6.	Dissolve Oxygen (DO)	mg/L	4.18	2.75	3.30	2.6	4.75	-
7.	Chloride (Cl^{-1})	mg/L	80	550	551	520	804	1,000
8.	Bicarbonate (HCO_3)	mg/L	38	230	251	210	352	-
9.	Sulfate (SO_4)	mg/L	17	109	170	92	175	600
10.	Nitrate (NO_3)	mg/L	0.028	0.86	2.14	1.6	2.4	-
11.	Carbonate (CO_3)	mg/L	BDL	BDL	BDL	BDL	BDL	-

[7] The groundwater is applied to NEQS.

NO	Survey Item	Unit	Survey result in each location					NEQS
			1	2	3	4	5	
12.	Calcium (Ca)	mg/L	22	112	189	170	242	-
13.	Magnesium (Mg)	mg/L	18	91	160	154	190	-
14.	Sodium (Na)	mg/L	32	201	240	210	281	-
15.	Potassium (K)	mg/L	3.42	34.8	48.6	38.4	63.0	-
16.	5-days BOD @ 20 ˚C	mg/L	BDL	348	640	564	430	80
17.	Chemical Oxygen Demand (COD)	mg/L	BDL	512	1380	978	782	150
18.	Chromium (Cr)	mg/L	BDL	BDL	0.265	0.02487	1.257	1.0
19.	Mercury (Hg)	mg/L	BDL	BDL	BDL	BDL	BDL	0.01
20.	Lead (Pb)	mg/L	BDL	BDL	0.1729	0.06782	0.8475	0.5
21.	Cadmium (Cd)	mg/L	BDL	BDL	0.0594	0.02458	0.64254	0.1
22.	Arsenic (As)	mg/L	BDL	BDL	0.01174	0.03057	0.2294	1.0
23.	Nickel (Ni)	mg/L	BDL	BDL	0.0292	0.8217	1.0528	1.0
24.	Zinc (Zn)	mg/L	0.2725	0.4117	3.497	2.538	5.338	5.0
25.	Total Plate Count @37°C	Cfu	Too numerous to count					-
26.	Total Coliforms @42°C	Cfu	Too numerous to count					-
27.	Escherichia Coli @37°C	Cfu	Too numerous to count					-
28.	Sodium Absorption Ratio (SAR)	mg/l	1.22	3.40	3.09	2.80	3.27	-

Source: JICA Basic Survey Report 2014

< Waste management >

The existing solid waste collection and transportation management system in Karachi is not perfect.

The municipal infrastructure construction has been lagged behind by the economic development, which becomes the bottleneck to hinder the faster and better development of the municipal economy. Of the municipal infrastructure construction, the infrastructure of collection, transfer and final disposal is also on the top of the agenda of the important factor to block

Under the situation, appropriate collection and disposal of industrial and domestic wastes from the Project is strongly required.

Table 2-2-34 shows the estimated volume and types generated during the construction phase and operation phase. Based on the interviews with KMC and EMC, all wastes generated in a construction area, a stockyard, a project office and workers accommodation are collected and conveyed to landfills, which are accredited by KMC, by a construction contractor.

Guidelines for Solid Waste Management was piblished by Pakistan Environmental Protection Agency (PEPA) in collaboration with JICA and UNDP in 2005. These guidelines provide for safe and sustainable mechanism for collection, handling, storage and disposal of solid waste including hazardous waste. The construction contractor is expected to follow the Guidelines during the construction phase.

There are 2 landfill sites in the outskirts of Karachi. 1) The Jam chakro landfill site having coordinates 25°01’640N, & 67°01’980E at the altitude of approx.87 m. This site is spread over 2.024km^2. The garbage/composite consists of silver, metal, glass, bones, polythene shoppers etc.

This landfill is in the north west of Umar goth having 1000 houses in deh Bund Murrad, Gaddap, Mangho Pir area. About 8-9 km of garbage is dumped at the height of 87m. below the datum. About 2000-3000 tons of garbage is dumped in the area, 2) Gond Pass Landfill Site is located in between 25°00'634N and 66°55'262E. Gond pass is an old landfill established about 40-50 years ago and spread over an area of 2.024 km^2. About 1,000 tons/day of municipal waste is transferred from various garbage collection points. According to the interview with KMC, there are enough spaces for waste generated by the Project.

The Survey Team also confirmed no dumping rubbish from vehicles in the target road through the site survey and interview with pedestrians. Rubbish scattered along the target road is presumed to be dumped by neighbouring shops and restaurants. On the other hand, places rubbish scattered along the target road (most of places are within ROW) are expected to clean up for the commencement of the Project.

Table 2-2-38 Summary of 2 Landfills to be used during the Project Construction

Items	Jam Chakro Landfill	Gond Pass Landfill
Location	25°01'640N, & 67°01'980E	25 °00'634N & 66 °55'262E
Total area	500 acre	500 acre
Area remaining for use	According to the interviews with KMC, the enough capacity for use in 2 landfills is confirmed.	
Garbage dumped	2,000-3000 tons per day	1,000 tons per day

Source: Survey Team

Table 2-2-39 Estimated Volume and Types Generated during the Construction Phase and Operation Phase

Phase	Location	Type of waste	Estimated volume of waste
Construction Phase	Construction areas	Waste plastic, Polluted mud, Industrial waste, Soil excavated	2,000-2,500L/month
	Stockyard	Sludge waste	
	Project office	General office waste	500L/month
	Workers accommodation (if it is newly constructed along the target road)	Kitchen waste and other waste	Volume of the waste generated by approx.100 workers
Operation Phase	Small-scale development area along the target road	Scrap woods, Waste plastic, Industrial waste	The volume of the waste will be dependent on the decree of the development.

Source: Survey Team

< Soil contamination >

During the construction phase, oils, chemicals and fuels, which are needed to handle with attention, are likely to be leaked out from construction equipment at the construction area as well as the stock yard, even though those amount sill over is not so much.

Type of activities and potential causes of impacts are described in Table 2-2-40.

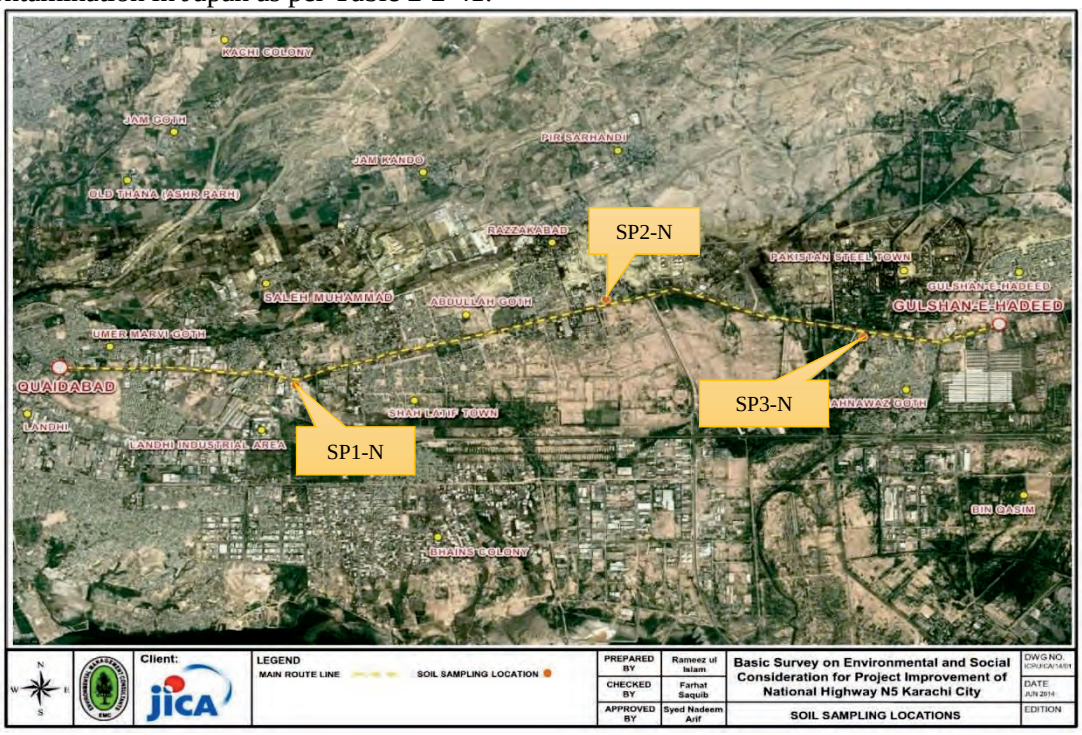
Table 2-2-40 Activities and Potential Causes of Impacts during Construction and Operation Phases

Phase	Type of Activities	Potential causes of impacts
Construction Phase	Operation of construction equipment and construction yard	Oils and chemicals stored in the construction yard and used in vehicles may spill over and causes localized contamination.
Operation Phase	Completion/existence of new expanded N5 (from 4 – 6 lanes) road with paved carriageway	During operation, no such activity will take place that will cause oil and chemical spills

Source: Survey Team

Soil Contamination monitoring was surveyed at three locations, Popular Fabrics Industry (SP1-N), Razzakabad Bus stop (SP2-N), Bin Qasim Park (SP3-N) along the target road. Figure 2-2-53 shows the location of each monitoring point. SP1-N is near heavy industrial activities are conducted and SP2-N is in Razzakabad town where small to medium residential houses are built. Location of SP3-N is outside the target section in front of Quaid-e-Azam Park.

Three soil samples taken during the survey were analyzed in laboratory for soil quality of the project area. All samples are low as compared to National Environment Standards for Soil Contamination in Japan as per Table 2-2-41.



Source: JICA Basic Survey
Note: The target road is yellow dotted line

Figure 2-2-53 Monitoring Location for Soil

Table 2-2-41 Survey Results of Soil Monitoring at Selected Locations for the Target Road

NO	Parameters	LOR	Unit	SP1-N	SP2-N	SP3-N	Japanese Regulation Law
1	pH	0.1	pH	9.7	9.0	9.4	
2	Moisture Content (dried @103oC)	0.1	%	8.7	9.8	2.1	

3	Antimony	1	mg/kg	<1	<1	<1	
4	Arsenic	1	mg/kg	<1	<1	<1	0.01 mg/l~1.7x10-6 mg/kg
5	Beryllium	0.5	mg/kg	0.6	0.8	<0.5	
6	Cadmium	0.2	mg/kg	<0.2	<0.2	<0.2	0.01 mg/l~1.1x10-6 mg/kg
7	Chromium	1	mg/kg	<1	<1	<1	0.05 mg/l
8	Copper	1	mg/kg	14	16	12	>125 mg/kg
9	Lead	1	mg/kg	<1	<1	<1	0.01 mg/l
10	Nickel	1	mg/kg	14	18	12	
11	Selenium	1	mg/kg	<1	<1	<1	0.01 mg/l
12	Silver	0.1	mg/kg	0.3	0.2	0.5	
13	Thallium	0.5	mg/kg	<0.5	0.7	0.7	
14	Zinc	1	mg/kg	25	29	19	
15	Mercury	0.05	mg/kg	<0.05	<0.05	<0.05	0.0005 mg/l
16	Benzene	0.1	mg/kg	<0.1	<0.1	<0.1	0.01 mg/l
17	Trichloroethane	0.2	mg/kg	0.3	0.3	0.5	1 mg/l
18	Dichloropropylene	0.2	mg/kg	0.5	0.4	0.4	
19	Carbon Tetrachloride	0.2	mg/kg	<0.2	<0.2	<0.2	0.002 mg/l
20	Dichloroethane	0.2	mg/kg	<0.2	<0.2	<0.2	0.004 mg/l
21	Trichloroethane	0.2	mg/kg	<0.2	<0.2	<0.2	0.006 mg/l
22	Simazine	0.05	mg/kg	<0.05	<0.05	<0.05	0.003 mg/l

Source: Survey Team

As concluded, at the construction phase, the current level of contamination of soil in the project area is within limits of EQS Japan. Due to the operation of construction yard, storage of oil and chemicals and during fueling in construction vehicles, spills may occur but they will be localized and small. Oils and chemicals used at the construction yards and the work areas may spill over, but can be contained in small area and soil contamination outside of the area will be avoided. On the other hand, during the operation phase there will be no soil contamination during operation of road.

< Noise and vibration >

Due to the construction work by vehicles and operation of construction equipment in the project area will increase the noise and vibration and produce nuisance to the public along the road. Traffic jam may also occur at diversions made for traffic flow during construction phase causes increase levels of noise and vibration. Power generators at construction camp will also generate noise. During operation phase, Noise and vibration of the area will significantly decrease due to faster speed of vehicles and mitigation of traffic congestion. Type of activities and potential causes of impacts are described in Table 2-2-42.

Table 2-2-42 Activities and Potential Causes of Impacts of Noise and Vibration during Construction and Operation Phases

Phase	Type of Activities	Potential causes of impacts
Construction Phase	Operation of construction equipment and tools Operation of power generators for camp activity	Noise and vibration will be increased in areas where construction equipment and tools are operated and at power generator points which supply power to camp.
Operation Phase	Completion/existence of new expanded N5 (from 4 – 6 lanes) road	Noise and Vibration will be decreased due to the mitigation of traffic congestion caused

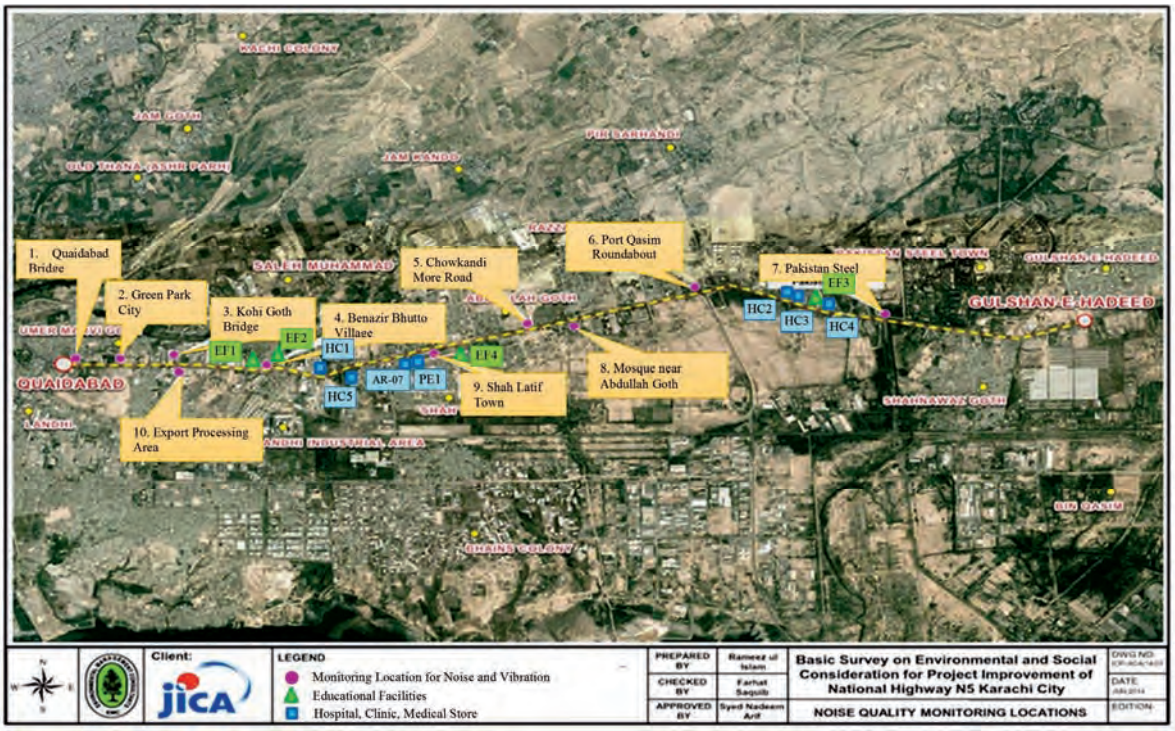
	with paved carriageway catering the design speed of 80 km/hr.	by the increase in the number of lanes from 4 to 6.

Source: Survey Team

According to the Basic Survey, 4 educational facilities are confirmed in the target area. The impacts for facilities possibly caused by the project activities during the construction phase are unpreventable. Furthermore, the exhaust emission gas is expected to increase which influences on schools. However, it can be limited impacts provided that the Project informs schools about the Project before its commencement, and makes consideration for schools about the methods of the construction work and working hours. Also, steps of construction works, traffic diversion, and access measures need to be applied for mitigation of the impacts.

Concerning medical facilities, 1 clinic, 1 hospital, 3 medical stores, 1 animal hospital and ambulance station are confirmed during the Basic Survey. It is confirmed that operating rooms and inpatients' wards are not equipped with the clinic and the hospital so critically-ill patients are not delivered to the clinic and hospital. Animal hospital does only medical examination. 3 medical stores are places where residents can purchase medicines during the day time and they close at night. It is clear, in the same manner of schools, that the these medical facilities will be influenced by the project activities in terms of noise and vibration but it can be limited impacts provided that the Project informs schools about the Project before its commencement, and makes consideration for medical facilities about the methods of the construction work and working hours. Also, likewise schools, steps of construction works, traffic diversion, and access measures needs to be applied for remailing the minimum of the impacts.

Monitoring survey for noise and vibration was conducted at 10 locations shown as Figure 2-2-54. 10 locations include the beginning of the target road, three intersections such as Manzil Pump, Port Qasim and Pakistan Steel where traffic is busy and the population are concentrated.



Source: JICA Basic Survey
Note: The target road is yellow dotted line

Figure 2-2-54 Monitoring Location for Noise and Vibration

Results of monitoring for noise are shown in Table 2-2-43. It is confirmed that levels of noise in all 10 location exceeded the NEQS during the day time. The noise levels in 7 of 10 locations are less than NEQS.

Table 2-2-43 Results of Noise Monitoring at Selected Locations for N5

Survey hours / Survey Location		Day time (6: 00～22: 00)		Night time (22: 00～6: 00)	
		Values (dB)	NEQS (dB)	Values (dB)	NEQS (dB)
1	Quaidabad Bridge	79	75	59	65
2	Green Park City	75	55	57	45
3	Kohi Goth Bridge	68	65	51	55
4	Benazir Bhutto Village	78	65	63	55
5	Chowkandi More Road	84	65	62	55
6	Port Qasim Roundabout	88	75	63	65
7	Pakistan Steel	78	75	62	65
8	Mosque near Abdullah Goth	79	65	64	55
9	Shah Latif Town	80	65	64	55
10	Export Processing Area	79	75	54	65

Source: JICA Basic Survey

Results of the vibration monitoring are shown in Table 2-2-44. As NEQS does not describe the standard for vibration, the result of the monitoring survey for vibration is evaluated based on Denmark vibration guidelines (standrads). According to the result of the survey, levels of the vibration in 9 out of 10 monitoring locations exceeded the Denmark standards during day time. On the other hand, levels of vibration were less than the standards during night time.

Table 2-2-44 Results of Vibration Monitoring at Selected Locations for N5

Survey hours / Survey Location		Day time（8: 00～19: 00）		Night time（19: 00～8: 00）	
		Value (dB)	Denmark Standard(dB)	Value(dB)	Denmark Standard (dB)
1	Quaidabad Bridge	79	75	59	70
2	Green Park City	75		57	
3	Kohi Goth Bridge	68		51	
4	Benazir Bhutto Village	78		63	
5	Chowkandi More Road	84		62	
6	Port Qasim Roundabout	88		63	
7	Pakistan Steel	78		62	
8	Mosque near Abdullah Goth	79		64	
9	Shah Latif Town	80		64	
10	Export Processing Area	79		54	

Source: JICA Basic Survey

The average noise and vibration from passing vehicles is predicted as shown in Table 2-2-45 and Table 2-2-46, with consideration of the increase of future traffic demand and improved road condition in two different cases, one is the project is implemented and the other is the project is not implemented. According to the result of the prediction, the noise level will increase than the present as the traffic volume increases. However, it is expected that the future noise level in the daytime and night time would be decreased if the Project is implemented due to the smoothened and steady traffic flow, compared with the case the Project is not implemented.

Also, it is expected that the vibration level in the future would decrease than the present and be under the standard value in spite of the increase of traffic as the flatness of the pavement and the soil condition under the pavement will be improved.

Table 2-2-45 Prediction of Average Future Noise at the ROW Boundry

Year		Daytime(dB)			Night time(dB)		
		without project	with project	NEQS	without project	with project	NEQS
Present	2015	79	79	55~75	60	60	45~65
After 3 years	2022	80	72		66	65	
After 5 years	2024	80	72		67	65	
After 10 years	2029	81	73		67	66	

Source: JICA Survey team

Table 2-2-46 Prediction of Average Future Vibration at the ROW

Year		Daytime(dB)			Night time(dB)		
		without project	with project	Denmark Standard	without project	with project	Denmark Standard
Present	2015	79	79	75	60	60	75
After 3 years	2022	80	70		60	56	
After 5 years	2024	80	70		60	56	
After 10 years	2029	80	70		60	56	

Source: JICA Survey team

Furthermore, the future noise levels at the 4 educational facilities and 1 clinic as well as Green Park City are predicted as shown in Table 2-2-47 since these facilities and residences should be particlarly cared for the life environment. The significant decrease of noise level due to the diffraction effect is considered at EF3 and Green Park City as there are existing wall around the ROW boundary.

As a result of the prediction, the noise level at EF3, EF4 and Green Park City would be within the NEQS, while the noise level at EF1, EF2 and HC1 would exceed the NEQS. Therefore, countermeasures might be required for these facilities based on the discussion between KMC and the owner of facilities.

Table 2-2-47 Prediction of Future Noise at each Facility in 3 years after the Project Completion

Location	Daytime(dB)		Night time(dB)	
	Predicted Value	NEQS	Predicted Value	NEQS
EF1	70	65	63	55
EF2	67	65	60	55
EF3	70	75	63	65
EF4	51	65	44	55
HC1	72	65	65	55
Green Park City	52	55	45	45

< Odour >

According to the results of the field survey conducted in October, odour which the Survey Team felt strange was not confirmed except the exhaust emission gas and dust generated by vehicles.

＜Ecosystem＞

Vegetation and Flora

Typical vegetation along the Project Area was surveyed by the Team, and plant species were identified by Dr. Syed Ali Ghalib, local expert. As shown in Figure 2-2-55, typical vegetation along the Project Area is similar to the typical tropical thorn scrub land and dominant flora species were the ones included in Figure 2-2-55. Although the landscape looks barren and disturbed, this is the typical native condition of the tropical thorn scrub land that spreads huge area of western Sindh. Since the Project Area is under urban development pressure since independence, there is little possibility that any conservation value remains in the area.

Source : Survey Team, photo taken on September 11, 2015.

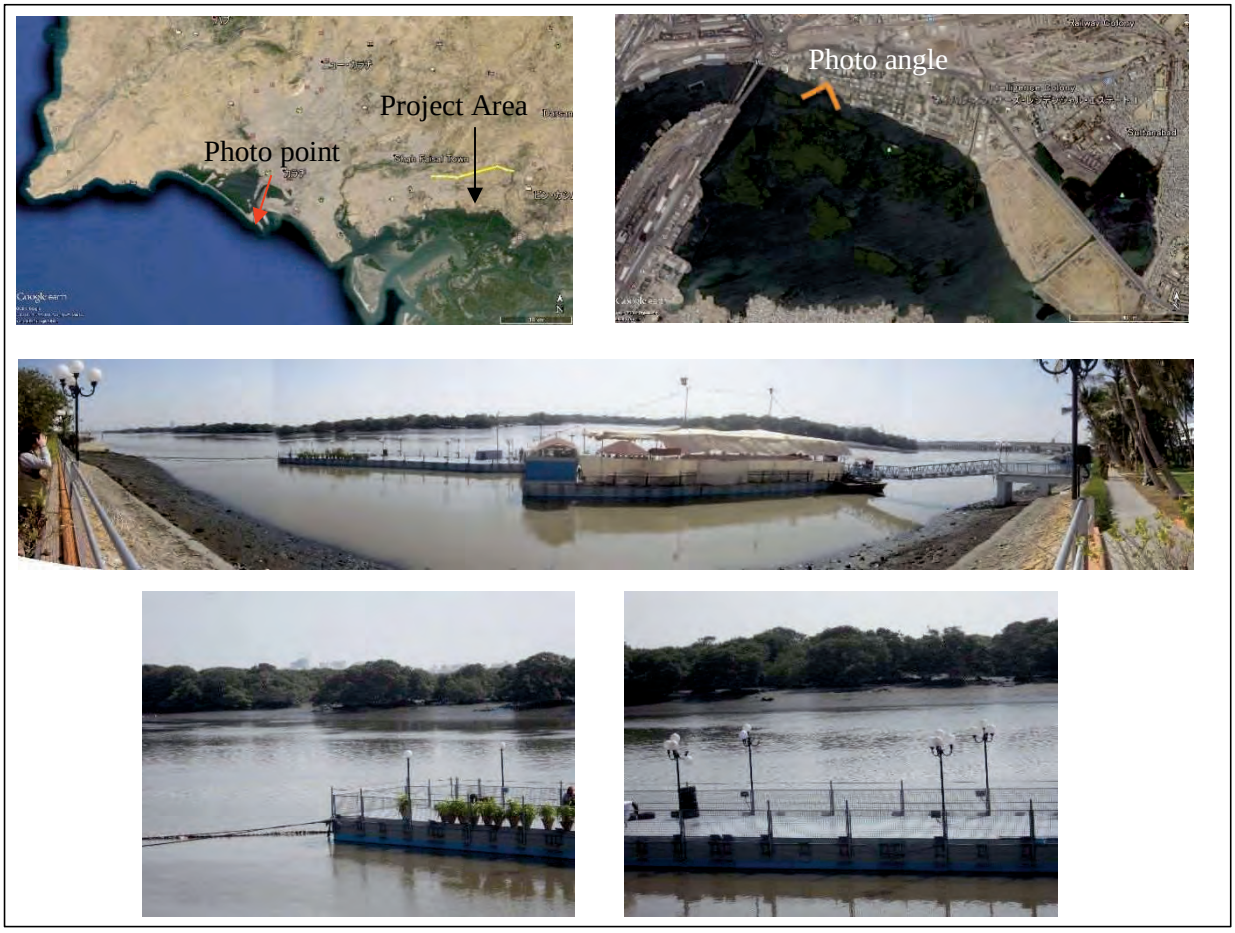
Figure 2-2-55 Typical vegetation along the Project Area : tropical thorn scrub land

Mangrove forest in Karachi

Cutting of mangrove trees is prohibited in Sindh Province for ecological as well as disaster prevention purposes. Naturally, mangrove forests can be observed even in Karachi Port area, as shown in Figure 2-2-56, which is the very centre of the economic and industrial activities of the city.

There is a high possibility that the water in the area shown in Figure 2-2-57 is polluted with waste water from houses, businesses and industries, at least the tree canopies did not show any unnatural damages in the field observation in February 2015.

On the other hand, as shown in Figure 2-2-58, the volume of run-off increase by the Project was calculated using a hypothetical model. It was found that, by the Project, the run-off to the coastal zone will increase 17,403m^3/day, or 1.55 % compared to the Present run-off volume of 1,119,738 m ^{3}/day.

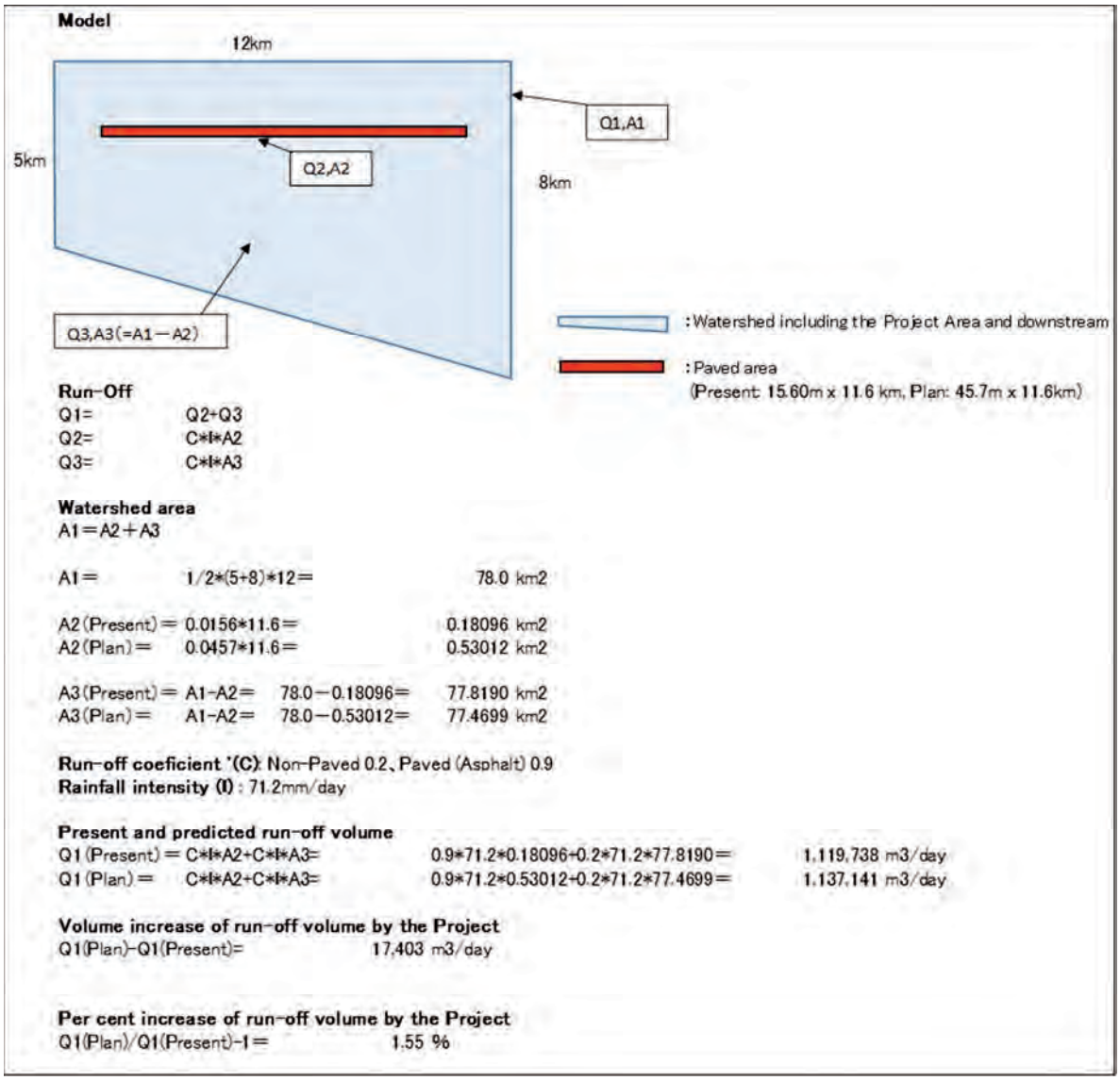


Source: Survey Team, photo taken on February 18, 2015.

Figure 2-2-56 Mangrove forest in Karachi Port area

Source: Survey Team, photo taken on May 26, 2015.

Figure 2-2-57 Mangrove forest in Qasim Port area



Source: Survey Team

Figure 2-2-58 Hypothetical calculation of surface run-off increase by the Project

Fauna

Animal species in the Project Area are surveyed by Dr. Syed Ali Ghalib, local wildlife specialist. Species commonly seen in Karachi are added to the fauna lists according to his expert knowledge.

Birds: Bird species observed in the Project Area and Karachi is listed in Table 2-2-48.

Among them, 6 species are listed. According to the observation and recorded ecology of those species, as summarized in Table 2-2-49, Black Kite (*Milvus migrans*) is apparently in abundance in Karachi, and other 5 species will not be negatively affected by the Project since the Project shall not disturb their habitat types, open grass lands with trees, or agriculture farmland near rivers.

Table 2-2-48 Species of avifauna recorded in the macro environment of the Project

No.	Common Name	Scientific Name	Status		Listing		
			Migratory	Resident	Sindh Ordinance	IUCN Red list*	CMS** Appendix
1	Ashy headed Finch Lark	*Eremopterix grisea*		x			
2	Bank Myna	*Acridotheres ginginianus*		x			
3	Bay backed Shrike	*Lanius vittatus*		x			
4	Black Crowned Finch Lark	*Eremopterix nigreceps*		x			
5	Black Drongo	*Dicrurus macrocercus*		x			
6	Black Kite	*Milvus migrans*		x	x		
7	Black Partridge	*Francolinus francolinus*		x			
8	Black Redstart	*Phoenicurus ochruros*	x				
9	Black Winged Kite	*Elanus caeruleus/E.leucurus*		x	x		
10	Blue Cheeked Bee-eater	*Merops superciliosus*	x				
11	Blue Rock Pigeon	*Columba livia*		x			
12	Chestnut shouldered Rock Sparrow	*Petronia xanthocollis*		x			
13	Collared Dove	*Streptopelia decaocto*		x			
14	Common Babbler	*Turdoides caudatus*		x			
15	Common Myna	*Acridotheres tristis*		x			
16	Common Redstart	*Phoenicurus phoenicurus*	x				
17	Crested Lark	*Galerida cristata*		x			
18	Desert Lark	*Ammomanes deserti*		x			
19	Great Grey Shrike	*Lanius excubitor*		x			
20	Grey Partridge	*Francolinus pondicerianus*		x			
21	Hoopoe	*Upupa epops*		x			
22	House Crow	*Corvus splendens*		x			
23	House Sparrow	*Passer domesticus*		x			
24	House Swift	*Apus affinis*		x			
25	Indian Crow Pheasant	*Centropus sinensis*		x			
26	Indian Robin	*Saxicoloides fulicata*		x			
27	Indian Roller	*Coracias benghalensis*		x			
28	Indian Sand Martin	*Riparia paludicola*		x			
29	Indian Silver Bill	*Eodice malabarica/Lonchura malabarica*		x			
30	Indian Tailor Bird	*Orthotomus sutorius*		x			
31	Indian Tree Pie	*Dendrocitta vagabunda*		x			
32	Jungle Babbler	*Turdoides striatus*		x			
33	Little Brown Dove	*Streptopelia senegalensis*		x			
34	Little Green Bee-eater	*Merops orientalis*		x			
35	Long-tailed Grass Warbler	*Prinia burnesii*		x		NT***	
36	Pied Bushchat	*Saxicola caprata*		x			
37	Purple Sunbird	*Nectarinia asiatica*		x			
38	Red vented Bulbul	*Pycnonotus cafer*		x			

No.	Common Name	Scientific Name	Status		Listing		
			Migratory	Resident	Sindh Ordinance	IUCN Red list*	CMS** Appendix
39	Red Wattled Lapwing	*Hoplopterus indicus*		x			
40	Rose-ringed Parakeet	*Psittacula krameri*		x			
41	Rosy Starling	*Sturnus roseus*	x		x		
42	Rufous Warbler	*Cercotrichas galactotes*	x				
43	Shikra	*Accipiter badius cenchroides*		x	x		
44	Short toed Eagle	*Circaetus gallicus*		x	x		
45	Sindh Jungle Sparrow	*Passer pyrrhonotus*		x			
46	Sind Pied Woodpecker	*Dendrocopos assimilis*		x			
47	Spotted Little Owl	*Athene brama*		x			
48	White Cheeked Bulbul	*Pycnonotus cafer*		x			
49	Whire browed Fantail Flycatcher	*Rhipidura aureola*		x			
50	Wire tailed Swallow	*Hirundo smithii*		x			

* IUCN Red list: Species classified as CR, EN, VU, and NT are considered as 'Listed.'
** CMS: Convention on the Conservation of Migratory Species of Wild Animals
*** NT : Near threatened
Source: JICA Basic Survey

Table 2-2-49 Habitat and Ecology of the Observed Listed Bird Species

No.	Common Name	Scientific Name	Habitat and Ecology
6	Black Kite	*Milvus migrans*	Although this species is listed in the Sindh Ordicance, its population in Karachi is in great number as shown in Figure 2-2-57.
9	Black Winged Kite	*Elanus caeruleus / E. leucurus*	**Habitat** : The species occupies relatively open habitats at a range of altitudes (0-750 m in West Palearctic; 0-2000 m in southern Asia; 0-3000 m in Africa), ranging from semi-desert to forest margins and clearings within densely forested areas. In the non-breeding season, communal roosts in trees or reed beds have been known to host up to 500 individuals (although most frequently 15-20), with birds dispersing to individual territories during the day (del Hoyo et al., 1994). **Diet** : The species' prey comprise small grassland mammals (up to 90g), reptiles, birds and insects, hunting its quarry from both a perch and hovering vantage, as well as quartering the ground and hawking insects in flight. **Breeding Site** : Nests are made of small twigs lined with finer material, and are located in tree branches 3-20m above the ground, usually in open areas (del Hoyo et al., 1994). The breeding season spans February to August in the West Palearctic region, whilst in Africa and India breeding begins at the end of the wet season, with the species double-brooding according to food availability.
35	Long-tailed Grass Warbler	*Prinia burnesii*	**Ecology :** This species is found in long grasslands, sometimes where mixed with acacias and tamarisks, mainly in the vicinity of large rivers and their tributaries and in swamps. In Pakistan and north-west India, subspecies *burnseii* is able to utilize some agricultural habitats, occurring around lakes, irrigation channels and watercourses. **Threats** : The destruction and modification of grassland and wetland habitats for agricultural development is on-going throughout the species' range. The effects of these changes are unclear - populations in Pakistan and India (burnesii) are apparently able to tolerate some agricultural habitats.
41	Rosy Starling	*Sturnus roseus*	**Breeding:** The breeding range of this bird is from easternmost Europe across temperate southern Asia. They breeds in tight colonies in very compressed season when more abundance of grasshoppers during May to June. **Migration:** The starling is a summer visitor for northwestern Afghanistan, passage migrants in the rest of the Afghanistan and almost entire world population winters in India and tropical Asia. **Habitat:** The rosy starling is a bird of steppe and open agricultural land. In years when grasshoppers and other insects are abundant, it will erupt well beyond its core range, with significant numbers reaching France and the United Kingdom. Diet: They are highly gregarious, in largely noisy flocks and forms the serious

			pests for the cereal crops. But they also acts as controlling agents of locusts and grasshopper spp. They are strongly attracted to flowering trees. **Threats:** Listed as Least Concern in the IUCN Red List.
43	Shikra	*Accipiter badius cenchroides*	**Habitat:** The shikra is found in a range of habitats including forests, farmland and urban areas. They are usually seen singly or in pairs. **Diet:** They feed on rodents, squirrels, small birds, small reptiles (mainly lizards but sometimes small snakes) and insects. **Breeding:** The breeding season in India is in summer from March to June. The nest is a platform similar to that of crows lined with grass. Both sexes help build the nest, twigs being carried in their feet. Like crows, they may also make use of metal wires. The usual clutch is 3 to 4 eggs. The incubation period is 18 to 21 days. **In culture:** The shikra was a favourite among falconers in India and Pakistan due to the ease with it could be trained and was frequently used to procure food for the more prized falcons. **Threats:** Listed as Least Concern in the IUCN Red List.
44	Short toed Eagle	*Circaetus gallicus*	**Range:** This is an Old World species found throughout the Mediterranean basin, into Russia and the Middle East, and parts of Asia, mainly in the Indian Subcontinent and also further east in some Indonesian islands. **Habitat:** It is found in open cultivated plains, arid stony deciduous scrub areas and foothills and semi-desert areas. It requires trees for nesting and open habitats, such as cultivations and grasslands for foraging. **Diet:** It specialises in feeding on reptiles, particularly snakes. **Breeding site:** The nest is almost always built relatively low in a tree. **Threats:** Listed as Least Concern in the IUCN Red List.

Source: Bird Life International, Data Zone, Species.

Source: Survey Team

Figure 2-2-59 Flock of Black Kites (*Milvus migrans*) observed in Karachi sky

Mammals: During field visits, a total of 15 species of mammals were recorded in the macro environment.

These species were recorded through observation of their footprints/tracks, scats and burrow system in addition to direct sightings.

The presence of most of the larger species was recorded close to thick vegetation of dry streambeds like Ghaggar Nullah where they get refuge. Whereas burrow system of small mammals were recorded in almost entire project macro environment, where soil was conducive for these species.

In general, the project area is not suitable for mammalian fauna particularly the large mammals. The mammals recorded during field work are all common species and include Asiatic jackal, Desert cat, Five striped palm squirrel, Indian gerbil, Indian hedgehog, Long-eared desert Hedgehog, Indian crested Porcupine, House mouse, Little Indian field mouse and Small Indian mongoose. Small

mammals and rodents are food for predators and raptors.

A list of mammals recorded from the area is provided in Table 2-2-50 below.

Four species are listed in the CITES Appendix to because the needs of trades of those species exists and may threaten their survival.

As summarized in Table 2-2-51, all 4 species are mammal of dry habitat, and Asiatic Jackal and Indian Grey Mongoose are adaptive to agricultural, rural and semi-urban habitats. Therefore, those species will not be negatively affected by the Project since the Project shall not disturb their habitat types located along N5.

Table 2-2-50 Mammal species recorded in the terrestrial habitat of the macro environment of the Project

No.	Common Name	Scientific Name	Lists		
			Sindh Ordinance	IUCN Red list	CITES* Appendix
1.	Asiatic Jackal	*Canis aureus*			III
2.	Balochistan Gerbil	*Gerbillus nanus*			
3.	Desert Cat	*Felis silverstris ornata*			II
4.	Desert Hare	*Lepus nigricollis*			
5.	Five striped Palm Squirrel	*Funambulus pennanti*			
6.	House Mouse	*Mus musculus*			
7.	Indian Bush Rat	*Golunda ellioti*			
8.	Indian Crested Porcupine	*Hystrix indica*			
9.	Indian Gerbil	*Tatera indica*			
10.	Indian Grey Mongoose	*Herpestes edwardsi*			III
11.	Indian Hedgehog	*Paraechinus micropus*			
12.	Indian Wild Boar	*Sus scrofa*			
13.	Little Indian Field Mouse	*Mus booduga*			
14.	Long-eared Desert Hedgehog	*Hemiechinus collaris*			
15.	Small Indian Mongoose	*Herpestes javanicus*			

*IUCN Red list: Species classified as CR, EN, VU, and NT are considered as 'Listed.'
** CITES: The Convention on International Trade in Endangered Species of Wild Fauna and Flora
Source: JICA Basic Survey

Table 2-2-51 Habitat and Ecology of the Observed Listed Mammal Species

No.	Common Name	Scientific Name	CITES*	Habitat and Ecology
1.	Asiatic Jackal	*Canis aureus*	III	Due to their tolerance of dry habitats and their omnivorous diet, the Golden Jackal can live in a wide variety of habitats. These range from the Sahel Desert to the evergreen forests of Myanmar and Thailand. They occupy semi-desert, short to medium grasslands and savannas in Africa; and forested, mangrove, agricultural, rural and semi-urban habitats in India and Bangladesh. Golden Jackals are opportunistic and will venture into human habitation at night to feed on garbage.
3.	Desert Cat	*Felis silvestris ornata*	II	**Distribution** : The Asiatic Wildcat occurs from the eastern Caspian region, north to Kazakhstan, into Pakistan and western India, western China and Mongolia. They are also known as Asian steppe cats or Indian desert cats. **Ecology** : Unlike the forest dwelling wildcats of Europe, these cats are more often associated with drier scrub desert up to 3,000 m. Preferring to live near water, these cats can live year round in waterless desert, relying on prey species for their moisture requirements. Their main prey is the desert gerbil, with hares, birds, small rodents, insects and reptiles making up the balance. Asiatic wildcats are frequently observed in the daytime. They frequently use rock crevices or burrows dug by other animals. In Pakistan they reportedly shelter underground or in dense cover during the heat of the

				day.
10.	Indian Grey Mongoose	*Herpestes edwardsi*	III	The habitat and ecology of the Indian Grey Mongoose is known from few studies, however, it has been recorded in disturbed areas, in dry secondary forests, and thorn forests, but seems to be a commensal with humans as well. This species was often recorded near human settlements by Shekhar (2003) in a survey in central India during 2002-03, where it was seen near garbage bins, garbage dumps, scavenging on carrion, and on roads. The species seems to be most common in disturbed areas, in dry secondary forests and thorn forests. This species has been found up to 2,100 m and feeds on insects and snakes. **Use and Trade** : Shekhar (2003) notes that the Grey Mongoose is often captured and sold as a pet. Gypsies from northern India use hook snares to capture individuals for skins, which are then sold in local markets in Nepal. All mongoose species are in demand for the wildlife trade: the meat is eaten by several tribes and the hair is used for making shaving brushes, paint brushes, and good luck charms.
15.	Small Indian Mongoose	*Herpestes javanicus*	III	**Habitat:** The species is known to occur in a variety of habitats but appears to prefer well-watered naturally open deciduous forests, shrublands and grasslands. Where it has been introduced in the West Indies and the Hawaiian Islands the species is found in grasslands, crops, and forest of various kinds, coastal areas, and even settled suburbs. It tends to prefer edge habitat in most areas. **Diet:** This species is terrestrial and feeds, during both the day and the night, on a wide diet, which includes rats, birds, reptiles, frogs, crabs, insects, and even scorpions. **Breeding:** It produces litters of two to four at short intervals, with a gestation period of about 7 weeks.

Source: The IUCN Red List of Threatened Species Web Site,
http://www.wildcatconservation.org/wild-cats/eurasia/wildcat-felis-silvestris/asiatic-wildcat/

Reptiles: A total of 11 reptile species were recorded in the macroenvironment during the field surveys. (Table 2-2-52)

Out of 11, 6 species are listed. However, as summarized in Table 2-2-53, their habitats are common in the Project Area, those species will not be negatively affected by the Project since the Project shall not disturb their habitat types located along N5.

Table 2-2-52 Reptile species recorded in the terrestrial habitat of the macro environment of the Project

No.	Common Name	Scientific Name	Lists		
			Sindh Ordinance	IUCN Red list *	CITES Appendix
1	Brilliant Agama	*Trapelus agilus isolepis*			
2	Desert Monitor	*Varanus griseus koniecznyi*	x		I
3	Garden lizard	*Calotes versicolor versicolor*			
4	Glossy bellied Racer	*Coluber ventromaculatus*	x		
5	Indian Cobra	*Naja naja*			II
6	Indian Fringe toed Sand Lizard	*Acanthodactylus cantoris*			
7	Indian Sand Boa	*Eryx johnii johnii*	x		II
8	Pakistan Ribbon Snake	*Psammophis leithii*	x		
9	Saw scaled viper	*Echis carinatus*			
10	Spiny Tailed Lizard	*Uromastyx hardwickii*			II
11	Yellow bellied House Gecko	*Hemidactylus flaviviridis*			

* IUCN Red list: Species classified as CR, EN, VU, and NT are considered as 'Listed.'
Source: JICA Basic Survey

Table 2-2-53 Habitat and Ecology of the Observed Listed Reptile Species

No.	Common Name	Scientific Name	Sindh Ordinance
2	Desert Monitor	*Varanus griseus koniecznyi*	Varanus griseus koniecznyi has the smallest and most easterly range among the subspecies, occupying eastern Pakistan and north-west India. **Habitat** : Although predominantly desert-dwelling, the desert monitor occupies a variety of arid and semi-arid habitats including clay steppe, savanna and riverbeds. A specific habitat requirement for this species is the presence of sand or soft soil in which tracks can be made for communication and orientation. **Biology** : Although the desert monitor is a solitary species, individuals may occur in relatively high densities over a small area, which is described as a "settlement". Desert monitor mating occurs over a 15 to 20 day period during the first two-thirds of June. Males typically locate a mate by following tracks in the sand, but while tracking may occur over days, and can range over many kilometres. Egg-laying generally occurs from late June to early July, and is preceded by the female digging a burrow with two shafts, one leading to a chamber which the female inhabits, and the other to a chamber in which a clutch of between 10 and 20 eggs is laid. After depositing the clutch, the female tightly packs the shaft leading to the eggs with sand, and then remains in the vicinity of the burrow to defend it from other desert monitors. In early October, after an incubation period of around 110 days, the eggs hatch, but the young do not yet attempt to dig to the surface. Like adult desert monitors, they hibernate through the winter, emerging from the subterranean chamber in the following spring.
4	Glossy bellied Racer	*Coluber ventromaculatus*	**Distribution** : SW Asia from north India to south Turkey, Pakistan, Afghanistan (Leviton 1959: 461), Uzbekistan, Iraq, Iran, Jordan (Disi 1993), Kuwait, Bahrain, Saudi Arabia (along the Arabian Sea) to Israel. **Habitat** : Inhabits mainly stony hillsides, open or cultivated land and sometimes in congested urban areas. It has been recorded in Pokaran district in the Thar desert also. **Habits** : A fast active snake which gives rise to its name - racer. Normally seen in open country. When alarmed it quickly retreats into cover. It hibernates in winter. These snakes have been known to live as long as five years. **Diet** : Largely feeds on lizards. **Reproduction** : Oviparous. Gravid female racers have been obtained in early summer. About 9 eggs are laid. They hatch around September. The young snakes are 30–33 centimetres (12–13 in) long.
5	Indian Cobra	*Naja naja*	**Habitat** : The Indian Cobra inhabits a wide range of habitats throughout its geographical range. It can be found in dense or open forests, plains, agricultural lands (rice paddy fields, wheat crops), rocky terrain, wetlands, and it can even be found in heavily populated urban areas such as villages and city outskirts, ranging from sea-level to 2,000 metres (6,600 ft) in altitude. This species is absent from true desert regions. The Indian cobra is often found in the vicinity of water. Preferred hiding locations are holes in embankments, tree hollows, termite mounds, rock piles and small mammal dens. **Reproduction** : Indian cobras are oviparous and lay their eggs between the months of April and July. The female snake usually lays between 10 to 30 eggs in rat holes or termite mounds and the eggs hatch 48 to 69 days later. The hatchlings measure between 20 and 30 centimetres (7.9 and 11.8 in) in length. The hatchlings are independent from birth and have fully functional venom glands.
7	Indian Sand Boa	*Eryx johnii johnii*	**Geographic range** : E. johnii is found from Iran through Pakistan into western, southern, and northwestern India. **Habitat** : The snake is found in dry, semi-desert scrub plains and rocky dry foothills. It prefers loose sand, or sandy soil that crumbles easily. Diet : The diet consists mainly of mammals such as rats, mice, and other small rodents that are killed by constriction. Some specimens have apparently fed exclusively on other snakes. Reproduction : E. johnii is ovoviviparous, with females giving birth to up to 14 young at a time. **Illegal trade** : Red sand boas have many superstitious beliefs attributed to them because of their double-headed appearance, such as bringing good luck, curing AIDS, etc. Such blind faith has resulted in endangering the species, and

			in illegal trade in India, despite being a protected species under the Wildlife Protection Act, 1972, of India.
8	Pakistan Ribbon Snake	*Psammophis leithii*	**Habitat** : Distributed mainly in two major areas; deserts and semi-deserts of Western-northern India. Also found in grasslands, coastal lands covered with low shrubs, degrading dry & open scrub-lands of its range. Choose dense thorny bushes of low height and rock gaps for roosting and egg laying. **Natural History**: Leith's Sand Snake is a diurnal and terrestrial species which often shows arboreal activity by climbing up to few heights of thorny shrubs for basking and foraging. Oviparous. Female lays 4-10 eggs in mounds, holes, cracks etc. during summer months. **Diet**: Feeds on lizards, bird chicks and small rodents by chasing them. **Threats**: As this species survives well in tough ecosystem like deserts and semi-deserts, habitat loss appears not a very effective threat to it. Killing by humans and road kills can be direct cause of threats. However it should be noted that Leith's Sand Snake rarely encounters with humans and lives in and around scrub forests.
10	Spiny Tailed Lizard	*Uromastyx hardwickii*, or *Saara hardwickii*	**Distribution**: Pakistan, India (Rajasthan, Gujarat, Uttar Pradesh), Afghanistan (area bordering Pakistan) Type locality: Kanauj district, U.P. **Habitat** : Generally found in firm ground rather than pure sand dunes, Hardwicke's spiny-tailed lizard is often found living in colonies, sometimes on the outskirts of villages. It prefers elevated patches of land especially in Kutch where it is invariably found on isolated patches of high ground (called Bets) above the monsoon water level. Burrow : The Hardwicke's spiny-tailed lizard excavates a sloping zig-zagging or spiraling tunnel of 6 to 8 cm diameter and over 2 metres long for itself. The spiny-tailed hibernates through the winter and emerges in spring. By the time it is ready for hibernation, the lizard puts on long strips of fat on each side of the backbone which presumably enables it to survive the long winter months. **Food** : The Hardwicke's spiny-tailed lizard is largely herbivorous and its teeth are adapted for a plant diet which comprises the flowers and fruits of the kair (*Capparis aphylla*); the beans of khejri (*Prosopis spicigera*); the fruit of *Salvadora persica*, and grass. **Breeding biology** : Hardwicke's spiny-tailed lizard breed in spring after emerging from hibernation. It lays white pigeon-sized eggs. Economic importance : In India, these lizards are caught for their meat. The fat stored in the tail of the lizard is purported to have medicinal properties and for this reason, these lizards are often illegally collected and sold in various parts of India and Pakistan for folk medicine. It is kept in captivity by the cruel practice of dislocating the backbone.

Source: Wildscreen Arkive Web Sites, Indian Snakes Web Sites, Encycropedia of Life Web Sites

Impact Assessment and Evaluation

> Construction Phase

The vegetation, flora and fauna found in the Project Area are the typical of the region. Since the Project will directly affect existing ROW, and the increase of surface run-off of the Project Area watershed is estimated less than 2 % of existing condition, the modification of the surrounding environment including the coastal area is evaluated as minimum, and no negative impact on local ecosystem is expected in the Construction Phase.

<Potential impacts on social considerations>

Involuntary resettlement and/or loss of properties

Out of 108 potential PAPs interviewed, 5 security facilities, 3 private businesses, 1 mosque, 1 ambulance dispatcher station, and 1 public hospital signboard are found to terminate its function

because of the clearance of ROW. No land acquisition or resettlement of resident is necessary for the Project.

Temporal occupation of land for the camp site (site office) and stock yard (material and mechanical storage, repair shop for vehicles and machines) will be necessary during the Construction Phase. The necessary size is about 200 m x 200 m.

KMC is planning to select a publicly owned land lot that will not require any resettlement or land acquisition.

As a result, although the number of PAPs is small (11 in total), and no land acquisition or resettlement of resident is necessary for the Project, the changes such as ROW clearance, the existence of construction works, and the new N5, shall require existing businesses to adopt. This adoption process may be received by the people in the businesses as negative stress, at the same time as new business opportunities.

The impact will be occurred mainly in the Planning Phase, and no negative impact shall occur newly in Construction and Operation Phases.

Poor, Indigenous or minority groups

Monthly income of respondents in JICA Basic Survey is summarized in Table 2-2-54. About 22 % of the respondents are earning less than the minimum wage of Sindh. The ratio is about the same with the poverty headcount ratio at national poverty lines which was 22.3 % in 2005.

More than half (54 %) of the respondents are earning over the minimum wage, and 21 % refused to answer the question.

Table 2-2-54 Monthly Income in Rs. (estimated) in the 2014 socio-economic survey

Monthly Income in Rs. (estimated)	Count	%
Less than Rs.5000	1	1%
05,000 - 10,000	17	21%
10,001 - 15,000	14	18%
15,000 - 20,000	12	15%
20,000 and over	17	21%
None	2	3%
Refused	17	21%
Total	80	100%

Source: JICA Basic Survey in 2014

Regarding the refugees and Internally displaced people (IDPs), IDP camps and refugee camps are mainly located in northern part of Pakistan, and none are located in or near Karachi.

Among the 12 religious facilities located along the Project Area, all are the mosque for Muslims. One facility, Imam Bargh, is for Shia sect Muslims, which is a minority in Pakistani Muslim sects.

One Sunni mosque, Bukhari Masjid, is located on ROW and shall be relocated before the construction with land allocation by KMC. Other 11 facilities, including the Shia facility, shall not be affected by the Project.

When asked about education level, 40 % answered that they are illiterate. This also corresponds with the statistics of adult literacy rate of Sindh, which is 60 %.

As for the mother language, nearly 40 % were the Pashto-native. This result is understandable considering that public transportation sector was dominated by Pashtos since 1980's, and related industries and settlements were strategically placed at city entry points including Qaidabad.[8]

As a result, except the mother language composition, all indices obtained from the survey results were average condition of Sindh or Pakistan.

No negative impacts are expected specifically on the socially vulnerable groups, including the Poor people, from the Project.

Local economy such as employment and livelihood

Locations of major employment in the Project Area where many workers arrive from different parts of Karachi are listed in Table 2-2-55.

Also, public transportation spots and pedestrian crossing spots are listed in Table 2-2-55 since these are also the locations where markets or housing colonies are located nearby.

After about 8.5 km from the starting point, both sides of N5 is occupied by industrial use and most of the activities on N5 are those of the drivers of oil tankers and service shop workers for them.

When the Project design and the construction plan are consulted, it was found that, in the Construction Phase, the current design of the Project allows spaces wide enough for vehicle access between the existing shop front and ROW boundary, which is state-owned land, in most part of the Project Section. Therefore, the customers will be able to access to the shops and services by driving or walking the space outside of ROW.

Also throughout the Construction Phase, 4-lane temporary road shall be kept open for the traffic within ROW. Therefore, the workers and customers will not have great difficulties in accessing to the shops, services and workplaces from N5.

Table 2-2-55 Locations of major employment, public transportation spots and pedestrian road crossing spots in the Project Area, with locations of the Planned facilities

Ref #*	Existing faciligy	Planned facility	Side	Description
RC1	0+000		L	Near the Quaidabad Masjid
ME3	0+000		L	Empty Industry
		No.0+130	L	Bus bay
		No.0+130	R	Bus bay
ME1	0+180		L	Abbott Industry
PT1	0+310		L	Bus Stop after Abott
ME2	0+350		L	Cement Storage Godown
ME23	0+770		R	Dawlance Industry
ME4	0+840		L	Younus Textile
RC2	1+010		L	In front of Bukhari Masjid
ME5	1+070		L	Union Lubricant (UCI)
ME6	1+140		L	Union Private Limited
		No.1+200	R	Bus bay Around the Manzil Pomp Intersection
ME7	1+240		L	Artistic Unit 1,2

[8] Laurent Gayer, 2014, Karachi : Ordered Disorder and the Struggle for the City, Harper Collins. p.44

Ref #*	Existing faciligy	Planned facility	Side	Description
ME22	1+240		R	Gul Ahmed Industry
PT2	1+270		L	Near Manzil Pump
RC3	1+270		L	Near Manzil Pump
		1+290 - 1+330	L/R	Zebra crossing Manzil Pump cross section
ME8	1+540		L	Atlas Engineering
ME21	1+550		R	Dawlance Industry
		No.1+570	L	Bus bay Around the Manzil Pomp Intersection
ME9	1+730		L	Mekotex Private Limited
ME10	1+820		L	Orient Textile Mills
ME11	2+100		L	Dawlance Industry
ME20	2+470		R	Lucky Industry
ME12	2+760		L	National Tile Industry
		No.2+760	L	Bus bay
		No.2+890	R	Bus bay
ME19	3+090		R	Popular Fabric
ME18	3+180		R	Pak Petro Chemical
ME17	3+250		R	Farhan Polymer
ME13	3+340		L	Kassim Textile
		No.4+080	R	Bus bay Around the Cattle Colony Intersection
ME14	4+150		L	A-Amini Flour Mill
PT3	4+380		L	Near Cattle Colony Mor
RC4	4+380		L	Near Cattle Colony Mor
		4+350 - 4+390	L/R	Zebra crossing Cattle Colony Road cross section
		No.4+590	L	Bus bay Around the Cattle Colony Intersection
RC6	5+450		R	Near MDA Compound
		No.5+600	R	Bus bay
		No.5+740	L	Bus bay
		6+200	L/R	Pedestrian bridge
		7+070	L/R	Pedestrian bridge
		No.7+380	L	Bus bay
ME16	7+400		R	Afzal Motors Pvt. Ltd.
		No.7+420	R	Bus bay
RC5	7+950		L	Near Police Training Station
PT4	7+960		L	Near Police Traning Station
PT5	8+230		L	Razzaqabad Bus Stop
		No.8+440	R	Bus bay Around The Port Qasim Intersection
PT7	8+700		R	Port Qasim Intersection
		8+730	L/R	Zebra crossing Port Qasim intersection
		No.9+120	L	Bus bay Around The Port Qasim Intersection
ME15	9+460		L	FAW Motors
PT6	10+140		L	Bus stop near Nistrabad Uc-6
		No.10+140	R	Bus bay
		No.10+170	L	Bus bay
		No.11+080	R	Bus bay Around the Pak Steel Intersection
		11+290 - 11+360	L/R	Zebra crossing Pak Steel intersection
		No.11+670	L	Bus bay Around the Pak Steel Intersection

* : ME/Major employment, PT/Public transportation spot, RC/Road crossing

Source: Survey Team

Followings are the impact assessment and evaluation for local economy such as employment and livelihood.

> Planning Phase

In the interview survey, it was found that by the clearance of ROW for 11.6 km, three shops in Qaidabad shall be closed because major floor area shall be lost. Otherwise, all shops that need structure slicing, roadside businesses that need to move their assets outside of ROW, and hawkers working on N5 shall keep their business open. The negative impact on local economy and livelihood, therefore, can be evaluated minimum.

> Construction Phase

In Construction Phase, positive impacts are expected from the procurement activities of the Project near the construction works and camp sites.

> Operation Phase

By faster and smooth traffic flow on N5, it may become more difficult for in-coming workers and out-going local residents to cross the road during their daily travel.

On the other hand, new provision of crossing facilities and service roads will make their move safer compared to existing condition. Major employers and markets will face service road that will have capacity of carrying smaller buses, motorcycles for employees as well as delivery trucks.

In order to maximise the positive impact of the Project, it is important that KMC provides information effectively to the company staff and educate the employees about road safety behaviours, such as how to use the facilities and what kind of behaviours must be avoided.

Existing traffic/public facilities, infrastructure, social services

On and near the Project Area, facilities summarized in Table 2-2-56 were observed and recorded. Eleven of those facilities are located on ROW at least partially. Planning considerations for those 11 facilities are explained in the following sections.

Table 2-2-56 Existing facilities for public and community services

Specification	Ref #	Chainage	Side	Description	On ROW	To remain	To relocate	To be rebuild
Educational facilities	EF1	2+450	L	Roshan Ali Memorial School (1-5)				
	EF2	2+620	L	Future Guide High School (1-10)				
	EF3	10+120	L	Govt. Primary School Nistrabad Uc-6 (1-5)				
	EF4	5+000	R	Fast University (13-16)				
Public service facilities	GO1	0+030	L	Quaidabad Traffic Police Post (AL-12)	Y			Y
	AL-13	1+390	L	Ranger Post (AL-13)	Y			Y
	GO2	2+630	L	Shah Latif Traffic Police Post				
	GO3	4+300	L	Zulfiqarabad Traffic Police Post				
	AL-14	5+060	L	Police Post (AL-14)	Y			Y
	GO4	7+700	L	Police Training Center				
	AL-15	8+150	L	Police Post (AL-15) (not in use)	Y			Y
	GO5	4+400	R	City District Govt. Karachi Fire Station				
	GO6	3+880	R	District Jail Malir				
	AR-06	1+400	R	Ranger Post (AR-06)	Y			Y
	SA1	0+760	L	Graveyard	Y	Y		

Specification	Ref #	Chainage	Side	Description	On ROW	To remain	To relocate	To be rebuild
	SA2	0+540	L	Garbage Collection Site (KMC)	Y			Y
	SA3	0+640	R	Garbage Collection Site (KMC)	Y			Y
	SA4	2+140	R	Water Hydrant for water tankers (KWSB)				
Medical facilities	HC1	3+260	L	ZMT Clinic				
	HC2	9+900	L	Afridi Medical Store				
	HC3	9+910	L	Al Rehman Medical Store				
	HC4	10+140	L	Govt. Hospital of Animals				
	HC5	4+340	R	Hashmi Medical Store				
	AR-07	3+650	R	Sign Board of Sindh Kidney Hospital	Y			Y
	PF1	4+420	R	Chhipa ambulance station (BR-01)	Y		Y	
Places of Worship	PW1	0+000	L	Masjid -ul- Furqan				
	PW2	3+400	L	Bilal Masjid				
	PW3	6+670	L	Bakhshi Masjid				
	PW4	6+910	L	Masjid Usman				
	PW5	8+500	L	Imam Bargh				
	PW6	8+580	L	Allah Wali Masjid				
	PW7	9+920	L	Al- Madina Masjid				
	PW8	10+120	L	Bilal Masjid				
	PW9	9+040	R	Al-Rehman Masjid				
	PW10	4+420	R	Rehmanyia Masjid				
	PW11	3+100	R	Suleman Masjid (Under Construction)				
	PW12	0+990	R	Bukhari Masjid (AR-01)	Y		Y	

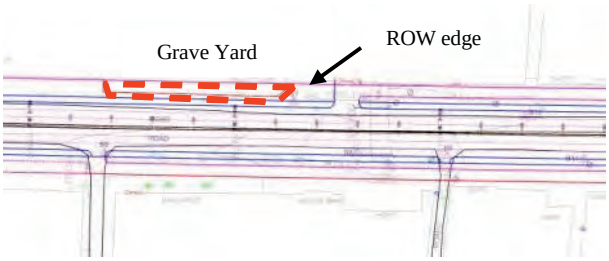
Source : Survey Team

Protection and/or relocation of existing infrastructures

> Protection of existing graveyard

There is a graveyard at 0+740 - 0+820 L encroaching ROW. The Plan accommodates the graveyard in the planting strip without disturbing the place.

Table 2-2-57 Protection of existing graveyard

Station	Image
No.0+800	

Source: Survey Team

> Structures to be rebuild

There are five stations located on ROW used by Sindh police, Karachi traffic police and Sindh Ranger. Engineering Division of KMC shall negotiate with respective institutions so that the posts shall be removed before the commencement of the construction works, be given alternate, temporal locations for public service during the construction, then, in the final stage of the construction, permanent structures shall be constructed by the funding of KMC. The same handling shall be applied for the signboard of Sindh Kidney Hospital.

AL-12

AL-13

AL-14

AL-15

AR-06

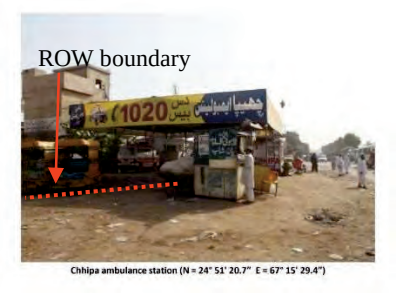
AR-07

Source: Survey Team

> Structures to be relocated

For the mosque that encroaches ROW, Engineering Division of KMC shall negotiate for voluntary relocation to agree vacant lot saved for religious facilities. The land lot shall be allocated free of cost.

Regarding the temporal structure of ambulance dispatcher on ROW, assets shall be moved to adjacent vacant area, outside of ROW, by the owner before the commencement of the Construction Phase. Its operation shall remain open without intermission.



PW-12/AR-01 PF1
Source: Survey Team

> Protection of underground utilities

Existing pavement is demolished and new pavement layer is constructed on the existing ground so as not to damage the underground utilities by raising the future road elevation. For the construction at the location where the underground utilities might be affected, the construction methods shall be considered to avoid negative impact, such as choice of the light machines.

Gender

Pedestrian access to local market or public transportation hub may become difficult because of the closure of road section during the construction phase. Women tend to walk as transportation mode compared to men. If pedestrian crossings are not developed in areas where stations of public transport are located along the target road, there may be negative effects on women who are wearing clothes that make it slow to walk or who are with children in the operation phase.

Foot paths and service roads will benefit local women population, whose main movement is between local market and their houses, by securing safe walking environment along N5. But if the markets are located on the other side of N5, the barrier fence on the median strip will obstruct the crossing movement.

Barrier fence on the median strip will also obstruct the crossing movement when they need to cross N5 between their houses and bus stop at farther lane on N5.

In the section where service roads are constructed on both sides, small buses may make U-turn and go into the service road so that their customer can be loaded or unloaded at their best location, without any obstruction by the median fences.

Children's rights

Table 2-2-58 and Figure 2-2-60 show existing schools and their covering grades recognized during the field surveys. Among the 4 schools, 3 except the governmental primary school are private schools.

In Karachi, including governmental school, there is no areal limitation designated for schools to invite their students, although parents prefer to send their children to the nearest schools from the home to save time and transportation cost.

Therefore, students in those schools either commute to school on foot or on public transportation, and it is assumed that many of them cross N5 to reach their schools.

Table 2-2-58 Existing transportation hubs and pedestrian crossings

Ref #	Chainage	Side	Name	Grade
EF1	2+450	L	Roshan Ali Memorial School	1*-5 (Primary)
EF2	2+620	L	Future Guide High School	1-10 (Primary & Secondary)
EF3	10+120	L	Govt. Primary School Nistrabad UC-6	1-5 (Primary)
EF4	5+000	R	Fast University	University (13-16)

* : 1st grade starts from 5 years old.

Source: Survey Team

Roshan Ali Memorial School (N= 24° 51' 15.4"E = 67° 14' 24.9")

EF1

Future Guide High School (N= 24° 51' 16.6"E = 67° 14' 30.1")

EF2

Govt. Primary School (N= 24° 51' 51.9" E = 67° 18' 48.5")

EF3

Fast University (N = 24° 51' 26.9" E = 67° 15' 51.6")

EF4

Source: Survey Team

Figure 2-2-60 Educational facilities (Ref # EF)

< Construction Phase >

When construction work is operated in the vicinity of the schools, there is possibility that traffic congestion and construction activities may give difficulties for pupils and students of the schools.

To mitigate the impact, it is important that KMC and the contractor explain the schedule and duration of the works to the schools, and avoid any accidents by placing guards during the pupils' commute hours, in addition to the regular safeguard measures.

If requested from schools, and if accepted by neighbouring residents and facilities, it is preferable to do the works in night hours to prevent noise and dust impact on the classes.

< Operation Phase>

By faster and smooth traffic flow on N5, it may become more difficult for pupils and students to cross the road during their daily travel.

On the other hand, new provision of crossing facilities and service roads will make their move safer compared to existing condition.

In order to maximise the positive impact of the Project, it is important that KMC provides information effectively to the school staff and educate the pupils/students for road safety behaviours, such as how to use the facilities and what kind of behaviours must be avoided.

Sanitation, public health condition, infectious diseases including HIV/AIDS

Table 2-2-59 summarizes major infectious diseases observed in Karachi. Many of those diseases are caused from polluted water.

According to WHO[9], Pakistan is one of the three remaining countries with endemic polio and the sixth highest with burden of tuberculosis. Major causes of the high neonatal, infant and under-5 mortality rates include malnutrition, diarrhoea, acute respiratory illness and other communicable and vaccine preventable diseases. The incidence of tuberculosis is estimated at 231 cases per 100,000 per year while that of malaria cases ranges between 2 to 5 cases per 1,000.

In regards to HIV and AIDS, there are 8,752 persons in Sindh Province who are infected, and 6,188 are in Karachi, as reported in the Dawn on September 10, 2015.

Table 2-2-59 Major infectious and other diseases observed in Karachi

Major infectious diseases	Cause	Timing of occurrence
Diarrhoea	Food, water, bacteria, virus, parasites	
Dengue fever	Virus infected by mosquito bites	End and after the monsoon season. Mosquitoes are most active in morning and evening hours.
Malaria (Tropical malaria and Tertian malaria)	Mosquito	
Tuberculosis (TB)	Various strains of mycobacteria, usually *Mycobacterium tuberculosis*	
Hepatitis A	Virus infected from food and water	
Typhoid	Bacteria infected from food and water	
Primary Amoebic Meningoencephalitis: PAM	Naegleria fowleri amoeba infected from piped water, water pools, and swimming in open water.	

[9] http://www.who.int/countryfocus/cooperation_strategy/ccsbrief_pak_en.pdf 150908

Polio (poliomyelitis)	Virus spread from faeces of infected person	
Congo - Crimean haemorrhagic fever (CCHF)	Virus spread from tick and blood of house animals	Occurs year round, but most susceptible when many animals are killed for festivals.
Rabies	Any animals including dogs, cats and bats	
Heat stroke	Dehydration caused by high temperature	
Acute respiratory illness	Dust, air pollution, dry weather	

Source : http://www.mofa.go.jp/mofaj/toko/medi/asia/karachi.html

< Construction Phase >

Although the number of HIV/AIDS infected person in Karachi is still limited, the possibility of higher infection risk of HIV/AIDS among the construction workers and the food and drink service providers near the camp and the Project Area can not be denied.

Also, the environment of the sample construction camp of other KMC road work was kept without water stagnation, if the environment of the camp of the Project was not kept in good sanitary condition, the camp could be a source of water-borne infectious diseases which may spread to surrounding environment.

In regards to the education on HIV/AIDS and other sexually transmitted diseases for workers, UNAIDS[10] in Islamabad can be the source of education materials and information of educators located in Karachi.

In regards to Dengue and other mosquito related diseases, KMC and Sindh Dengue Control Programme (SDCP) shall be the resource for educational pamphlet and pesticide spray.

Industrial safety and health, working environment

According to ILO, there is no stand-alone law on Operational Safety and Health (OSH) in Pakistan. OSH is currently part of 'Factories Act' which covers only Factories and Shops. Other workplaces are out of the ambit of this law.

After 18th amendment to the Constitution, the provincial Government has got the mandate to establish laws and policies relating to the subject of Labour.

ILO is currently working with Provincial Labour Department Sindh to develop 'Joint Action Plan for Promoting Workplace Safety and Health in Sindh.'

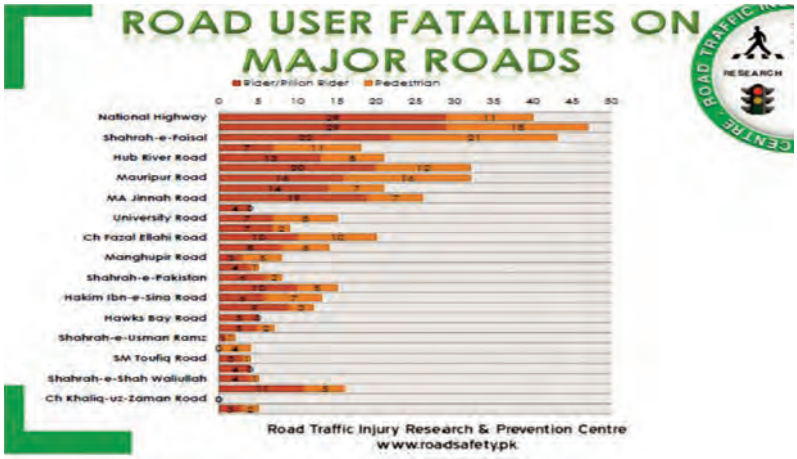
The Sindh Labour Department will prepare a provincial policy for Social Protection and Work Injury Compensation and will also look at good practices in other regional countries – in terms of coverage of maximum number of workers as well as coverage in terms of a range of 'occupational diseases'.

Therefore Japanese and international (ILO) guidelines shall be applied in the Project unless those law and related guidelines are prepared by the commencement of the Construction Phase of the Project.

Accidents, crime

[10] Communication on June 28, 2015, with Dr Rajwal Khan, Strategic Information Adviser, Joint United Nations Programme on HIV/AIDS (UNAIDS) – Pakistan & Afghanistan, Tel: +92-51-8355782

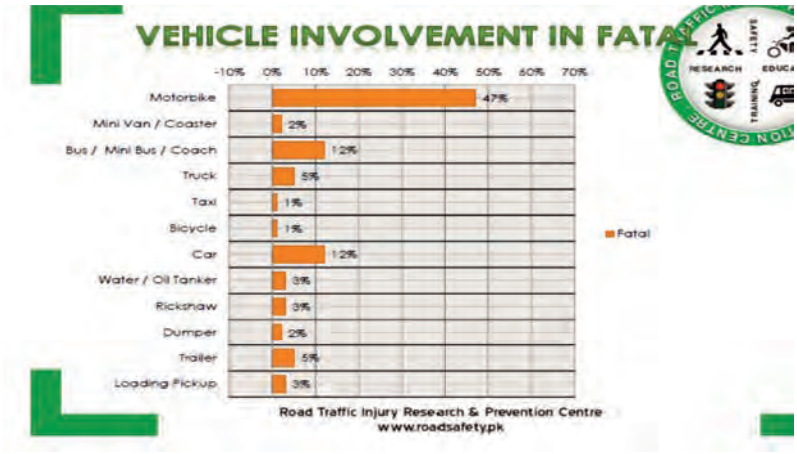
According to "Road Traffic Accident Data- 2013" by Road Traffic Injury Research & Prevention Centre[11], the number of traffic accidents on N5 (shown as 'National Highway' in the following figures) scored highest in 2012, and the second in 2013 after Shahrah-e-Faisal Road. (Figure 2-2-61)



Source: "Road Traffic Accident Data- 2013", Road Traffic Injury Research & Prevention Centre

Figure 2-2-61 Road user fatalities on major roads in Karachi, 2013 and 2012

In the total road fatality in Karachi in 2013, 47 % was either the driver or pillion rider of motorbike. (Figure 2-2-62)

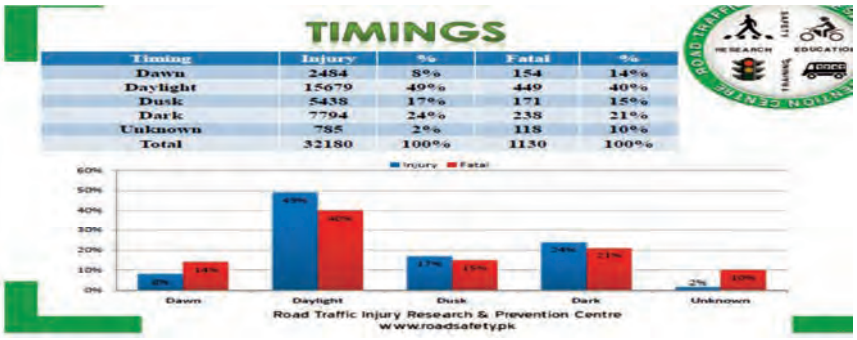


Source: "Road Traffic Accident Data- 2013", Road Traffic Injury Research & Prevention Centre

Figure 2-2-62 Vehicle involvement in fatality in Karachi, 2013

Over 40 % of accidents occurred during daytime, and over 20 % occurred after dark.

[11] http://www.urckarachi.org/Road%20Accident%20Forum%2020%20march%202014%20by%20Asad%20Jahangir.pptx



Source: "Road Traffic Accident Data- 2013", Road Traffic Injury Research & Prevention Centre

Figure 2-2-63 Timing of road accidents in Karachi, 2013

(7) Impact Assessment

Based on the results of the environmental survey, final rating during planning and construction, and operation phase are finalized in Table 2-2-60.

Table 2-2-60 Impact Assessment

NO	Potential Impacts	Rating of scoping		Final scoping		Evaluation during the construction and operational phases
		Planning and Construction Phase	Operational Phase	Planning and Construction Phase	Operational Phase	
1	Air Quality	B-	B+/-	B-	B+/-	Construction Phase: ● An increase in exhaust emissions is expected due to traffic congestion by traffic restriction and vehicles manoeuvring. Furthermore, Dust and exhaust emissions are expected due to operation of construction vehicles, construction machinery and the transport of construction materials. Operational Phase: ● Dust is expected to be reduced due to an increase in the amount of paved roads. Moreover, a decrease in exhaust emissions is expected due to the mitigation of traffic congestion and improved traffic flow. ● An increase in exhaust emissions is expected due to the increase in traffic volume, especially large-sized vehicles, which is caused by the improvement of road conditions, such as its expansion.
2	Water Quality	B-	B-	B-	B-	Water discharged by the Project into rivers is only from rainfall, so water quality will not be affected by the Project. Construction Phase: ● Project work will not discharge water containing any chemical materials. ● There is a possibility that the project offices and accommodation are set up in places where no the sewerage system is developed. Operational Phase: ● There is a possibility that the discharge of waste water may increase due to the promotion of small-scale development and

NO	Potential Impacts	Rating of scoping		Final scoping		Evaluation during the construction and operational phases
		Planning and Construction Phase	Operational Phase	Planning and Construction Phase	Operational Phase	
						the undeveloped sewage system.
3	Waste Management	B-	B-	B-	B-	According to the field survey, the serious dumping rubbish was not confirmed from vehicles in the target road. Construction Phase: ● Waste is expected to generate by the Project (in construction area and project office. etc.). Operational Phase: ● There is a possibility that the amount of waste may increase due to the promotion of small-scale development along with the road development.
4	Soil Contamination	C	D	B-	D	Construction Phase: ● Even though there may be some oil discharge from construction vehicles, its amount will be limited and it is not expected to contaminate soil. Operational Phase ● No soil contamination issues are anticipated.
5	Noise and Vibration	B-	B-	B-	B-	Construction Phase: ● Some noise and vibration are expected due to the construction activities by the construction vehicles in the adjacent resident area. Operational Phase: ● An increase in the amount of noise is expected due to the increase of traffic and runnning speed.
6	Subsidence	D	D	D	D	Construction Phase and Operational Phase: ● The Project does not have any activity to cause a subsidence.
7	Odour	C	C	D	D	Construction Phase: ● Major impact is not expected as the application period of emulsified asphalt and asphalt mixture is limited. Operational Phase: ● No activities that may cause offensive odour are planned.
8	Bottom Sediment	D	D	D	D	Construction Phase and Operational Phase: ● No bottom sediment issues are anticipated.
9	Conservation Area	D	D	D	D	Construction Phase /Operational Phase: ● Conservation area is not identified around the target road. There is approximately 35 km between the target road and the nearest natural reserve that is the second largest national park called Kirthar National Park.
10	Ecosystem	C	D	D	D	Construction Phase and Operational Phase: ● Ecosystem surrounding the Project Area is typical of the region. No significant impacts are expected outside of ROW and coastal

NO	Potential Impacts	Rating of scoping		Final scoping		Evaluation during the construction and operational phases
		Planning and Construction Phase	Operational Phase	Planning and Construction Phase	Operational Phase	
						area. No effects on ecosystem are anticipated.
11	Hydrology	D	D	D	D	Construction Phase and Operational Phase: ● The Project does not change existing watershed. No effects on water regime are anticipated.
12	Topography and Geology	D	D	D	D	Construction Phase and Operational Phase: ● No effects on topography or geology are anticipated.
13	Involuntary resettlement and/or loss of properties	B-	D	B-	D	Planning Phase: ● Twelve structures on ROW shall be required to terminate their use. ● No land acquisition or resettlement of resident is necessary for the Project. Construction Phase: ● No negative impact is expected in Construction Phase.
14	Poor	C	D	D	D	Planning and Construction Phase: ● The poverty ratio in the Project Area was average of the national ratio. No specific negative impacts on the Poor group are anticipated.
15	Indigenous or minority groups	C	D	D	D	Planning and Construction Phase: ● Except the mother language composition, all indices obtained in the Project Area were average condition of Sindh or Pakistan. No specific negative impacts on the indigenous or minority groups are anticipated.
16	Local economy such as employment and livelihood	B+/-	B+/-	D/B+	B+/-	Planning Phase ● Four shops along the entire 11.6 km will be closed for the Project. All other businesses will stay open throughout the Planning and Construction Phase. Negative effect on local economy, employment and livelihood is minimal. Construction Phase ● In the Construction Phase, the current design of the Project allows spaces wide enough for vehicle access between the existing shop front and ROW boundary in most part of the Project Section. Also 4-lane temporary road shall be kept open for the traffic within ROW. Therefore, the workers and customers will not have great difficulties in accessing to the shops, services and workplaces. ● Positive impacts are expected from the procurement activities of the Project near the construction works and camp sites. Operational Phase: ● Faster and smoother traffic flow may lead difficulty of accessing to the local businesses and markets.

NO	Potential Impacts	Rating of scoping		Final scoping		Evaluation during the construction and operational phases
		Planning and Construction Phase	Operational Phase	Planning and Construction Phase	Operational Phase	
						● Positive impacts of better and safer access to the businesses and markets via service road and crossing facilities are at the same time exptected.
17	Land use, local resource use, communal/common resource use rights	D	B+	D	B+	Construction Phase: ● No effect on land use is anticipated. Operational Phase: ● Increase of traffic capacity on N5 will contribute to economic development of the surrounding area and Karachi City.
18	Water rights/ water use	D	D	D	D	Construction Phase and Operational Phase: ● No effect on water rights or water use are anticipated.
19	Existing traffic/public facilities, infrastructures, social services	B-	B+/-	B-	B+/-	Planning Phase ● Public facilities and infrastructures on ROW are either protected or relocated nearby in the Planning Phase and no negative impacts are expected for general public. Construction Phase ● Traffic congestion and construction works may lead difficulty of accessing to the facilities. Operational Phase: ● Faster and smoother traffic flow may lead difficulty of accessing to the facilities. ● Positive impacts of better and safer access to the facilities via service road and crossing facilities are at the same time exptected.
20	Social capitals, local decision making systems and social organizations	D	D	D	D	Construction Phase and Operational Phase: ● No effect on social capitals, local decision making systems or social organizations are anticipated.
21	Uneven distribution of benefits and damages	D	D	D	D	Construction Phase and Operational Phase: ● No effect on uneven distribution of benefits and damages is anticipated.
22	Local conflicts of interest	D	D	D	D	Construction Phase and Operational Phase: ● No effect on local conflicts of interest is anticipated.
23	Physical splits of communities	D	D	D	D	Construction Phase and Operational Phase: ● No effect on physical splits of communities is anticipated.
24	Historical and cultural resources	D	D	D	D	Construction Phase and Operational Phase: ● No effect on historical or cultural resources are anticipated.
25	Landscape	D	D	D	D	Construction Phase and Operational Phase: No effect on landscape is anticipated.
26	Gender	C	B-	B-	B+/-	Construction Phase ● Traffic congestion and construction works

NO	Potential Impacts	Rating of scoping		Final scoping		Evaluation during the construction and operational phases
		Planning and Construction Phase	Operational Phase	Planning and Construction Phase	Operational Phase	
						may give female pedestrians difficulty of crossing the road. Operational Phase: ● Faster and smoother traffic flow may lead increase of traffic accidents of crossing female pedestrians. ● Positive impacts of better and safer access to the destination, such as local market, via service road and crossing facilities are at the same time exptected.
27	Children's rights	B-	C	B-	B+/-	Construction Phase ● Traffic congestion and construction works near schools may give students difficulty of crossing the road. Operational Phase: ● Faster and smoother traffic flow may lead increase of traffic accidents of crossing students. ● Positive impacts of better and safer access to the school via service road and crossing facilities are at the same time exptected.
28	Sanitation, public health condition, infectious diseases including HIV/AIDS	B-	B+	B-	B+	Construction Phase ● Possibility of higher infection risk of infectious diseases such as dengue, diarrhea, HIV etc. can not be denied. Operational Phase: ● The Project is expected to improve water stagnation in the surrounding area and to contribute positive effect on sanitary condition in the area.
29	Industrial safety and health, working environment	B-	D	B-	D	Construction Phase ● Workers in the Project may be subject to injury or respiratory difficulties from under-standard safety measures and dust emission.
30	Accidents, crime	B-	B+/-	B-	B+/-	Construction Phase ● Traffic congestion and confusion among the drivers and public-transportation users may increase traffic accidents. Operational Phase: ● Faster and smoother traffic flow may lead increase of traffic accidents of crossing pedestrians and motorbikes. ● Positive impacts of better and safer access via service road and by traffic lights and crossing facilities are at the same time exptected.
31	Border-crossing impacts and global warming	D	D	D	D	Construction Phase and Operational Phase: ● No border-crossing impacts (spillover effects) or global warming issues are anticipated. ● An increase in CO2 emissions is expected due to an increase in the number of

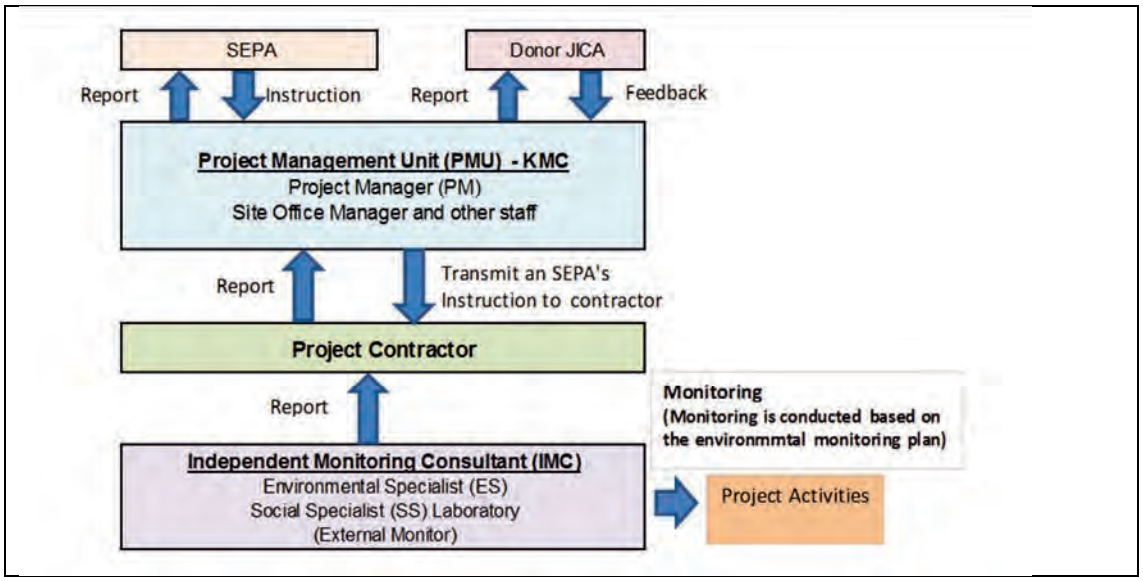
NO	Potential Impacts	Rating of scoping		Final scoping		Evaluation during the construction and operational phases
		Planning and Construction Phase	Operational Phase	Planning and Construction Phase	Operational Phase	
						vehicles; on the other hand, a proportional decrease in CO2 emissions is expected to due to mitigation of traffic congestion. The project purpose is to extend the length of the road, by approximately 11 km, within the ROW and it is not intended to change drainage basins. Thus, it will not cause an increase in CO2 emissions and the negative effects will be a minor.

Rating Category
- A+: Significant positive effect is expected.
- A-: Significant negative effect is expected
- B+: Certain positive effect is expected.
- B-: Certain negative effect is expected.
- C: Effect is unknown (as of preparatory survey phase).
- D: No effect is expected.

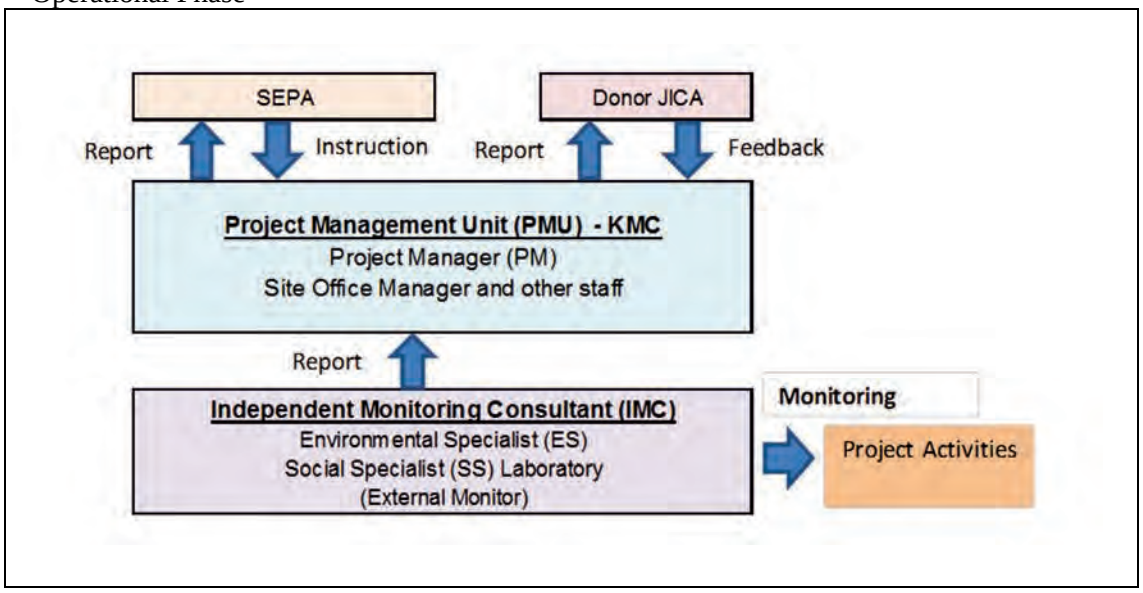
(8) Environmental Management Plan (EMP) and Environmental Monitoring Plan (EMoP)

Figure 2-2-64 shows the organizational setup for the implementation and monitoring of EMP and EMoP. As the Figure pointed out, basically, communicational lines/arrows between concerned agencies/parties are the same in both Construction Phase and Operational Phase. Monitoring is conducted by IMC (Independent Monitoring Consultant) employed by a contractor during construction phase and by KMC during operational phase respectively. IMC monitors the Project based on the EMP and reports its result to the contactor, then the contractor reports to PMU, after that SEPA and JICA at the same time. Once SEPA reviews the report and gives feedbacks to PMU which transmit an SEPA's instruction to the contractor. Monitoring will be conducted 1 year after the project completion, which is obliged by SEPA. However, the duration of monitoring is generally required for 3 years for the Japan's Grant Aid Project. Therefore, 3-years monitoring needs to be discussed with KMC.

< Construction Phase >



< Operational Phase >



Source: Draft of EIA report

Figure 2-2-64 Organizational setup for the implementation and monitoring of EMP in Construction Phase and Operational Phase

Table 2-2-61 Environmental management plan including major mitigation measures and Table 2-2-62 Environmental Monitoring Plan are completed. Project monitoring is supposed to be conducted according to the Environmental Monitoring Plan. The environmental impacts are expected to be improved due to the following improvement of the target road, under the condiion that the proper monitoring and maintenance are done by KMC.

- Enhanvement of traffic capacity due to the widening of the carriage way
- Smoothing the pavement surface
- Planting Strip

On the other hand, the medium- and long-term countermeasures such as the establishment of related laws and regulations as well as the traffic policy are required in order to comply with the NEQS for the noise, air and water quality.Therefore, some political suggestions to Pakistani side are included in the Table 2-2-61.

Table 2-2-61 Environmental Management Plan (EMP)

NO	Items	Parameter	Mitigation Measures		Implementation Agency	Responsible Agency	Cost (US$)
			Pre-construction and Construction Phase	Operational Phase			
Environmental Pollution							
1	Air Quality	NO, NO2, SO2, CO	・ Construction vehicles should be selected based on the national standards for emissions in Pakistan. ・ Construction machinery should be maintained regularly to keep them in good condition. ・ Construction methods should be selected to avoid unnecessary use of the construction machinery. ・ Supply routes selected for vehicles conveying construction materials from borrow pits should be as short as feasibly possible. ・ Appropriate traffic control based on the traffic diversion plan is conducted, which is shown in Figure 2-2-63.	・ Planting strip will be installed at the edge of ROW on either side. ・ Coordination of signal phase according to the traffic condition to reduce the waiting time at the signalised intersections. ・ KMC is recommended to promote kiving people to more use the public transportation then peronal vehicles, and to strengthen the exhaust gas regulations of vehiclesfor decrease of the exhaust gas amount. ・ KMC is also recommended that car inspection in Karachi needs to be imposed thoroughly.	<Pre-construction and Construction Phase> Contractor <Operational Phase> KMC	<Pre-construction and Construction Phase> KMC <Operational Phase> KMC	As actions for mitigation measures are included in the project activities, it is not necessary for securing costs.
		SPM, PM10	・ Rear decks of vehicles conveying construction materials should be covered by sheeting to minimize sand and dust becoming airborne and affecting following vehicles. ・ Water sprinkling near residential areas to minimize airborne dust affecting vehicles.	・ Not required	<Pre-construction and Construction Phase > Contractor	<Pre-construction and Construction Phase> KMC	US$20,000 (included in the Project cost)
2	Water Quality	-	・ Workers' accommodation will be set up in places where sewerage to transport effluent is.	・ Sewerage system will be developed based on the laws relevant to sewage system	<Pre-construction and Construction Phase >	<Pre-construction and Construction Phase >	<Pre-construction and Construction Phase > US$15,000

			• The site offices, including toilets, will not discharge effluent directly to sewerage. Portable toilets will be used.	recommended to Karachi Water & Sewerage Board (KWSB) by KMC.	Contractor <Operational Phase> KMC / KWSB as necessary	KMC <Operational Phase> KMC / KWSB as necessary	(included in the Project cost) <Operational Phase> Necessary KMC human resource is the part of the project human allocation.
3	Waste management	-	• Waste generated in the construction areas and the project office will be collected and conveyed by a contractor to disposal areas, accredited by KMC, in accordance with the general specification of the project contaract signed between KMC and the contractor.	• Waste disposal collection and its conveyance to landfills are managed appropriately by KMC and District Municipal Council (DMC) as the "Sindh Solid Waste Management Board Bill 2014" established in 2014 is affected.	<Pre-construction and Construction Phase > Contractor <Operational Phase> KMC / DMC as necessary	<Pre-construction and Construction Phase > Contractor <Operational Phase> KMC / DMC as necessary	<Pre-construction and Construction Phase > US$16,500 (included in the Project cost) <Operational Phase> Necessary KMC human resource is the part of the project human allocation.
4	Soil Contaminati on	-	• Oil mat will be used to preventing oil from spilling from construction machine. • Periodic maintenance of construction machine is conducted for keeping the machines in good condition	• Not required	<Pre-construction and Construction Phase> Contractor	<Pre-construction and Construction Phase> KMC	US$3,600 (included in the Project cost)
5	Noise and vibration	Leq, L10	• In order to mitigate disturbing noise from construction equipment, equipment that has low noise and vibration emissions should be selected. • Night time operation should be avoided in the project area near residential areas when possible • If any complaint arise from	• Planting strip will be installed at the edge of ROW on either side. • Dense tree type will be selected • Routine and periodic road maintenance to keep the road surface in good condition. • Improved asphalt will be	<Pre-construction and Construction Phase> Contractor <Operational Phase> KMC	<Pre-construction and Construction Phase> KMC <Operational Phase> KMC	<Pre-construction and Construction Phase> No cost generated. <Operational Phase> Planting strip: US$125,000

			residents about noise and vibrations, the construction work should be temporarily stopped and countermeasures between KMC and the contractor should be discussed.	adopted for the pavement to prevent the deflections and ruts on the pavement. ・ Soundproof panel will be considered around the educational facilities and clinic based on the result of environmental monitoring and the discussion with the facility owners. ・ KMC is recommended to promote kiving people to more use the public transportation then peronal vehicles, and to strengthen the exhaust gas regulations of vehiclesfor decrease of the exhaust gas amount. ・ KMC is also recommended that car inspection in Karachi needs to be imposed thoroughly.			Maintenance cost is under examination Improved asphalt: US$85,000 (included in the Project cost) Soundproof panel: US$2,000 X 4 locations =US$8,000
Social Environment							
13	Involuntary resettlement and/or loss of properties	-	<Detailed Design Phase> ・ Minimize design change that causes change of PAPs ・ Conduct appropriate survey and consultation, if necessary, on the new PAPs added because of the design change <Between Detailed Design Phase and Construction Phase> ・ Provide appropriate relocation assistance measures to PAPs ・ Monitor grievances and redress, if any, and ensure that the issues are solved.	・ Not required	<Pre-construction > Consultant and Contractor	<Pre-construction> KMC	Cost is included in Regular operation human expense.

			・ Set up appropriate temporal public facilities such as police posts. <Construction Phase> ・ Confirm that the allocated lot for the Camp Site require no resettlement or land acquisition. ・ Plan the construction works so that no additional negative impacts on the structures and residents out of ROW are caused by the Project ・ Confirm that the permanent structures are set up as promised for the affected public facilities such as police posts.				
16	Local economy such as employment and livelihood	-	<Construction Phase> ・ KMC and the Contractor shall; 1) notify the schedule, location and duration of the works to the public, and , in addition to the regular safeguard measures, cooperate with Traffic Police to monitor and control the traffic. 2) explain the schedule and duration of the works to the schools, and avoid any accidents by placing guards during the pupils' commute hours, in addition to the regular safeguard measures. If requested from school, and if accepted by neighbouring residents and facilities, the Contractor shall work in night hours to prevent noise and dust impact on the classes.	・ KMC, in coordination with relevant institutions, shall provide information effectively to the school staff, the pupils/students, company staff where many works, local residents, bus / truck drivers, and general public about road safety behaviours, such as how to use the facilities and what kind of behaviours must be avoided. ・ Providing institution for programs and funding need to be found. ・ Pedestrian crossings at 4 intersection and 2 pedestrian bridges are to be developed for the decrease of the traffic accidents.	<Construction Phase> The Contractor in coordination with KMC <Operational Phase> KMC in coordination with Karachi Traffic Police and any relevant institutions	<Operational Phase> KMC <Pre-construction and Construction Phase> KMC	Cost is included in Regular operation human expense.
19	Existing traffic/public facilities, infrastructures, social services	-					
26	Gender	-					<Operational Phase> US$75,000 for pedestrian crossings at 4 intersection and 2 pedestrian bridges (included in the Project cost)
27	Children's rights	-					
28	Sanitation,	-	<Construction Phase>	・ Not required	Management of	< Construction	Cost is included in

	public health condition, infectious diseases including HIV/AIDS		• The Contractor site manager, or his deputy, shall regularly patrol and monitor the sanitary situation and order the staff any improvement as needed. • The Contractor site manager, or his deputy, shall avoid water stagnation at the Camp and work areas to prevent the Dengue, and apply pesticide spray after the monsoon season at any water stagnation found. • The Contractor, in coordination with other institutions, shall provide education for workers in regard to how to prevent infectious diseases including HIV/AIDS.		sanitary condition in the Camp and work areas : Contractor Education of the Workers : Contractor in coordination with KMC, Sindh Dengue Control Program, UNAIDS, and local NGOs	Phase> KMC	Regular operation human expense.
29	Industrial safety and health, working environment	-	• Workers are obliged to put on personal protective equipment (PPE), including work uniforms, helmets and safety shoes • Education about health and safety through morning meetings and workshops should be conducted • KMC and the contractor have to comply with the following laws: 1. Labor Laws regulating the Relation of Employer and Employee, 2. Labor Laws Assigning Levies and 3. Labor Laws Assigning Standards for Wages.	• Not required	<Pre-construction and Construction Phase> Contractor	<Pre-construction and Construction Phase> KMC	Cost is not generated. Human resource for conducting training is the part of the project human allocation.
30	Accidents, crime	-	• Countermeasures for mitigation of traffic congestion should be discussed between the contractor, traffic police and KMC prior to	• Not required	<Pre-construction and Construction Phase> Contractor	<Pre-construction and Construction Phase> KMC	US$530,000 for human resource for safety measures (included in the

			the start of construction ・ Speed limits should be determined for construction vehicles, and signs and fences should demark construction sites to avoid accidents ・ Lighting facilities should be established for construction work during the night time ・ Education about health and safety through morning meetings and workshops should be conducted. ・ Periodic patrols around construction sites should be undertaken to ensure that safety measures are in place and that sites are secure. ・ Necessary road safety measures are required where the possibility of vehicle accidents happened become higher due to the construction. ・ Pedestrian crossings at 4 intersection and 2 pedestrian bridges are to be developed for the decrease of the traffic accidents.				Project cost) US$75,000 for pedestrian crossings at 4 intersection and 2 pedestrian bridges (included in the Project cost)

Table 2-2-62 Environmental Monitoring Plan

No.	Impacted Item	Parameter	Location	Frequency	Responsibility	Cost (Rs./frequency)
< Environmental Pollution >						
Construction Phase						
1	Air Quality	・ NO2, NO, SO2, CO, PM10, PM2.5, SPM ・ Functioning status of traffic control based on the traffic diversion plan	・ 6 locations (Same locations of baseline survey) ・ Locations to be determined after the construction commencement	Biannually	KMC and contractor	720,000
2	Water Quality	・ Whether workers' accommodation and a project office are set up in places where sewerage to transport effluent is.	・ Location of workers' accommodation and a project office	-	KMC	Cost is included in the project cost
3	Waste Management	・ Whether waste generated by the Project is appropriately collected and conveyed to disposal area accredited by KMC	・ Construction area ・ Project office, etc.	Biannually	Contractor / KMC as necessary	As the visual management (check) is presumed, no cost is necessary.
4	Soil Contamination	・ Whether mitigation measure for preventing oil from spilling to the ground is taken. ・ Whether periodical maintenance of construction machine is conducted.	・ Construction area ・ Stock yard	Biannually	Contractor	As the visual management (check) is presumed, no cost is necessary.
5	Noise and Vibration	・ Ambient and road side noise (dB(A) LAeq) & Vibration level ・ Functioning status of traffic control based on the traffic diversion plan	・ 15 locations (10 locations as baseline survey, 4 educartional facilities and 1 clinic) ・ Locations to be determined after the construction commencement	Quarterly	KMC and contractor	500,000
Monitoring for Item 1-5 will continuously conducted 1 year after the completion of the Project (Operational Phase).						
Operational Phase						
1	Air Quality	NO2, NO, SO2, CO, PM10, PM2.5,	6 locations (Same locations of	Biannually	KMC /	720,000

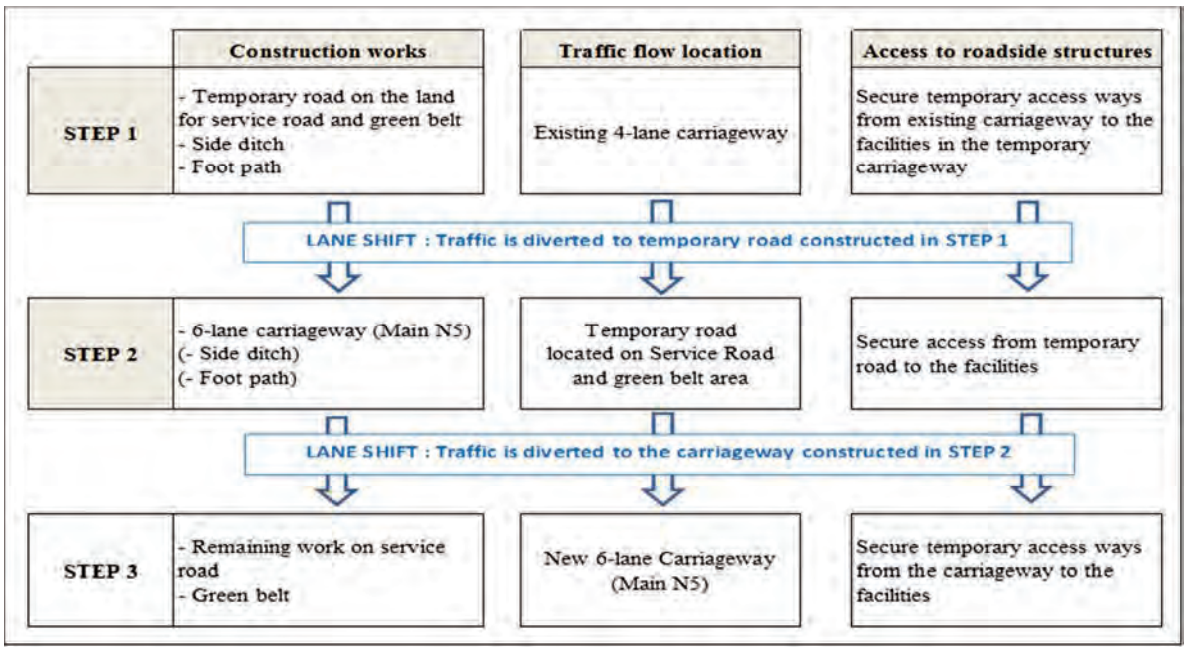
		SPM	baseline survey)		Independent Monitoring Consultant (IMC)	
2	Water Quality	Whether sewage system is developed or not based on the laws relevant to sewage system.	4 locations (Maril river) and 1 hydrant water	Biannually	KMC and contractor	720,000
3	Waste Management	Whether the Bill is affected on not. Waste disposal is collected appropriately based on the Bill.	-	-	KMC / IMC	Cost is included in the project cost
5	Noise and Vibration	Ambient and road side noise (dB(A) LAeq) & Vibration (L10)	15 locations (10 locations as baseline survey, 4 educartional facilities and 1 clinic)	Quarterly	KMC / IMC	500,000
< Social Environment >						
13	Involuntary resettlement and/or loss of properties	<Detailed Design Phase> ・ Monitoring of design change ・ Additional survey, if necessary, on the PAPs based on the design change ・ Update of the understanding of ROW condition for necessary arrangement and negotiation between KMC and related stakeholders <Between Detailed Design Phase and Construction Phase> ・ Monitoring of assistance measures provided by KMC ・ Monitoring of voluntary clearance by property owners ・ Monitoring of grievances and redress of them, if any ・ Monitoring of the progress of clearance ・ Monitoring of the set up of	・ The Project Area ・ The location where PAPs relocated	<Detailed Design Phase Monthly <Between Detailed Design Phase and Construction Phase> Monthly <Construction n Phase> Quarterly	<Detailed Design Phase Consultant <Between Detailed Design Phase and Construction Phase> Consultant <Construction Phase> Contractor	<Detailed Design Phase> Included in the ordinary project human expense <Between Detailed Design Phase and Construction Phase> Included in the ordinary project human expense <Construction Phase> Included in the ordinary project human expense

		appropriate temporal public facilities <Construction Phase> ・ Monitoring of the allocated lot for the Camp Site to confirm that no resettlement or land acquisition is necessary ・ Monitoring of the Project Site to confirm that no additional negative impacts on the structures and residents out of ROW are caused by the Project ・ Monitoring of the set up of appropriate public facilities ・ Monitoring of the livelihood recovery condition of the PAPs				
16	Local economy such as employment and livelihood	Changes in traffic safety condition ・ Visual observation ・ Complaints, opinions, suggestions raised	・ The Project Area	Daily observation record is to be compiled once a month as a monthly report.	Contractor	Included in the ordinary project human expense
19	Existing traffic/public facilities, infrastructures, social services					
26	Gender					
27	Children's rights					
28	Sanitation, public health condition, infectious diseases including HIV/AIDS and	・ Sanitary condition of the Project Area and the Camp (Visual observation) ・ Education input on sanitation and sexually transmitted diseases (Training record and participants' list)	・ Around workers' dormitory, toilets, water tank and puddles at the Project Area	Daily observation record is to be compiled once a month as a monthly report.	Contractor	Included in the ordinary project human expense
29	Industrial safety	・ Occurrence of industrial accidents	・ The Camp Site	Daily	Contractor	Included in the

	and health, working environment		・ The Project Area	observation record is to be compiled once a month as a monthly report.		ordinary project human expense
30	Accidents, crime	<Construction Phase> <Operational Phase > ・ The number of accident and crime confirmed ・ Type of accident and crime confirmed ・ Type of action taken after the accident and crime generated	・ Congested areas along N5	Monthly	<Construction Phase> Contractor <Operational Phase > KMC Engineering Division,	Included in the ordinary project human expense

During the Construction Phase, the traffic on N5 shall use either the existing or new carriageway, or temporary road constructed on the area for the service road and green belt. The lane for traffic shall be clearly directed to avoid confusion and traffic jam. Also, the construction area shall be surrounded by movable fences and tapes so that even after dark no cars or motorcycles shall mistakenly drive into the area.

In addition to above safety measures, KMC shall put sign boards well before the commencement of the works to encourage drivers to use alternate route such as Mehran Highway and M9 to reduce the traffic volume on N5. Steps of construction works, traffic diversion, and access measures is shown in Figure 2-2-65.



Source: Survey Team

Figure 2-2-65 Steps of construction works, traffic diversion, and access measures

(9) Stakeholder Meeting (Scoping meeting and Public Hearing)

On the procedure of the EIA approval procedure, prior to the EIA survey, KMC is required to conduct a scoping meeting for disclosure of the project description for provincial administrative agencies related to the Project, representatives of local areas along to the target road and environmental protection and conservation groups including NGOs. The scoping meeting of the Project was conducted at 27th May, 2015. Sindh Wildlife Department and IUCN Pakistan were invited for both Scoping meeting and Public Hearing, and WWF Pakistan for Public Hearing respectively, in order to obtain professional knowledge from specialists related to ecosystem. Furthermore, as the result of the consideration for women, female participants were confirmed in both scoping meeting and publis hearing.

During the detailed design and before the commencement of the Project, the stakeholder meeting is preferred as necessary. After the project commencement, stakeholder consultation is supposed to conduct following situation, as necessary.

- Before and after the project monitoring
- Grievance is drawn up
- Before the newly step commencement of construction and after the step construction completion
- Before the construction which might generate dust and increase the vibration and noise levels
- Requests for conducting stakeholder meeting are raised by residents around the target area, and others

Contents of the scoping meetings are shown in Table 2-2-63.

Table 2-2-63 Contents of the scoping meeting

Date and venue	Objective of the meeting
15: 00-17: 00, 27th May, 2015 At Pearl Continental Hotel, Karachi	To disclose: 1. The project description 2. EIA survey methodology 3. Potential environmental impacts by the Project 4. EIA approval procedure To collect opinions and concerns raised by participants To obtain consensus(agreement) the project description and the implementation of the survey
Name of participants	
Number of participants: 39 1. Port Qasim Authority 2. National Telecommunication Corporation 3. Sindh Wildlife Department 4. Sindh EPA 5. Sindh Police 6. Karachi Water and Sewerage Board 7. Pakistan Telecommunication Company Limited	8. UC 6 Gulshan-hadeed 9. UC 4 Quaidabad 10. UC 5 Landhi 11. Anti-Encroachment Cell 12. International Union on Conservation of Nature 13. Landhi Association of Trade and Industry 14. IoBM 15. Sindh Forest Department 16. University of Karachi

There were 39 participants for the scoping meeting and a variety of issues of the Project was discussed among the participants, KMC and EMC. Major queries /concerns raised by participants and answers/responses by KMC as well as EMC in the Scoping Meeting are summarized in Table 2-2-64.

Table 2-2-64 Major Queries /Concerns from Participants and Answers/Responses in the Scoping Meeting

NO	Name and Organization	Queries /Concerns	Answers/Responses by KMC is written in (K) by EMC is (E)
1	Mr. Wazeer Sheikh, Senior Manager Pakistan Telecommunication CompanyLimited (PTCL)	1. PTCL has its optical fibre lines laid all along the project alignment. 2. The proposed construction could likely damage the lines running below the surface. 3. Which party would bear the cost of repair if any damage occurs?	1. PTCL lines do not lie in the existing 2 lanes. Upon construction of 3 lanes, the lines would fall below the service road or near the edge of the carriageway. Secondly, the service road will be constructed using pavers that will make any necessary repair easy (K). 2. It is KMC's priority to ensure that utility lines are least affected (K). 3. KMC will keep the margin of future repair and maintenance in the project plan (K).
2	Mr. M. Riaz Senior Engineer, Karachi Water and Sewerage Board	1. Different diameter pipelines and manholes are located along the project route and once project is completed, we fear that we might not be able to do any repair of the lines that would fall below the road.	1. KMC has kept provision for strengthening and repair of joints but relocation of existing lines cannot be considered by KMC because that involves huge cost. However, KMC will definitely attend to the week points that will be kept in the estimates (K).
		Comment/Suggestion: Anticipating the future repair problem, officials from KWSB suggested KMC to consider relocating the lines that are running below the proposed alignment.	
3	Dr. Abdul Karim Solangi, Special Secretary, Dept. of Antiquities	Comment/Suggestion: Detailed maps of proposed alignment should be provided to the Dept. of Antiquities for review. The department will send a team to the site for evaluation and will later communicate its stance to KMC.	
4	Mr. Shunail Hussain Shah Assistant Superintendent, District Jail Malir	Comment/Suggestion: KMC is requested to consider the problem of road accidents that occasionally occur in front of the main entrance of the Jail due to high speed traffic coming from port Qasim due to absence of speed barriers.	KMC will see to this issues and will take necessary road safety measures where required. The front area of the Jail where currently barriers are placed will have to be cleared if required.
5	Mr. Shahid Hussain, National Telecommunication Corporation (NTC)	1. NTC has its optical fibre and copper cables below the existing road. 2. KMC is requested to share the drawings/maps with NTC. 3. The survey team should be advised to contact us before starting the activity.	1. (No answers confirmed in the minutes) 2. KMC will be writing letters to all such departments in order to inform them about the survey (K). 3. (No answers confirmed in the minutes) (as an additional information) KMC plans to carry out the surveys manually without using heavy machinery to ensure least chances of

NO	Name and Organization	Queries /Concerns	Answers/Responses by KMC is written in (K) by EMC is (E)
			damage to the subsurface lines (K).
6	Mr. Islam-ud-deen Zafar, Senior Vice President, LATI& Dr. Kaneez Fatima (Sociologist) from Department of Sociology, University of Karachi	Enquiring the Encroachment and resettlement issue that may be involved during the project.	1. Encroachment is not a huge issue for the project as such and that no concrete structure will be removed except for mosques that are coming within RoW which KMC would negotiate and if required, it will be relocated (K). People have mainly extended their businesses into the government land which will be cleared during the project. For this reason, we have invited officials from Anti-Encroachment Cell to the meeting in order to bring them in the loop for future assistance (K).
7	Mr. Haider Ali, Transport and Communication Department (TCD)	1. In order to convert this intersection into a free flow condition, it should be converted into a clover leaf type therefore adequate land should be available. 2. Have you kept provision of pedestrian crossings along the 9km stretch of project road?	1. KMC agreed to his comment on future growth and need for converting the intersection into a grade separated or clover leaf type intersection, but he further added that it's not possible to acquire and hold the land for future development. He also added that although there is possibility, we might not require a clover leaf type intersection here (K). 2. At intersections, KMC has given signalized pedestrian crossing. He asked Mr. Haider to share with KMC if there are requests for pedestrian crossings at any other place (K).
8	Mr. Imran Sabir Deputy Director Technical Sindh EPA	Comment: KMC should carefully look into the issue of resettlement and encroachments since it's a very sensitive aspect. KMC should also take efforts during the project to ensure that there is least resettlement involved and alternatives should be explored in all such cases.	1. There are no permanent structures along the road. As far as the restaurants are concerned, mainly the hotel owners have their chairs and tables within the area and they mostly keep it inside at night once they close their business. There are mostly movable /katcha structures which people have constructed on open land (K). During the preliminary survey by EMC, it was observed that most of the people are mainly vendors having movable structures (push carts etc.). There were some who have extended their business into the ROW. During the survey, we also found that the people were willing to pull their business back to clear the land required for the project (E).
9	Mr. Karim Shah (Secretary UC 4)	1. There is large number of shops, petrol pumps and other structures located along the road. How will you handle this? 2. How will you manage traffic during construction phase?	1. 150ft ROW is the property of KMC as per the Master Plan. Any property within this length will be considered an encroachment into the land and will be cleared if required (K). 2. KMC will make sure that least problems arise for the locals during the project. There will be disturbance during construction, but once the project is complete, things will definitely improve. Traffic Diversion Plan will be

NO	Name and Organization	Queries /Concerns	Answers/Responses by KMC is written in (K) by EMC is (E)
			implemented and KMC might also consider undertaking the construction work in sections to minimize the disturbance (K).

Upon receiving queries/concerns raised by the participants and their response by KMC, some matters have been reflected on the Mitigation Measures and Environmental Monitoring Plan.

KMC described that there would be no negative impacts such as damages on the utility lines (an optical fibre line). Also, KMC remarked that the utility would not basically shifted and budgets for damages generated by the construction would be surely secured. That remark finally led to solution of their concerns (NO1, 1-2-3and NO2). Documents which participants requested were committed to disseminate to participants (NO 3 and NO5, 1-2-3). Preliminary identifications were conducted 3 times on site before commencement of the Interview Survey, so that no potential PAPs are missed from the survey. Moreover, the social expert and the Engineer kept good communication so that the Project minimizes the number of affected structures and assets by modifying cross-section design. (NO6, NO8 and NO9). While KMC received the road design change requests, KMC showed the difficulty to consider the request in view of the present situation (NO7, 1).

Concerning NO4, NO7, 2 and NO9, mitigation measures were considered and described in Table 2-2-61. As a whole, the queries and questions received were considered when the preparatory survey including road design was implemented.

The EIA draft was submitted to SEPA on 14th September, 2015 and it was reviewed by SEPA.

SEPA organised the Public Hearing in 12th November 2015, which aims to disclose the contents of the EIA report and collect the opinions from persons related to the Project including local people. The preparation process for having the Public Hearing is mentioned in "2-2-4-2 Land Acquisition and Involuntary Resettlement, (8) Public consultation, 4) Public Hearing". Table 2-2-65 shows the details of the Public Hearing.

Table 2-2-65 Contents of the Public Hearing

Date and venue	Agenda
10:30-13:30, 12th November, 2015 Regent Plaza Hotel, Karachi	1. Introduction - Defining meeting format, theme and objectives by SEPA 2. Presentation on the project 3. Question/Answer session
Name of participants	
Number of participants: 71 ・ IUCN Pakistan ・ WWF Pakistan ・ UC Secretary in Qasim Town and Gulshan-e-Hadeed ・ Anti-Encroachment Cell ・ Government of Sindh ・ Sindh Wildlife Department ・ Solar Consultant & IoBM ・ Urban Resource Center ・ P&D Sindh	 ・ AAQB ・ Gulshan-e-Iqbal ・ International Industries Limited ・ Matrixx Co. ・ Degree College ・ NED University ・ Mehran University of Engineering & Technology ・ Inst. Of Space and Technology, Karachi University

Source: Results of the interviews with EMC

There were 71 participants for the Public Hearing and a variety of issues of the Project was discussed among the participants, KMC and EMC. Major queries /concerns raised by participants and answers/responses by KMC as well as EMC and SEPA in the Public Hearing are summarized in Table 2-2-66.

Table 2-2-66 Major Queries /Concerns from Participants and Answers/Responses in the Public Hearing

NO	Name and Organization	Queries /Concerns	Answers/Responses by KMC is written in (K) by EMC is (E) and by SEPA is (S)
1	Mr. Imran Sabir Deputy General SEPA	As stated by SEPA in the scoping meeting of this project, a Resettlement Action Plan (RAP) should be developed and submitted to SEPA.	1. Regarding RAP, although there are no legal structures or titleholders who will be affected from this project (E). JICA, the Project donor, took a serious initiative on the social issues of this project. Therefore, RAP has already been developed. It is not the part of this EIA report as it was under preparation when the study was submitted to SEPA for scrutiny, but will be submitted separately to SEPA (E).
2	Mr. Asim Khan	For traffic study, which consultant did the traffic study?	1. JICA study team and Exponent Engineers (local consultant) did the traffic survey (K).
3	Mr. Ijaz Khilji (Independent Consultant)	The alignment will avoid the structures, as the proposed alignment will be shifted from the existing. The shifting will eventually create curves and encourages the accident. Therefore while designing, measures should be taken to avoid accidents.	1. The design and curves will comply with requirements for safety and smooth traffic. This has been considered during the designing of the alignment. A detail meeting was held between KMC and JICA study team and design has been finalized accordingly (K).
		Noise level and pollution levels of NO, NO2 are beyond NEQS levels. Due to widening of the road, more traffic will come on the road and therefore pollution may increase. There are several coal fired power plant coming in the area of Port Qasim, therefore this will also add the existing pollution. It is recommended that these problems should be taken care of and mitigated properly.	1. It cannot be said that due to the project NOx will be reduced but will not increase either. Current levels of NOx are due to the traffic jams where these pollutants get concentrated. Due to the smooth flow of traffic, the effluent gases will get dispersed instead of getting concentrated. At the current moment the gases do not get dispersed due to the traffic jams (E). 2. The issue rises from the point that congestion of traffic is at one side and volume of traffic is at the other side. As the project addresses the congestion, the volume of traffic cannot be lessened (E). 3. If intersections will be designed without congestion, there will be no issue of congestion as well as noise and air pollution (E). 4. The solution for congestion and pollution does not lie in widening of the roads, construction the bridges etc. The solution is the Mass Transit. Unless BRTs and MRTs are not implemented, the problem would still be there (E). 5. There will be no impact of coal power plant in this region. The emissions

NO	Name and Organization	Queries /Concerns	Answers/Responses by KMC is written in (K) by EMC is (E) and by SEPA is (S)
			from these power plants shall be mitigated at source as directed by SEPA (E).
4	Mr. Zahid Farooq (Urban Resource Centre, U.R.C Karachi)	As the project would take around 3 years of construction, it may cause hindrance to the people who travels along N5.	1. N5 will not be closed during construction. First the service roads and diversions will be developed and after that this road will be rehabilitated in segments so that the traffic would not get impacted at any stage (K).
		Regarding project affected persons, policy should be developed in which the affected people should be compensated equally and accordingly.	1. There are as such no PAPs in the 150ft road alignment. There are petrol pumps signboards, temporary car parking areas and small cabins. Anyone who needs to be resettled will be assisted by KMC. A plan has already been developed for the assistance (K). 2. There are no houses found on ROW and no resettlement is necessary for the Project (E). 3. Regarding the policy of affected persons, an ARAP has been developed and compensation plan has been devised in this plan. The plan is summarize as: (E) ・ 5 police/rangers/traffic posts will be affected. It will be reconstructed by KMC. The consultation with the authorities has already been conducted and they will be taken on board during the reconstruction. ・ Notice for the clearance will be given well before the clearance date. ・ There will be 3 shops affected. The structures of shop will be removed according to the Anti-Encroachment act and structure owner will not be assisted. The renters/business owner's belongings will be moved by the aid of KMC to other place of business as demand by PAP. In operation KMC / monitoring team will monitor the livelihood of shifted PAPs. ・ 1 mosque will be affected during the clearance. So KMC will provide alternate space on KMC land for the mosque and assist in reconstructing the Mosque. ・ Regarding the Chippa Ambulance parking, the temporary parking structure will be shifted by Chippa in the adjacent area outside the ROW but KMC will assist Chippa if requested for public purpose. ・ A signboard of kidney center is placed ROW which is will be shifted by the aid of KMC.

NO	Name and Organization	Queries /Concerns	Answers/Responses by KMC is written in (K) by EMC is (E) and by SEPA is (S)
			• A full entitlement matrix is given in the ARAP report and can be seen if needed. 4. All the social and environmental aspects are considered and JICA is really strict in such matter. RAP will be implemented in letter and spirit (E).
		Instead of pedestrian bridges, concept of subways may be considered as the pedestrian bridges are 22ft high which is a problem for old age people to climb up as the subways would go 8ft under and would come 8ft up so it'll be easy for people to pass.	1. Subways cannot be designed as there are main water trunks of 45" and 33" dia runs along the ROW which is around a depth of 12ft. Besides there are many other utility lines runs underground so it is not possible to make subways. If there is any space available to construct subways, we'll consider it. There will be 6 pedestrian bridges planned to be erected and apart from that if there will be any feasible option for the design of the bridges, so it'll be considered as the design is not final yet (K). 2. The designing of the pedestrian bridges can be improved and people living nearby will use the pedestrian bridges the same way. Subways that are constructed in other areas are an example of a failure and should not be promoted as they are used for other unlawful activities (E).
5	Dr. Ameer Hussain (NED University)	Road safety component should be included as well particularly for this section where a lot of accidents occur. If the congestion is controlled, accidents will get lessened but their severity will get increased due to high speed so this issue should also be considered. It seems like we are only increasing the speed of transportation on the roads which will result in accidents too. There should be a balance approach. A road safety audit may be conducted to reduce accidents.	1. We have considered this point according to industries, school and other public activities (K). 2. Road accident analysis has already done for this project as it an important component of EIA (E). 3. EPA does not have much of a role in reducing traffic accidents as it the responsibility of Traffic Police who should implement their laws strictly (E). 4. There is no concept of road safety audit in Pakistan. EPA should put condition to perform road safety audit (E).
		Pedestrian bridges should be constructed.	1. There are 4 intersections and on all 4 intersections there will be 4 pedestrian bridges and 3 more planned at other locations. This number can be increased as the project is still in the design phase (K).

NO	Name and Organization	Queries /Concerns	Answers/Responses by KMC is written in (K) by EMC is (E) and by SEPA is (S)
6	Mr. Tahir Qureshi (IUCN)	Plans should be included for the maintenance of trees planted at the green belts. If trees are left unattended, they will not grow properly.	1. For green belts, we have a horticulture department on board (K). 2. We will also consider the funds available with us for the implementation of this project. If the plan for handing over the green belts to horticulture department is feasible, we will consider it (K). 3. There will be a role of third party known as Independent Monitoring Consultant (IMC), which will monitor all these issues regularly. JICA itself will monitor the project implementation (E). 4. The plantation works are outsourced in some other projects so such options should be considered and IMC should monitor it (E). 5. It is in practice in Punjab to take horticulture department on board that the number of trees are to be cut and planted as compensation; the department measures the cost (S). <Additional comments> 6. Further, storm water drains are being reconstructed and repaired so that during rainy seasons the water will be drained and disposed. Drains will be constructed on both sides of the road of 11.3 km (K). 7. The area in the north is a catchment area since centuries and natural nallahs already exist, one of them is Badal nalah. Storm Water will drain into Badal nalah and stagnation will not be occurred (E).
7	Usman Ali (Resident of Landhi)	1. The project will span 36 months of construction. Will this project be completed in this period? 2. Government of Sindh allocated funds in his last budget but it does not seem that this project will get complete in this financial year.	1. The project of rehabilitation of N5 will be constructed in two phases; Phase 2 from Quaidabad to Steel mill will be constructed by JICA, it has already been a year since we are planning this project and would take a year more to finalize the detailed design (K). Phase 1: from Star gate to Quaidabad is being undertaken by Govt. of Sindh which you are referring to (K). 2. Regarding traffic condition from Malir Halt to Malir 15, traffic issues at malir halt have been catered. At Malir 15 works are being done as the arrival of funds (K).
8	Ms. Suneela (Asst. Director EPA Sindh)	Which is a phase of the project?	1. The project is in the detailed design phase (K).
		Traffic management plan should be a part of EIA report.	1. Regarding traffic management, diversions will be given and ensured that there will be no traffic hindrance during construction phase of the project (K).

NO	Name and Organization	Queries /Concerns	Answers/Responses by KMC is written in (K) by EMC is (E) and by SEPA is (S)
			2. Improvement will be done in the existing roads which will automatically reduce the traffic time. Therefore the congestion will get reduced (K).
		There is no mitigation measure provided in operational phase for the waste management.	1. Chapter 7 (Table 2-2-53 Environmental Management Plan) mentioned mitigation measures of waste management in the construction phase (E). 2. What kind of waste are you expecting? The answer is that there will be no such waste in the operational phase (E).
9	Mr. Waqar Pulpoto (D.G Technical SEPA)	<Remark concluded by SEPA> 1. The final design should be submitted to SEPA. 2. The details of borrow soil are recommended to submit to SEPA. 3. The hearing by saying that this project should be completed for the betterment of the people but not at the cost of environment.	

2-2-4-2 Land Acquisition and Involuntary Resettlement

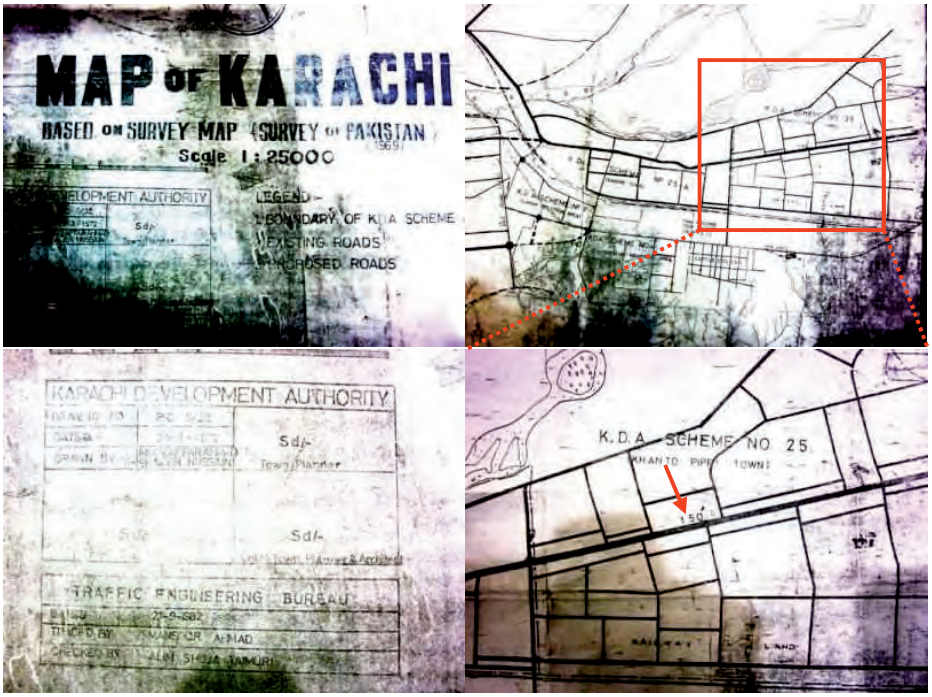
(1) Potential Project Impact

Road work

The Project, including the work area (work space) for the construction, will be conducted within the existing ROW of N5. The ownership and management responsibility of the ROW of N5 was transferred from Government of Sindh to KMC in May 13, 1999, (No. SO- IV/ 1 - 139/98 d).

Although the NHA Act 1991 (amended in 2001) does not specify the width of the National Highway ROW, Karachi Development Authority's 'Map of Karachi'(1:25,000, based on survey conducted in 1969, Figure 2-2-66) shows the ROW of existing N5, including the Project section, as 150 ft (45.72 m).

Although ROW is secured as public land, there is possibility that separate land ownership registrations exist in the Project Area. The result of the interview survey regarding land ownership is described in Section (4).



Source: KMC

Figure 2-2-66 'Map of Karachi' by Karachi Development Authority

Temporal lease of the camp site / stock yard

Temporal lease of land for the camp site (site office) and stock yard (material and mechanical storage, repair shop for vehicles and machines) will be necessary during the Construction Phase. The necessary size is about 200 m x 200 m.

KMC is responsible to designate the suitable land lot prior to the public announcement of the Pre-Qualification of the construction contractor.

KMC assured to the Survey Team that KMC is planning to select a publicly owned land lot that

will not require any land acquisition and resettlement.

Necessity of resettlement

The structures located on ROW shall be cleared before the commencement of the construction works of the Project.

When the structure is wholly located on ROW, or the remaining structure located outside of ROW will not be able to perform the intended function, the residents or the users of the structure need to move out.

In case, however, such structures located on ROW and found not to interfere the function of the designed road because of their size and location, these structures shall be exempted from the clearance list of the Project, so that the Project will minimize the resettlement of the residents and structure users, and reduce the occurrence of the negative reputation to the Project as low as possible.

Those exempted structures shall be the existing private and public structures located in the areas for the Planting Strip and the Future Service Road. When the needs for construction of the additional Service Road arises in future, reflecting the expansion of the urban and industrial development in the now-vacant lots, KMC will approach the owners to encourage voluntary clearance and relocation of those structures.

The interview survey conducted in July and August 2015 found that none of the permanent or temporal structures and other improvements such as fences and signboards on ROW had legal permission for construction.

(2) Legal Framework Related to the Land Acquisition, Resettlement, and other Social Impacts

1) Laws and regulations of Federal, Provincial, and KMC government

Legal framework related to the land acquisition, resettlement, and other social impacts are listed in Table 2-2-67.

Table 2-2-67 Legal Framework Related to the Land Acquisition, Resettlement and other Social Impacts

Topics	Name (Year)	Statement
Property rights	The Constitution of The Islamic Republic of Pakistan, 2012	Article 24 states that; ● No person shall be deprived of his property save in accordance with law; (1) ● No property shall be compulsorily acquired or taken possession of save for a public purpose, and save by the authority of law which provides for compensation . (2) The Article, however, states at the same time that; ● Nothing in this Article shall affect the validity of any law providing for the acquisition of any class of property for the purpose of providing housing and public facilities and services such as roads; (3)(e)(ii) ● The adequacy or otherwise of any compensation provided for by any such law as is referred to in this Article, or determined in pursuance threreof, shall not be called in question in any court. (4)
Public Consultation	Guidelines for Public Consultation, (Pakistan Environmental Protection Agency, May, 1997)	These guidelines deal with possible approaches to public consultation and techniques for designing an effective program of consultation that reaches out to all major stakeholders and ensures the incorporation of their concerns in any Impact Assessment study.
Land acquisition	Federal Land Acquisition	The Act and its Implementation Rules require that;

Topics	Name (Year)	Statement
	Act, (1894, amended 1969)	● Following an impacts assessment/valuation effort, land and crops are compensated in cash at market rate to titled landowners and registered land tenants/users, respectively. ● Land valuation is to be based on the latest 5-3 years average registered land sale rates. ● Due to widespread land under-valuation by the Revenue Department, current market rates are now frequently used with an added 15 per cent Compulsory Acquisition Surcharge as provided in the Act. No substitute Provincial Land Acquisition Act has been implemented yet. Therefore, the Federal Act is applied in Sindh Province.
	Sindh Land Revenue Act (1967 and 2011) Sindh Land Revenue Rules (1968)	● Defines the procedure of land registration.
	NHA Code (1999 as revised in 2005)	● Defines the procedure for land acquisition for National Highways. ● Describes negotiation procedure with legal title holders of the concerned land. ● No description is available regarding other project-affected parties.
Prohibition of encroachment of public land	Federal Highway Safety Road Ordinance (2000)	This ordinance includes provisions for keeping the highways clear of encroachments.
	Sindh Public Property (Removal of Encroachment) Act (2010) (Usually called as Anti-Encroachment Act)	● Government or any authority may require the person directly or indirectly responsible for encroachment on the public property, within the period not less than two days as may be specified in the order. (3 (1)) ● Any person dissatisfied by the order may, within three days from the service prefer a review petition to any authority who has passed such order.(4 (1)) ● Where any structure is demolished or removed on eviction, the cost of demolition or removal of such structure shall be recovered as arrears of land revenue from the person responsible for the encroachment. (6) ● To retrieve the possession from **the land grabbers** and trespassers and to enforce the provisions of this Act, Government may establish an Anti-Encroachment Force. (17)
Resettlement policy	The draft National Resettlement Policy (2002)	● The draft document is still available from the web site, and the cover page shows the name of the Ministry of Environment, Local Government & Rural Development (Pakistan Environmental Protection Agency). ● The current status of the draft, however, is not clear as of April 2015 because, 1) the ministry is now re-organized, and 2) since 2010 Sindh Government may be able to choose not to implement the federal policy and wait for its own policy to be formulated.
Labour safety	Hazardous Substances Rules, 2003 (Federal)	These Rules make provisions for the granting of licences for the collection, treatment, storage, importation, transportation, etc. of hazardous substances. ● Substances prescribed as hazardous substances are listed in Schedule I. ● An environmental impact assessment (EIA) of the project involving hazardous substances shall accompany the application to obtain a licence (rule 5). ● Rules 7 and 8 deal with the issuance of licences, and the conditions and requirements of licensees. ● General safety precautions and precautions for workers are covered in rules 11 and 12. ● Authorized staff of the Federal Agency/Provincial Agency is entitled to enter and inspect the premises in which hazardous substances are generated, collected, treated, disposed of, stored, etc. (rule 16). ● Safety plans and waste management plans shall be submitted to

Topics	Name (Year)	Statement
		the Federal Agency (rules 17-19). ● Details to be provided for the application to licences for the importation and transportation of hazardous substances are given in rules 20 and 21.
	Labour Laws (Amendment) Ordinance 1972 (No. 9). (Federal)	The Law makes provisions for; Freedom of association, collective bargaining and industrial relations; Wages; Occupational safety and health; Employment accident and occupational disease benefit
	Draft Bill on the Sindh Companies Profit's (Workers Participation) Act 2013 (To Replace the Companies Profit (Workers Participation) Act, 1968)	The Bill makes provisions for; 3. Establishment of Fund 4. Management of the Fund 5. Penalty 6. Power to call for information 7. Settlement of disputes etc. 8. Delegation of power 9. Power to made rules
	Sindh Industrial Relations Ordinance – 2002	The Ordinance makes provisions for; Chapter II - Trade Unions Chapter III - Workers' Participation and Dispute Resolution Chapter IV - Labour Courts Chapter V - National Industrial Relations Commission Chapter VI - Authorities Chapter VII - Decisions, Settlements and Awards Chapter VIII - Penalties and Procedures The Schedule I - PUBLIC UTILITY SERVICES The Schedule II - Rights and Duties of Workers and Employers
Minimum wage	Sindh Minimum Wages Ordinance (1961)	● Based on this Ordinance, GOS shall declare the minimum rates of wages for adult/juvenile unskilled workers employed in all the industrial and commercial establishment. (As of July 1, 2013, Rs. 48 / hour, Rs. 384.62 / day, Rs. 10,000.00 / month) ● The minimum rates of wages of skilled and semi-skilled workers shall not be less than the minimum wages of unskilled workers.
	Sindh Minimum Wages Rules (1962)	An adult female worker shall get the same minimum wages as payable to a male worker for work of equal value. (Rule 15)
Children's right	The Sindh Child Protection Authority Act 2011	"Child" means a person who has not attained the age of 18 years. (Section 2 (g)) For the purposes of this Act, the Authority shall have powers (a) to coordinate and monitor the child protection related issues at the provincial and district level; (g) to set minimum standards for all other institutions relating to the children (like educational institutions, orphanages, shelter homes, remand homes, certified school, youthful offender work places, child parks and hospitals etc) and ensure their implementation;(Section 10)
Archaeological relics	Federal Antiquities Act (1975)	The Project proponents are obligated; ● To ensure that no activity will be undertaken within 61 m (200 ft) of a protected antiquity, and ● To report to the GoP's Department of Archaeology any archaeological discovery made during the course of the project.
	Sindh Cultural Heritage (Preservation) Act (1994)	The Act makes provisions for; Advisory Committee, Declaration of protected heritage, Preservation of protected heritage, Compulsory purchase of protected heritage, Maintenance of protected heritage, Right of access to certain protected heritage, and Penalty.
HIV and AIDS Control	Sindh HIV and AIDS Control Treatment and Protection Act, 2013 (Act No.LII of 2013).	The Act makes provisions for; CHAPTER II Establishment of Sindh AIDS Commissions : Implementation and Monitoring, Administration of Sindh AIDS Commission, Right of Redress. CHAPTER III Protection Against Discrimination : Penalties for Discrimination. CHAPTER IV Awareness, Behaviour Change Communication and Advocacy of HIV and AIDS Prevention Measures : Support for Education and Awareness Raising Programs, the Sindh AIDS Control

Topics	Name (Year)	Statement
		Program. CHAPTER V Reduction of Risk of HIV Exposure Among Members of Most at Risk Populations : HIV and AIDS Prevention Services Amongst Most at Risk Populations ("Most at Risk Populations" means such populations that are considered to be at disproportionately high risk for HIV due to behaviours and practices that heighten their vulnerability to the virus;).

Source : Survey Team,
'Basic Survey of Environmental & Social Consideration for Project Improvement of National Highway N5' July, 2014

2) Sindh Public Property (Removal of Encroachment) Act or Anti-Encroachment Act

Based on the analysis of daily newspaper articles and field observations in 2015, main target of the anti-encroachment activities in Karachi can be described as shown in Table 2-2-68.

In the 2014 Survey, no residents were observed on the target ROW.

Table 2-2-68 Main target of the Sindh Public Property (Removal of Encroachment) Act

Category	2015 Survey on the Target ROW
1. Land mafias or land grabbers (landlords) who occupy unused public/private land for their own profit. (In many cases, wedding greens and mosques are built for the purpose)	Possible but difficult to confirm
2. Shop owners or caretakers who are located just outside of the ROW, and using the ROW, including sidewalks, for stock area, service area, or parking space for customers.	Observed
3. Hawkers who continuously move along the roads for their commercial activities.	Observed
4. Those who live on public land without legal base	Not observed

Source: Survey Team,

General Procedure of the Anti-Encroachment Unit of KMC is described in Table 2-2-69.

Table 2-2-69 General Procedure of the Anti-Encroachment Activities by KMC

1. Notification of the date of clearance	(1) Important businesses and mosques, in case their structures or properties are the target of the removal, are individually visited for request of cooperation and consulted regarding the necessary length of time for voluntary clearance, in most cases a few weeks to months prior to the planned schedule. (2) The date of the clearance is notified to the public by posters, notice boards, announcement in the mosques. Legally, the notice must be given at least 2 days before the clearance implementation. (3) Unnecessarily long interval between the public notice and clearance is avoided to prevent accumulation of hawkers and shacks in the target area.
2. Negotiation of relocation of mosques	(1) KMC will make proposal of relocating land lot for mosque or prayer place, which are clearly designated in the land development plan of various public agencies with their own land development plan. (2) There have been cases KMC paid for the re-construction of the mosque building in the new location when the negotiation was difficult with various reasons.
3. Implementation of the clearance	To avoid violent condition, clearance work shall be guarded by Sindh Police.

Source : KMC

Although the Article 3 (3) of the Act states that 'If Government or any authority or officer authorized by Government under this Act is satisfied that un-authorized construction over the state land or public property is being carried out, it or he may direct the person or persons who raised or are raising the un-authorized construction, to stop the construction and the later shall stop the unauthorized construction forthwith,' in reality, KMC concentrates on the project area for urgent public works or already constructed city centre area of Karachi.

3) NHA operation in projects assisted by international partners

The Survey Team selected 'Resettlement Planning Document, National Highway Development

Sector Investment Program, Project 2 (Sukkur - Jacobabad (N-65) Section 2, Project number: L2540, 2011)' as a good practice example in Sindh Province. The Survey Team interviewed the General Manager of the Project, Mr. Tujail Shaikh, NHA Karachi on June 30, 2015.

NHA is a federal agency that has stronger legal power to establish its own procedural rules, and more experience of working with international development partners, when compared to KMC.

Major findings in the interview are summarized in Table 2-2-70.

Table 2-2-70 NHA operation in projects assistad by international partners

Legal base of policies and actions	* Since federal government does not have laws, regulations, guidelines that covers requirements of ADB guideline, the Loan Agreement between ADB and NHA is the basis of NHA policies and actions in regards to the resettlement, compensation, and assistances. * NHA has many experiences of preparation and publication of RAPs for the projects assisted by WB, ADB, JICA, and others, based on the guidelines provided by each partners.
Information dissemination and communication with stakeholders PAPs participation	* NHA has many experiences of information dissemination and public consultation adjusted with the project phase and local specific condition for the projects assisted by WB, ADB, JICA, and other partners. * NHA usually coordinate stakeholder meetings when needs arise, from planning phase through maintenance phase. * The meeting may call for particular type of stakeholder, or for any stakeholder in particular area, depending on the topic of the meeting. * Stakeholders of NHA projects are usually categorized in following groups: Gas filling stations, Utility companies, Roadside businesses, Daily commuters, Transporters, Defence (as a land owner), Land owners, and Local residents. * Representatives of the PAPs may become member of the Grievance Redress Committee. * Monitoring reports for the ADB-assisted NHA projects are available through the ADB website, and for some projects through the NHA website as well.
Cut off date	* Before the Detailed Design, there will be the initial survey to formulate initial list of PAPs with initial cut-off date. The PC1 process to apply for federal budget allocation will start with the initial data. * After the Detailed Design, where no design change has been made, the initial cut-off date shall be used for entitlement of compensation and assistance. If new addition of PAPs is necessary because of the design change, an update survey is conducted for the new area with new cut-off date. * The final list, including the initial part and updated part shall be certified by local administration and parlament.
Contents of compensation and/or assistances to PAPs	* NHA negotiates with PAPs to determine the measures of compensation to the property loss. * When NHA plans new alignment of its road, and relocation of structures can not be avoided, NHA may pay relocation allowances, if found necessary and appropriate, to the owners of the structures when avoidance is not found possible. (NHA) * When NHA plans new alignment of its road, NHA pays to the businesses newly located on the ROW the business-loss compensation for the days needed to set-back within the same land lot or to relocate to new site. If found necessary, NHA may provide livelihood recovery assistance.
Handling of business on the area of new ROW expansion	* When NHA is to expand ROW of existing highway, NHA usually ask existing business on the area to move out by paying compensation. * When the business asks to remain on the same site, and NHA agrees to change the design so the business is located on an island surrounded by highway, 1) the business is not considered as PAPs, 2) NHA charges 'direct access fee' on the business, and 3) NHA and the business exchange an agreement that the business shall shift to outside of ROW when NHA officially require the original ROW.
Determination of fair market price	* There are property dealers in Karachi and Pakistan. There is no licensing system for the dealers. * There is no official survey results of prices of land transaction. There is no licensing system for evaluator of land and structure. * If a person is native in the area, the person may be able to tell honest dealers from black (dishonest) dealers. * As the official land and structure price, NHA refers to a federal schedule issued by NHA Building Department.

Window of grievance filing	* When a on-site project office is set up, the Grievance Redress Cell is formed within the Project Implementation Unit, with the Project Director on field is assigned as the Chair. * If a grievance can not be solved at the on-site office level, the issue shall be handed to district level, province level, and to NHA HQ. * There is Environment and Social Wing (ESW) at NHA HQ, staffed with experts of each field. The wing was established in 2001. * Representatives of the PAPs may become member of the Grievance Redress Committee.
Monitoring	* The monthly monitoring is conducted by the staff of ESW. (Internal monitoring) * As prescribed in the Loan Agreement, the Bank consultant comes to the project office quarterly for monitoring. (External monitoring) * Monitoring reports for the ADB-assisted NHA projects are available through the ADB website, and for some projects through the NHA website as well.
Knowledge of project area	* In the Lyari Highway project, NHA was responsible for its construction only, and Sindh Province was responsible for preparation of Land Acquisition and Resettlement Action Plan. Since KMC has all the knowledge and data of land ownership and residents, KMC staff was in the province team for assistance. * KMC and local police station has information and data of local residents and businesses including their connection to legal and illegal groups. But such information will not be shared with public or outsiders.

4) ADB Policy on landlords building structures illegally in public safety zones

In the 'Handbook on Resettlement : A Guide to Good Practice' by ADB (1998), ADB states clearly that landlords and their structures on public safety zones will not be compensated as cited in Table 2-2-71. According to information from KMC and local consultants, in the Project Area, large permanent structures are usually owned by those landlords, and the business owners or operators are renting the floor spaces. According to KMC and local consultants, major companies in Pakistan are also owned by landlords and influential people who are either politician or relatives.

Table 2-2-71 ADB Policy on Landlords' Structures in Public Safety Zones

Are people without formal title or rights to be assisted?	Landlords who had gained illegal rents from public safety zones would not be compensated.	p. 7
Squatters and Encroachers	● Squatters occupying public safety zones can be provided with housing, land, or income-earning opportunities elsewhere. ● Since the rationale is to protect vulnerable groups, the project would not compensate landlords building structures illegally in public safety zones.	p. 31

Source : ADB (1998) 'Handbook on Resettlement : A Guide to Good Practice'

5) Comparison of JIC A Guidelines 2010 and Pakistani Laws and Examples

Table 2-2-72 shows the gaps between current relevant regulations and experiences in Karachi and Sindh, and JICA Guidelines for Environmental and Social Considerations (April 2010) and WB O.P. 4.12.

According to the Anti-Encroachment Act, the occupants on public lands are required to move out voluntarily when the public works are to be implemented on the land parcel. Those occupants are not considered as 'project affected persons' of the clearance activities operated in the policy of the Anti-Encroachment Act and no compensation and assistance is legally mandated to the project owner, in this case, Anti-Encroachment Unit of KMC. The ordinary operation of KMC is described in the B cullum of the Table 2-2-69.

Land Acquisition Act of Pakistan (1894) neither provides any legal frameworks about the

property rights of occupants on public land and their eligibility for compensation and assistances in case of any loss caused by public works.

Therefore, the occupants on the ROW of the Project are categorized as 'Project Affected Persons' only under the JICA Guidelines.

The (Draft) National Resettlement Policy (2002) is still available online from the website of the Pakistan Environmental Protection Agency. The Policy is, however, still in the draft state, and was formulated to be the Federal policy. After the decentralization in 2010, it is not clear whether Sindh Province has obligation to follow the policy after the policy obtains the final approval of the federal government.

Table 2-2-72 Comparison of JICA Guidelines 2010 and Pakistani Laws and Examples regarding Land Acquisition, Resettlement and Assistances to PAPs

	A	B	C	D
No.	JICA GL（Appendix 1, 6. Involuntary Resettlement）, WB O.P.4.12	Federal Land Acquisition Act (LAA), Sindh Environmental Protection Act (SEPA), Examples of KMC and NHA	Gap between A and B	Plan to bridge the gap
<Avoidance and minimization of the impacts>				
1	(a) Involuntary resettlement should be avoided where feasible, or minimized, exploring all viable alternative project designs. (b) Where it is not feasible to avoid resettlement, resettlement activities should be conceived and executed as sustainable development programs, providing sufficient investment resources to enable the persons displaced by the project to share in project benefits. Displaced persons should be meaningfully consulted and should have opportunities to participate in planning and implementing resettlement programs. (c) Displaced persons should be assisted in their efforts to improve their livelihoods and standards of living or at least to restore them, in real terms, to pre-displacement levels or to levels prevailing prior to the beginning of project implementation, whichever is higher. (JICA GL) (WP 2)	In designing the alignment and cross section of the roads, impacts on existing structures are avoided as much as possible. When the impact can not be avoided, KMC negotiates with each affected person to find out mitigation and assistance measures agreeable for both parties. (KMC)	No significant gap in the basic principle and process of mitigation planning.	-
<Eligibility>				
2	People who must be resettled involuntarily and people whose means of livelihood will be hindered or lost must be sufficiently compensated and supported by project proponents etc. in	The Pakistan laws do not stipulate the eligibility of benefit in details. (LAA) KMC demolish and reconstruct police stations and alike on ROW.	Local system may not make the demolition and reconstruction of the private properties on ROW eligible for assistances.	It is recommended that KMC recognize the PAPs to be covered by the RAP, and that KMC negotiate with each affected person to discuss and agree on

	A	B	C	D
No.	JICA GL（Appendix 1, 6. Involuntary Resettlement）, WB O.P.4.12	Federal Land Acquisition Act (LAA), Sindh Environmental Protection Act (SEPA), Examples of KMC and NHA	Gap between A and B	Plan to bridge the gap
	a timely manner. (JICA GL 2) The eligibility is clearly distinguished and it includes the following: a) Those who have formal legal rights to land. b) Those who do not have formal legal rights to land at the time the census begins but have a claim to such land or assets; (provided that such claims are recognized under the laws of the country or become recognized through a process identified in the resettlement plan). c) Those who have no recognizable legal right or claim to the land which they are occupying.(WB 15)	Mosques on ROW are given alternative land reserved for religious facilities free of charge, and based on the negotiation, there are cases KMC reconstruct the new building on the lot. Based on the Anti-Encroachment Act, private properties on ROW is required to clear the area by their owners. (KMC)		mitigation and assistance measures agreeable and implementable for both parties. It should be discussed that the Cut-off Date is announced by KMC to the public at the suitable timing and with appropriate measures so that the eligibility (and non-eligibility) to the assistances are understood by the public.
	<Calculation of the amount of compensation>			
3	**<Compensation at replacement cost>** Prior compensation, at full replacement cost, must be provided as much as possible. (JICA GL 2) It indicates compensation at replacement cost for losses of assets. It clearly indicates the following: a) Calculation method of the replacement cost for agricultural land and land in urban area, respectively. b) Management of cost of any registration and transfer taxes. c) In repairing structures, necessary costs such as transport cost of building materials and labour cost should be covered. d) Interest in the case of delays in actual payment of compensation	In determining the amount of compensation to be awarded for land acquired under this Act, the Court shall take into consideration- first, the market-value of the land(LAA, 23 (1)). No award of agreement under this Act shall be chargeable with stamp duty, and no person claiming under any such award or agreement shall be liable to pay any fee for a copy of the same (LAA, 51). When the amount of such compensation is not paid or deposited on or before taking possession of the land, the Collector shall pay the amount awarded with compound interest at the rate of eight (8) per centum per annum from the time of so taking possession until it shall have been so paid or deposited (LAA, 34).	No significant gap between the JICA guidelines and the Pakistani laws.	-
	<Compensation and assistance (livelihood restoration, resettlement and community)>			
4	Compensation modes for lost assets are clearly prescribed; land-based resettlement strategies or cash compensation, or both.(WB	There is no specification. (LAA) In NHA projects, NHA negotiates with PAPs to	Local system may not make the demolition and reconstruction of the private properties on ROW eligible for	It is recommended that KMC recognize the PAPs to be covered by the RAP, and negotiate with each affected

	A	B	C	D
No.	JICA GL（Appendix 1, 6. Involuntary Resettlement）, WB O.P.4.12	Federal Land Acquisition Act (LAA), Sindh Environmental Protection Act (SEPA), Examples of KMC and NHA	Gap between A and B	Plan to bridge the gap
	11, 12)	determine the measures of compensation to the property loss. (NHA) KMC negotiates with the owner of the properties on ROW to move out voluntary. When agreement was not reached, KMC continue to discuss possibility of individual treatment, before taking in the Anti-Encroachment forces. (KMC)	assistances.	person to discuss and agree on mitigation and assistance measures agreeable and implementable for both parties.
5	Host country must make efforts to enable people affected by projects and to improve their standard of living, income opportunities, and production levels, or at least to restore these to pre-project levels. Measures to achieve this may include: providing land and monetary compensation for losses (to cover land and property losses), supporting means for an alternative sustainable livelihood. (JICA GL 2) Necessary assistance for livelihood recovery is required such as short-term employment, livelihood assistance, and income compensation. (WB 6)	The severely affected APs are entitled to rehabilitation assistance over and above their entitlements for compensation of lost assets, as determined(LAA) When NHA plans new alignment of its road, NHA pays to the businesses newly located on the ROW the business-loss compensation for the days needed to set-back within the same land lot or to relocate to new site. If found necessary, NHA may provide livelihood recovery assistance. (NHA) KMC does not provide business loss compensation or livelihood recovery assistance when KMC remove encroaching businesses from previously defined ROW. (KMC)	Local system may not provide income compensation or livelihood recovery assistance to the PAPs who are forced to close businesses or to lose daily employment during and/or after the construction.	For road design and construction plan, KMC is required to try to avoid and minimize the negative impacts. When PAPs are still found to be significantly affected with their income and livelihood, it is recommended that KMC negotiate with each affected person to discuss and agree on mitigation and assistance measures agreeable and implementable for both parties.
6	Measures to achieve this may include providing the expenses necessary for the relocation. (JICA GL 2) Relocation assistance such as relocation allowance is addressed and requested explicitly. (WB 6)	There is no specification (LAA) When NHA plans new alignment of its road, and relocation of structures can not be avoided, NHA may pay relocation allowances, if found necessary and appropriate, to the owners of the structures when avoidance is not found possible. (NHA) KMC does not provide relocation assistance (transportation measures) or relocation allowance for the owners of the encroaching structures on the existing ROW. (KMC)	Local system may not provide relocation assistance, relocation allowance for the owner of the structures on the ROW.	It is recommended that KMC negotiate with each affected person to discuss and agree on mitigation and assistance measures agreeable and implementable for both parties.
7	Measures to achieve the improvement of the standard	There is no specification (LAA)	Local system may not secure the	The Project is not expected to relocate

	A	B	C	D
No.	JICA GL（Appendix 1, 6. Involuntary Resettlement）, WB O.P.4.12	Federal Land Acquisition Act (LAA), Sindh Environmental Protection Act (SEPA), Examples of KMC and NHA	Gap between A and B	Plan to bridge the gap
	of living, income opportunities, and production levels, or at least to restore to pre-project levels, may include re-establishment of communities at resettlement sites. (JICA GL 2) Enhancement of infrastructure in the resettlement site such as roads, water supply, drainage and sewerage, waste management, and public service such as education and health, and provision and assistances of alternative or similar resources to compensate loss of access to the community resources such as fisheries, rangelands, fuels, feeds, farms, and irrigation water, are required. (WB 13)		restoration of the pre-project level standard of living.	PAPs to relocation sites. If re-establishment of communities for the relocated PAPs is found necessary, KMC is advised to discuss with the group of PAPs and agree on measures agreeable and implementable for both parties.
	<**Participation** JICA GL 3>			
8	**<Participation of PAPs >** Appropriate participation by affected people and their communities must be promoted in the planning, implementation, and monitoring of resettlement action plans and measures. (JICA GL 3) Appropriate participation of affected persons and its communities are facilitated in planning, implementation, and monitoring measures on involuntary resettlement and loss of livelihood.(WB 22, 23, 24)	There is no specification (LAA, KMC) In NHA projects assisted by WB, ADB, or JICA, NHA follows the direction written in the Loan Agreement. NHA holds repetitive stakeholder meetings when needs arises throughout the project life, including the design phase and maintenance phase after opening the Highway. The meeting may be organized by type of stakeholders (residents, utilities, businesses, commuters, transporters, gas stations, police/defence), or by locations, depending on the issues to be discussed. Representatives of the PAPs may become member of the Grievance Redress Committee. (NHA) When resettlement is necessary, KMC directly informs and negotiates with individual PAP. KMC fully supports and takes part in the mandated EIA disclosure and consultation procedure. (KMC)	According to the Anti-Encroachment Act, KMC does not conduct a public-hearing type participatory planning or monitoring for relocation of occupants on public land. KMC, does not have experience of preparation, publication, implementation, and monitoring of the livelihood rehabilitation plans. KMC lacks necessary staff and division, or coordination with outside institutions for those activities.	KMC is required that in the process of formation of entitlement framework, all the PAPs are fairy treated in information dissemination, and that their participation in the process is secured. KMC is also advised to consider realistic and appropriate contents and measures of information disclosure, in compliance with the JICA Guidelines.
9	**<Grievance redress mechanism>**	There is no specification (LAA)	There is possibility that appropriate and	It is recommended that KMC assign a staff

	A	B	C	D
No.	JICA GL（Appendix 1, 6. Involuntary Resettlement）, WB O.P.4.12	Federal Land Acquisition Act (LAA), Sindh Environmental Protection Act (SEPA), Examples of KMC and NHA	Gap between A and B	Plan to bridge the gap
	Appropriate and accessible grievance mechanisms must be established for the affected people and their communities. (JICA GL 3) Appropriate and accessible grievance redress mechanism is required. (WB 13)	NHA assigns a staff responsible for monitoring and collecting grievances at the Project Office on site as the window. Also the Grievance Redress Cell is formed within the Project Implementation Unit, with the Project Director on field is assigned as the Chair. The experts of the Environment and Social Wing at NHA HQ, established in 2001, monitors the activities once a month.(NHA) KMC has a banner for complaints submission on its website, but it is not functioning as of August 2015. (KMC)	accessible grievance redress mechanism may not be formed.	responsible for monitoring and collecting grievances at the Project Office on site as the window. It is also recommended that KMC streamline the handling of the grievances within KMC structure, and get assistance from third parties, if possible, for prompt solution of the problems.
10	**<Consultation with PAPs>** Discussion with PAPs to be relocated and host-communities in resettlement site, and strategies for participation of communities in preparation and implementation of resettlement activity are required. As steps of the participation, (1) information disclosure, (2) public consultation, and (3) public participation are to be carried out properly in planning and implementation stages. (WB 13)	There is no specification (LAA)	Local system may not secure sufficient participation and consultation in planning and implementation stages of the RAP.	Large-scale involuntary resettlement is not expected by the Project. KMC is advised to work with sufficient participation and consultation in detailed planning and implementation stages of the RAP.
11	**<Considerations to socially vulnerable groups>** It requires paying special attention to socially vulnerable groups, especially those below the poverty line, landless, elderly, women, children, indigenous peoples, persons with disabilities, and minority group. (WB 8)	There is no specification (LAA)	The negative impacts may affect vulnerable groups more severely.	If PAPs who belong to the vulnerable groups are found, it is recommended that KMC discuss with the particular PAPs and agree on measures agreeable and implementable for both parties.
<**Planning, Information Disclosure, and Consultation** JICA GL 4>				
12	For projects that will result in large-scale involuntary resettlement, resettlement action plans must be prepared and made available to the public. (JICA GL 4) It is desirable that the resettlement action plan include elements laid out in the World Bank Safeguard	Federal government and Sindh Province government do not mandate the preparation of resettlement action plan. NHA has many experiences of preparation and publication of RAPs for the projects assisted by WB, ADB, JICA, and others, based on the guidelines provided by each	KMC, the Project Owner, may not prepare the RAP for the Project.	Large-scale involuntary resettlement is not expected by the Project. It has already been discussed with KMC and SEPA to prepare for RAP based on JICA GL for the Project. KMC is to submit the RAP to SEPA for

	A	B	C	D
No.	JICA GL（Appendix 1, 6. Involuntary Resettlement）, WB O.P.4.12	Federal Land Acquisition Act (LAA), Sindh Environmental Protection Act (SEPA), Examples of KMC and NHA	Gap between A and B	Plan to bridge the gap
	Policy, OP 4.12, Annex A. (JICA GL 4) (WB 17, 22, 25)	partners. (NHA)		review as one of the supporting information of the EIA in the EIA approval procedure.
13	In preparing a resettlement action plan, consultations must be held with the affected people and their communities based on sufficient information made available to them in advance. (JICA GL 4) When consultations are held, explanations must be given in a form, manner, and language that are understandable to the affected people. (WB 22)	There is no specification (LAA) Sindh Province does not have specific requirements for the procedure of making RAPs. SEPA receives RAPs as a supporting document of EIA. Project owners are free to select guidelines they use in preparation of the RAP. (SEPA) NHA has many experiences of information dissemination and public consultation adjusted with the project phase and local specific condition for the projects assisted by WB, ADB, JICA, and other partners. (NHA) When public works projects require resettlements, KMC negotiates with individual land owners with legal rights and other PAPs. (KMC)	Local system does not have standards for information dissemination and consultation with PAPs and communities. Existing conditions, however, regarding the provision of project information and negotiation about the mediation of the impact, does not have significant gap with the GLs, provided that the activities are conducted in the manner to avoid unnecessary disturbance to the social security/ stability and to avoid unnecessary influx of population who see the chance to grab easy money.	In order to secure the fulfilment of the requirement of JICA GL, KMC is advised to work to to find out the best way and timing of information dissemination for the particular PAPs of the Project, and it is recommended to assist KMC in the implementation of the plan.
14	It requires the design of plans, implementation structures, costs and financial source for both internal and external monitoring during and after the resettlement. (WB 32)	There is no specification (LAA) KMC does not have permanent unit for monitoring of environmental and social impacts from its projects. (KMC)	There is possibility that KMC's monitoring activities during and after the construction works may not be sufficient.	KMC is advised about the institutional structure and procurement of consultants for monitoring, ,in compliance with the JICA Guidelines..
15	It requires disclosure of monitoring results to stakeholders for both internal and external monitoring during and after the resettlement. (WB 22)	There is no specification (LAA) Monitoring reports for the ADB-assisted NHA projects are available through the ADB website, and for some projects through the NHA website as well. (NHA)	Monitoring results may not be disclosed to the stakeholders.	KMC is advised to consider realistic and appropriate contents and measures of information disclosure, in compliance with the JICA Guidelines.. (i.e. The names and the amount of assistance/ compensation may be kept confidential to general public.)

Source : Survey Team

(3) Cut-Off Date

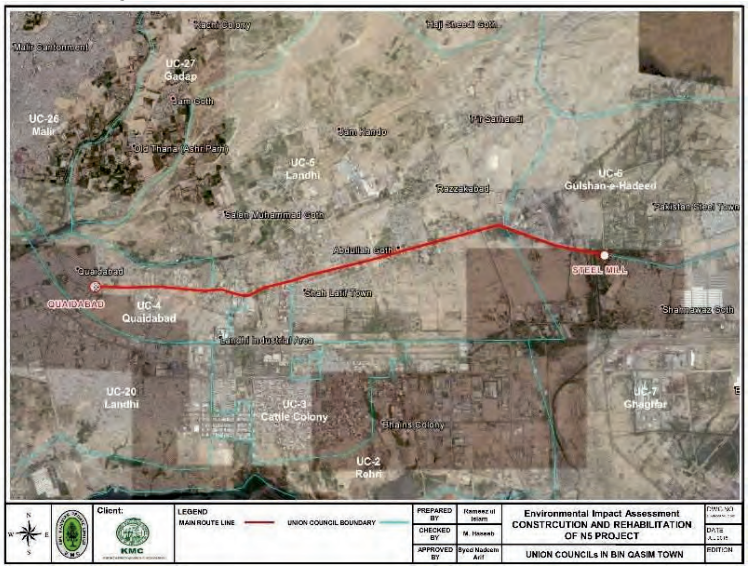
As illustrated in Figure 1.1, the location of target section traversing 5 UCs. Table 2-2-67 presents the date of potential PAP interview surveys.

Table 2-2-73 Dates of Interview Survey

UC	Group	Start date	End date
Quaidabad	A	01 July 2015	06 July 2015
	B	06 July 2015	06 July 2015
	C	04 August 2015	06 August 2015
Landhi	A	06 July 2015	10 July 2015
	A(additional)	14 Sep 2015	14 Sep 2015
	B	06 July 2015	06 July 2015
	C	06 August 2015	08 August 2015
Cattle Colony	A	07 July 2015	07 July 2015
	B	06 July 2015	06 July 2015
	C	07 August 2015	07 August 2015
Gushan-e-Hadeed	A	11 July 2015	13 July 2015
	A(additional)	14 Sep 2015	14 Sep 2015
	B	8 July 2015	8 July 2015
	C	08 August 2015	08 August 2015
Ghaghar	A	11 July 2015	13 July 2015
	B	8 July 2015	8 July 2015
	C	08 August 2015	08 August 2015

A: Structures on ROW
B: Roadside businesses habitually placing movable assets on ROW
C: Hawkers, temporal structures
Source: Survey Team

The PAP survey for Social Impact assessment was started from 01 July 2015. Therefore 01 July 2015 is the cut-off date for the Project. Any person occupying or encroaching the right of way after this cut-off-date will not be eligible as Project Affected Person (PAP). All the interviewees were given information and agreed for the condition that the Survey is targeted for PAPs, i.e. those who were on the site on 01 July 2015.



Source: Survey Team

Figure 2-2-66 Project Location

(4) Survey results on land ownership

1) Land acquisition

During the Survey, all 103 interviewees were asked whether the interviewees or the structure owners have legal or customary ownership of the land. No legal or customary land title holders on ROW was recognised during the Survey.

No land acquisition will be necessary for the improvement of the N5.

2) Temporal lease of the camp site / stock yard

Temporal occupation of land for the camp site (site office) and stock yard (material and mechanical storage, repair shop for vehicles and machines) will be necessary during the Construction Phase. The necessary size is about 200 m x 200 m.

KMC is planning to select a publicly owned land lot that will not require any resettlement or land acquisition. Since the site will be chosen from available public land, no temporal lease of land will be necessary for the Project.

(5) Results of interview survey

1) Permanent structures on ROW

Table 2-2-74 is the list of the permanent structures and businesses in them. Annex I shows pictures of the structures and businesses.

Among the 22 permanent structures recognized to be located on ROW and to be affected by the Project, 6 structures are publicly owned.

The remaining 15 businesses in the structures and 1 mosque on ROW were interviewed. Therefore, the number of valid respondent is 16 in the following tables.

For the police and ranger stations, separate interviews were conducted with respective officers.

Table 2-2-74 List of interview targets : Permanent Structures

ID	Description	Chainage	Note
AL-01	Shop	0+000	
AL-02	Shop	0+000	
AL-03	Shop	0+000	
AL-04	Drum warehouse	0+050	
AL-05	Empty Plot Wall (For Industrial Purposes)	3+920	
AL-06	Caltex Sign Board	3+980	
AL-07	FAW Motors Garden and Grill	9+480	
AL-08	Sign Board of PSO Petrol Pump	9+640	
AL-09	Caltex Sign Board	9+770	
AL-10	Shop combined with Bilal Masjid	10+100	Mosque is not affected but part of the shop combined with mosque is affected
AL-11	Sign Board of PSO Petrol Pump	10+600	
AR-01	Mosque	1+000	
AR-02	Gul Ahmed Fence	1+420 -1+570	
AR-03	PSO Fuel Pump + Signboard	2+550	
AR-04	PSO Sign Board	4+750	
AR-05	Sign Board	7+950	
	Private structure sub-total	16	
AL-12	Traffic Police Section	0+030	Interview with Sauadabad Traffic section completed
AL-13	Ranger Post	1+390	Interview with 82 Wing Rangers section Malir completed
AL-14	Police Post	5+060	Interview with Quaidabad Police Section Head Office (SHO)
AL-15	Police Post	8+150	Interview with Quaidabad Police SHO
AR-06	Ranger Post	1+400	Interview with 82 Wing Rangers section

ID	Description	Chainage	Note
			Malir completed
AR-07	Sign Board of Kidney Hospital	3+650	GoS Property
	Public and semi-public structure sub-total	6	
	Grand total	22	

Note: Information dissemination and opinion hearing minutes for public structures are included in Annex II.
Source: Survey Team

General characters

Only 25 % (4 out of 16) of the respondents were aware of the location of ROW. The age of the structure on ROW varies but majorities are less than 20 years old, that means they were built after 1995.

Table 2-2-75 Do you aware about the location of the boundary of road land (ROW)?

		TOTAL PAPs	
		Count	%
BASE: All respondents		16	100%
Do you aware about the location of the boundary of road land	**Yes**	**8**	**50%**
	No	8	50%
Based: Those who aware		8	100%
Source of awareness (C2)	Through Survey team	4	50%
	KMC	**3**	**38%**
	Friends/Relatives/Neighbors	**1**	**12%**

Table 2-2-76 Number of years since the structure is located

		TOTAL PAPs	
		Count	%
BASE: All respondents		16	100%
Number of years since the structure is located (B2)	Up to 5 years	3	19%
	05-10 years	4	25%
	16-20 years	2	12%
	21-25 years	1	6%
	46-50 years	1	6%
	Don't know/Can't Remember	2	12%

Simple average income of the respondent was Rs. 12,143, and majority of the respondent is assumed to be just above the minimum wage of Rs. 10,000. It is also assumed that there is no business association united by the location, since only 4 businesses belong to any association and 2 are the member of oil pump association based on the business field, rather than the location.

Table 2-2-77 Respondent Profile

		TOTAL PAPs	
		Count	%
BASE: All respondents		16	100%
Gender of affected person	Male	16	100%
Gender of HH Head	Male	16	100%
Marital Status of Respondent	Single	2	12%
	Married	14	88%
Respondent Religion	Muslim	16	100%
Respondent Monthly Income Open	Refused to answer	1	6%
	5,000 – 10,000	0	0%
	10,000 – 20,000	12	80%
	20,000 – 30,000	1	7%
	30,000 -	1	7%

Table 2-2-78 Are you associated with any organization or group

		TOTAL PAPs	
		Count	%
BASE: All respondents		16	100%
Respondent association with organization/group (G21)	None	11	69%
	Pump association	2	12%
	Business Association/Group	2	12%
	Sunni Tehreek Religious Group	1	6%

Impacts of the Project and adaptability

Out of the 16 respondent, 12 answered that the structure or business facilities are usable after the clearance of ROW. Four businesses answered that they need to close their business by the ROW clearance. The difficulty of business observation with the remaining structures was confirmed by field observation of the local consultant. The per cent of the loss of floor area is between 35 % and 70 %.

Those 3 respondents who answered the need of business closure were then asked what they will do as adaptation. Their choice was to move to other places. When asked about the prefered place to move, all three shop tenant answered that they will rent shop spaces in the same area and do same business, because threre are plenty of shops in the area available for rent. All tenants also answered that they prefer to move to shop space that has legal construction permission.

The owner of the structure in which 3 shops are located was also interviewed. The owner knows that his structure is built on KMC land, and at any time he will remove the structure when asked to do so.

Table 2-2-79 Type of Construction and Affected Ratio

ID No.	Type	Description	Affected Floor Size (m2)	Affected Ratio (%)	Present Use		Usability of remaining structure
					Business	Number of wage earners	
AL-01	Auto parts shop structure	Brick masonry walls with concrete slab roof	12.6	**69.4**	X	1	Not usable
AL-02	Biryani shop structure	Brick masonry walls with concrete slab roof	27.2	**70.8**	X	3	Not usable
AL-03	Gas filling shop structure	Brick masonry walls with concrete slab roof	10.2	**69.4**	X	1	Not usable
AL-04	Drum Warehouse	Brick masonry walls with concrete slab roof	185.6	30.3	X	4	Usable
AL-05	Empty industrial plot Wall	Brick masonry wall	32.2	1.0	X	-	Usable
AL-06	Petrol pump sign board	Fiber & Aluminum Sign Board	51.1	3.3	X	5	Usable
AL-07	Factory front lawn and fence	Garden & Fence	341.0	4.43	X	16	Usable
AL-08	Petrol pump sign board	Fiber & Aluminum Sign Board	1.75	0.03	X	7	Usable
AL-09	Petrol pump sign board	Fiber & Aluminum Sign Board	53.1	1.0	X	4	Usable
AL-10	Petrol shop structure	Brick masonry walls with Asbestos roof	5.61	32.2	X	(1 care taker)	Usable
AL-11	Petrol Pump	Fiber & Aluminum	1.47	0.01	X	10	Usable

ID No.	Type	Description	Affected Floor Size (m2)	Affected Ratio (%)	Present Use		Usability of remaining structure
					Business	Number of wage earners	
	Sign Board	Sign Board					
AR-01	Mosque structure	Brick masonry walls with Concrete roof	131.2	**34.6**	X	1	Not usable
AR-02	Petrol pump sign board & roof (partial)	Fiber & Aluminum Sign Board & Roof	215.0	14.2	X	6	Usable
AR-03	Petrol pump sign board	Fiber & Aluminum Sign Board	1.43	0.09	X	13	Usable
AR-04	Address sign board	Steel Sign Board	0.07	1.0	-	-	Usable

Table 2-2-80 What will you do during the construction of work?

		TOTAL PAPs		
		Count	%	ID
BASE: All respondents		16	100%	
What will you do during the construction work (D4)	Keep operation/business open	13	81%	
	Move to other place	3	19%	

Market Price Survey

The market price survey was conducted to assess the replacement cost for the affected structures listed in Table 2-2-79. Two local construction contractors have been consulted to collect the current market prices of material which is used in the Group A structures. The local contractors are located on target section in Landhi area. Market prices collected are based on unit rates.

Table 2-2-81 Market Price Survey

S.No	Description		Unit Rates
1	Brick Masonry walls, Asbestos/Tin Roof complete in all respect (with labor, material & color)	Katcha Pucca	Rs.800 per ft2
2	Brick Masonry walls, TR Girder Roof complete in all respect (with labor, material & color)	Pucca	Rs.1,000 per ft2
3	Brick Masonry walls with RCC Roof complete in all respect (with labor, material & color)	RCC	Rs.1,200 per ft2
4	Shop metal steel (MS) Shutter		Rs.230 per ft (10 ft per floor)
6	MS sign board		Rs.300 per ft2
7	Landscaping		Rs.20 per ft2
8	Iron Fence (depends on the width)		250-300 per ft

Request for the Project

Majority of the respondent wished to be informed about the clearance schedule date directly from KMC staff. One third wished to be informed 90 days before, and another one third wished 30 days before the final date of the clearance.

Table 2-2-82 How do you wish to know about the schedule of the clearance date for the project?

		TOTAL PAPs	
		Count	%
BASE: All respondents		16	100%
Source of awareness (C4)	Personally by KMC staff	12	75%
	Through written notice	6	38%
	Newspaper	1	6%

Table 2-2-83 How many days in advance do you wish to be informed so that you can prepare for any change necessary?

		TOTAL PAPs	
		Count	%
BASE: All respondents		16	100%
No. of days advance do you wish to be informed (C5)	30 days	5	31%
	60 days	1	6%
	75 days	1	6%
	90 days	6	38%
	No response	1	6%
	120 days	1	6%
	150 days	1	6%

When asked about overall opinion about the Project, all respondents expressed positive opinion about the Project.

Table 2-2-84 Opinion regarding impacts of N5 Project

		TOTAL PAPs		
		Count	%	ID
BASE: All respondents		16	100%	
Overall Opinion about impact of N5 Project	Positive Impact	16	81%	
	Negative Impact	0	0%	

2) Roadside businesses habitually using ROW

Table 2-2-85 is the list of roadside businesses habitually using ROW. Eight roadside businesses were counted to be potentially affected by the Project.

As shown in Table 2-2-90, all respondents answered that they will setback voluntarily and the business will stay open during and after the construction phase. Therefore, those 8 businesses were excluded from PAPs.

Table 2-2-85 List of interview targets : Roadside businesses habitually using ROW

ID	Description	Chainage	Note
BL-01	Bamboo Storage Shop	5+000	
BL-02	Construction Material Shop	5+400	
BL-03	Construction Material Shop	5+400	
BL-04	Construction Material Shop	5+400	
BL-05	Puncture Shop before FAW Motor	9+400	
BL-06	Hotel	10+000	
BR-02	Steel Works Shop	7+120	
BR-03	Steel Works Shop	7+150	
Total	8		

Note: BR-01 was changed to CR-48.
Source: Survey Team

General characters

More than half of the businesses are operating in the place since less than 5 years. The business structures out of ROW is mostly used only for business purpose, and only 1 answered that the structure has residents.

Table 2-2-86 Number of years since the structure is located

		Total PAPs	
		Count	%
BASE: All respondents		8	100%
Number of years since you are doing business here (B3)	Up to 5 years	5	62%
	05-10 years	1	12%

	Don't know/Can't Remember	2	25%

Table 2-2-87 Status of Structure out of ROW

		Total PAPs	
		Count	%
BASE: All respondents		8	100%
Status of Structure	Inhabitant	1	12%
	Un-inhabitant	7	88%

Use of ROW

Four businesses use ROW to store the reinforcing iron bars. Most of the shops to be affected handles either construction or vehicle related goods and services.

Table 2-2-88 Usage of ROW

		Total PAPs	
		Count	%
BASE: All respondents		8	100%
Usage of Row (B5)	Storage	6	75%
	Workshop	1	12%
	Customer Service Area (such as table chairs for restaurants)	1	12%

Table 2-2-89 Use and type of structure to be affected

		Total PAPs	
		Count	%
BASE: All respondents		8	100%
Use of Structure	Commercial	8	100%
Nature of Commercial Structure	Restaurant	1	12%
	Hardware Shop	1	12%
	Steel/Iron shop	4	50%
	Puncture Shop	1	12%
	Tile Beam/Bamboo Shop	1	12%

Impacts of the Project and adaptability

All interviewee answered that they will setback voluntarily and the business will stay open during and after the construction phase.

Table 2-2-90 Significance of Impact Survey

		Total PAPs	
		Count	%
BASE: All respondents		8	100%
Will you set back voluntary before the construction phase (D1)	Yes	8	100%
	No	0	0%
Is business closure required in the construction phase (E2)	Yes	0	0%
	No	8	100%
Do you need to change your location of residence/business during the construction phase (E4)	Yes	0	0%
	No	8	100%
Will business be closed due to widening in the operation phase (E3)	Yes	0	0%
	No	8	100%

Request for the Project

Most of the interviewee wish to know about the schedule of the clearance date about 90 days before by either face-to-face or via telephone conversation with KMC staff.

Table 2-2-91 How do you wish to know about the schedule of the clearance date for the project?

	Total PAPs	
	Count	%
BASE: All respondents	8	100%

Source of awareness (A4)	Personally by KMC staff	4	50%
	Through phone/mobile call	2	25%
	Newspaper	1	12%
	Through written notice	1	12%

Table 2-2-92 How many days in advance do you wish to be informed so that you can prepare for any change necessary?

		Total PAPs	
		Count	%
BASE: All respondents		8	100%
How many days in advance do you wish to be informed so that you can prepare for any change necessary	30 Days	1	12%
	60 Days	1	12%
	90 Days	6	75%

3) Hawkers and temporal structures on ROW

Table 2-2-93 is the list of Hawkers and temporal structures on ROW.

Although 78 businesses were counted to be potentially affected, CL-15, CR-09 and 31 were not available for the interview. Therefore, the number of valid respondent is 75 in the following tables. As shown in Table 2-2-101 and Table 2-2-102, all except 1 respondents each answered that they will move to other location and no business closure during the Construction Phase is necessary. In total, just 2 respondents among 75 answered either they will close the business and/or have negative opinion on the Project.

When consulted with the Basic Design drawings as shown in Figure 2-2-68, the boundary of the planned ROW boundary has spaces between existing structures outside of ROW. In this case, the most possible locations of relocation of the hawkers and temporal structures in the Planning Phase are the nearest place available outside of ROW. When such relocation occurs, access to the customers and surrounding economic condition are not largely different from the pre-project situation.

Therefore, those hawkers and temporal structures on ROW as a group were considered not to experience losses and disadvantages. However, KMC shall monitor the clearance activities on site to be accountable for the Project implementation, and to avoid and/or minimise any unexpected negative impacts on these hawkers and temporal structures.

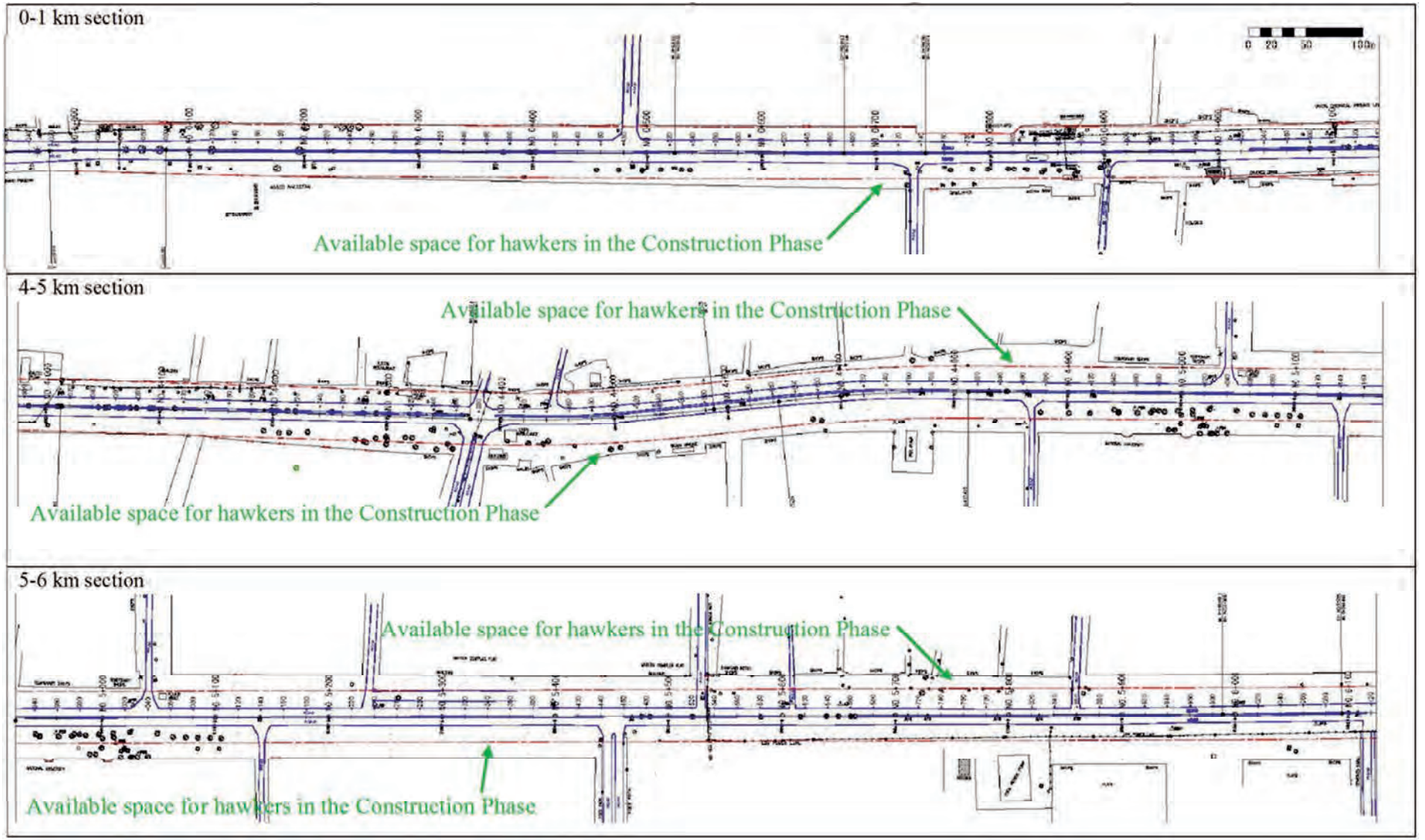
Table 2-2-93 List of interview targets : Hawkers and temporal structures

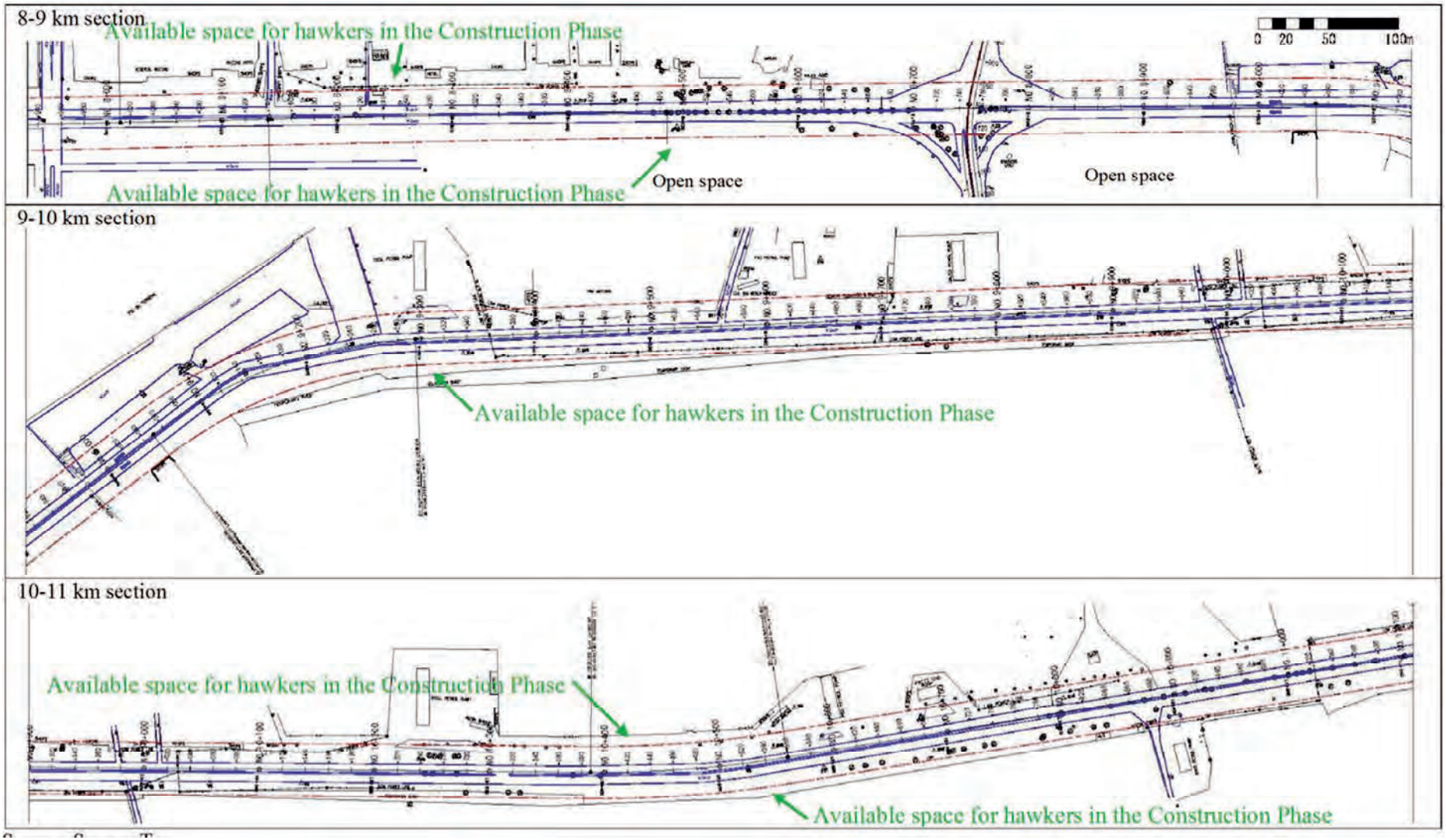
ID	Description	Chainage	Note
CL-01	Puncture Shop	0+030	
CL-02	Fruit Push Cart	0+440	
CL-03	Fruit Push Cart	0+440	
CL-04	Fruit Push Cart	0+440	
CL-05	Fruit Push Cart	0+440	
CL-06	Fruit Push Cart	0+440	
CL-07	Fruit Push Cart	0+440	
CL-08	Fruit Push Cart	0+440	
CL-09	Fruit Push Cart	0+440	
CL-10	Fruit Push Cart	0+440	
CL-11	Fruit Push Cart	0+440	
CL-12	Fruit Push Cart	0+440	
CL-13	Fruit Push Cart	0+440	
CL-14	Fruit Push Cart	0+440	
CL-15	Swing for Children	3+000	Closed for business
CL-16	Nursery	7+000	

ID	Description	Chainage	Note
CL-17	Shop	8+140	
CL-18	Shop	8+140	
CL-19	Pan Shop	9+800-9+850	
CL-20	Pan Shop	9+900-9+950	
CL-21	Pan Shop	9+900-9+950	
CL-22	Fruits Cart	9+900-9+950	
CL-23	Fruits Cart	9+900-9+950	
CL-24	Cart/Panshop	10+150	
CL-25	Cart/Panshop	10+150	
CL-26	Cart/Panshop	10+150	
CL-27	Cart/Panshop	10+150	
CL-28	Cart/Panshop	10+150	
CL-29	Cart/Panshop	10+150	
CL-30	Cart/Panshop	10+150	
CR-01	Veg Carts	0+000 - 0+200	
CR-02	Veg Carts	0+000 - 0+200	
CR-03	Veg Carts	0+000 - 0+200	
CR-04	Veg Carts	0+000 - 0+200	
CR-05	Veg Carts	0+000 - 0+200	
CR-06	Veg Carts	0+000 - 0+200	
CR-07	Veg Carts	0+000 - 0+200	
CR-08	Nursery	0+250-0+350	
CR-09	Nursery Under Construction	0+250-0+350	Closed for business
CR-10	Nursery	0+400	
CR-11	Construction material Vendor	0+600	
CR-12	Nursery	0+600	
CR-13	Cart	0+600	
CR-14	Cart	0+600	
CR-15	Nursery	0+650	
CR-16	Cart	0+650	
CR-17	Cart	0+650	
CR-18	Cart	0+950	
CR-19	Cart	0+950	
CR-20	Cart	0+950	
CR-21	Puncture Shop	1+000	
CR-22	Juice Cart	1+000	
CR-23	Shop	1+100	
CR-24	Shop	1+150 - 1+250	
CR-25	Cart	2+400	
CR-26	Nursery	3+750	
CR-27	Juice Cart	4+350	
CR-28	Pan Shop	4+400	
CR-29	Pan Shop	4+450	
CR-30	Pan Shop	4+450	
CR-31	Pan Shop	5+500	Closed for business
CR-32	Samosa shop	5+800	
CR-33	workshop	5+800	
CR-34	Nursery	7+500	
CR-35	Fruit Cart	8+730	
CR-36	Push Cart	8+750	
CR-37	Tire Shop	9+550	
CR-38	Boxes of oil	9+550	
CR-39	Nursery	9+650	
CR-40	Nursery	9+750	
CR-41	Tire Shop	9+900	
CR-42	Pan Shop	10+220	
CR-43	Oil and Tire Shop	10+230	
CR-44	Pan Shop	10+350	
CR-45	Tire Shop	10+580	
CR-46	Fruit Cart	10+860	
CR-47	Pan Shop	10+830	
CR-48	Chippa Ambulance Parking	4+420	

ID	Description	Chainage	Note
Total	78		

Source: Survey Team


0-1 km section
Available space for hawkers in the Construction Phase
4-5 km section
Available space for hawkers in the Construction Phase
Available space for hawkers in the Construction Phase
5-6 km section
Available space for hawkers in the Construction Phase
Available space for hawkers in the Construction Phase



Source: Survey Team

Figure 2-2-68 Main locations of hawkers and temporal structures and the planned ROW boundary

General characters

About half of the interviewee already knew the boundary of ROW through KMC or their friends and neighbours.

Table 2-2-94 Do you aware about the location of the boundary of road land (ROW)

		TOTAL	
		Count	%
BASE: All respondents		75	100%
Do you aware about the Location of the boundary of road land	Yes	35	47%
	No	40	53%
Based: Those who aware		35	100%
Source of awareness (a3)	KMC	17	49%
	Friends/Neighbors	15	43%
	When Soil Testing is taking in the area	2	6%
	Survey Team (EMC Official)	1	3%

The property on ROW are either with or without tire, and either owned by the operator or rented.

Table 2-2-95 Type of Structure/Selling tools

		TOTAL	
		Count	%
BASE: All respondents		75	100%
Type of Structure/Selling Tools (B1)	Carried by the Person	1	1%
	Push Cart mostly settled but with tire	35	47%
	Movable but without tire	37	49%
	Other	2	3%

Majority of the interviewee makes sale between Rs. 10,000 to Rs. 30,000. 80 % of the respondents are earning more than the minimum wage of Rs. 10,000. In the social survey conducted in 2014, simple average income in the Project Area was estimated as Rs. 14,246 per month. At least 54 % of the respondents (over Rs. 20,001) exceeds the average. The income is the sole source of family income for 74 % of the interviewee.

Table 2-2-96 About how much sale per month do you take from this business

		TOTAL	
		Count	%
BASE: All respondents		75	100%
MONTH SALE (C2)	Refused	9	12%
	04,000 - 10,000	7	9%
	10,001 - 20,000	20	27%
	20,001 - 30,000	27	36%
	30,001 - 50,000	7	9%
	50,000+	5	7%

Table 2-2-97 The income from this business is how much % of your total family income (C3)

		TOTAL	
		Count	%
BASE: All respondents		75	100%
The income from this business is how much % of your family income total (C3)	Refused to answer	5	7%
	15-25 %	4	5%
	26-50 %	9	11%
	51-75	3	4%
	100%	54	72%

Use of ROW

Majority of the businesses sell food items. Fruit vendor was the largest group among the 73

counted. Since the Survey was conducted in early July, which is the height of mango season, the ratio of fruit vender may be smaller in other season.

Table 2-2-98 Type of Business done at N5

		TOTAL	
		Count	%
BASE: All respondents		75	100%
Type of business (b2)	Fruits	22	29%
	Pan/Tobacco etc.	13	17%
	Plant Nursery	9	12%
	Vegetable	7	9%
	Mechanic : Car/ Motorcycle etc.	5	7%
	Drinks/ Juice i.e. Orange/ Lemon/ Water melon/ Sugarcane	4	5%
	Puncture Repair	5	7%
	Glasses/Hat/Motorcycle Helmet etc.	3	4%
	Packed snacks	2	3%
	Fast Food	2	3%
	Ambulance dispatcher	1	1%
	Salad	1	1%
	Ice-cream	1	1%
	Ice Seller	1	1%
	Meat Dish	1	1%
	Electrician	1	1%
	Carpenter	1	1%
	Accessories Comb/ Pen/ Notepad/ Mobile Cover/ Knife/ Scissor/ Towel etc.	1	1%
	Mobile shop	1	1%
	Easyload shop	1	1%
	Clothes	1	1%
	Oil Shop	1	1%
	Construction material	1	1%

It was found that the majority of the hawkers on the Project Area do not change their location of business very often. Again, the ratio of moving hawkers may be larger in other season, since the Survey was conducted in early July, which is the height of mango season, and most of the fruit venders tend not to move.

Table 2-2-99 Do you often change location of the Business

		TOTAL	
		Count	%
BASE: All respondents		73	100%
Do you often change location of the business	Yes	10	13%
	No	65	87%
Based: Those change the location		10	100%
How often you change the location	Hourly	4	40%
	Daily	3	30%
	Alternate Days	1	10%
	Weekly	1	10%
	Seasonal	1	10%
Moving Range/Moving Place (B11b)	Al Syed Centre	2	20%
	Road side (near place)	4	40%
	Abbot to Green city	1	10%
	Gulshan-e-Hadeed to Bin Qasim more	1	10%
	Gul Ahmed Textile mill to Manzil Pump	1	10%
	Wireless gate to Razzaqabad	1	10%
Moving Range/Length of movement (B11b)	2 KM	3	30%
	1 KM	3	30%
	500 meter	1	10%
	200 meters	1	10%

	15 Meter	1	10%
	100 meters	1	10%

With multiple answer selection, it was found that commuters, local residents, and workers along N5 are the main customers of the interviewees. Drivers of the tankers, trucks and buses are chosen by about 1/3 of the interviewee as one of the main customer groups.

Table 2-2-100 Main customers (Multiple answer)

		TOTAL	
		Count	%
BASE: All respondents		75	100%
Type of business (b3)	Commuters	68	91%
	Residents	60	80%
	Workers	53	71%
	Drivers	22	29%
	Students	8	11%
	Companies	2	3%

Impacts of the Project and adaptability

Only 1 interviewee answered that he needs to close his business during the Construction Phase. The interviewee operates a plant nursery using the unused space of ROW.

Another respondent answered he will change his main business at the same location when the construction is started.

Other respondents answered that they will move to other areas and keep the same business. Eighteen per cent of the respondent answered that they will decide the new location when the construction work is started. There is high possibility that they will stay on N5 since many parts of the Project Area has additional open space between ROW and existing structure outside of ROW. Such behaviour of the respondents is predicted by KMC and the local consultant. The additional open space between ROW and existing structure outside of ROW will also be used as the access road from N5 to the roadside businesses, which means that the respondents have access to their regular customers in the location.

Table 2-2-101 Necessity of business closure in the construction phase (D1)

		TOTAL		ID
		Count	%	
BASE: All respondents		75	100%	
Necessity of business closure in the construction phase	Yes	1	1%	CR-40 Plant nursery
	No	74	99%	

Table 2-2-102 What will you do when the road construction work is started (C1)

		TOTAL		
		Count	%	ID
BASE: All respondents		75	100%	
What will you do when the road construction work is started	Move to other area	74	99%	
	Change my main business	1	1%	CR-33 Workshop
Based: Those move to other place		74	100%	
Name of area	Port Qasim	3	4%	
	Near place (Behind side)	21	28%	
	Quaidabad bridge	12	16%	
	Gulshan-e-Hadeed	9	12%	
	Bhains colony	4	5%	
	Near to Residence	3	4%	
	Pakistan Steel	2	3%	

		TOTAL		
		Count	%	ID
	Bukhari Masjid	1	1%	
	Landhi	1	1%	
	Warehouse	1	1%	
	Nishterabad	1	1%	
	Near Younus Textile mill	2	3%	
	Manzil Pump	1	1%	
	Will decide when work start	13	18%	

Request for the Project

Almost all respondents wish to be informed about the Project directly from KMC staff 30 to 120 days before the clearance to prepare for the necessary change.

Table 2-2-103 How do you wish to know about the schedule of the clearance date for the project?

		TOTAL	
		Count	%
BASE: All respondents		75	100%
Source of awareness (A4)	Personally by KMC Staff	73	98%
	TV	1	1%
	Through Written Notice	1	1%

Table 2-2-104 How many days in advance do you wish to be informed so that you can prepare for any change necessary?

		TOTAL	
		Count	%
BASE: All respondents		75	100%
No. of days advance do you wish to be informed (A5)	07 days	2	3%
	10 days	3	4%
	30 days	15	20%
	60 days	14	19%
	90 days	13	17%
	120 days	14	19%
	150 days	8	11%
	180 days	4	5%
	240 days	1	1%
	365 days	1	1%

About 1/3 of the respondents expect that the Project will reduce traffic accidents by providing service road and foot path. Two respondents out of 73, however, answered that their opinion about the Project is negative.

Table 2-2-105 Overall opinion for the project implementation (C6)

		TOTAL		
		Count	%	ID
BASE: All respondents		75	100%	
OVERALL OPINION FOR THE PROJECT IMPLEMENTATION	Positive	73	97%	
	Negative	2	3%	CR-28 Pan shop CR-40 Plant nursery

Table 2-2-106 Opinion about project implementation

		TOTAL	
		Count	%
BASE: All respondents		75	100%
Opinion about project implementation (c6)	Reduce Accident	23	32%
	Reduce traffic jam	17	23%
	Better for all	16	22%
	Reduce traffic problems/ Resolve traffic problems	10	14%

	Improve condition of the road	5	7%
	Traffic problem solve	3	4%
	No response	3	4%
	Increase business / Sale	2	3%
	Traffic can easily flow	2	3%
	Economic growth	1	1%
	Work will be easy	1	1%

Detailed information of the respondents with negative opinion or change of business, business closure

Among the 3 respondent who answered differently from others, the workshop owner who opt for business change without moving expressed positive opinion on the Project. It is assumed that he is expecting new business opportunity with the implementation of the Project.

Table 2-2-107 Summary of respondents answers who opt for business closure or negative opinion

ID	Business Location	Table 16 Necessity of business closure	Table 17 What to do in the Construction Phase	Table 21 Opinion on the Project
CR-28	Pan shop 4+400R	No	Move to other area for same business	Negative
CR-33	Workshop 5+800R	No	Change business	Positive
CR-40	Plant nursery 9+720R	Yes	Move to other area for same business	Negative

CR-28 Pan shop

CR-33 Workshop

CR-40 Plant nursery

Respondents answers who opt for business closure or negative opinion

The pan shop owner (CR-28) answered that he will move to other place to continue his business, but at the same time expressed negative opinion on the Project.

The plant nursery owner (CR-40) answered that he need to close his business, probably because he use ROW to grow and show his plants, but move to other area to continue same business.

(6) Summary of the impact

1) Land acquisition

No land acquisition is necessary for the Project.

2) Temporal lease of the camp site / stock yard

Temporal occupation of land for the camp site (site office) and stock yard (material and mechanical storage, repair shop for vehicles and machines) will be necessary during the Construction Phase. The necessary size is about 200 m x 200 m.

KMC is planning to select a publicly owned land lot that will not require any resettlement. No

temporal lease of land is necessary for the Project.

3) Resettlement

There is no residential structure or residents, including renters and sharers, on ROW and no resettlement is necessary for the Project.

4) Businesses structures (Permanent/Temporal)

Three businesses were considered to be project-affected after 1) receiving answers in the survey that they need to close their business by the ROW clearance, and 2) confirmation of the difficulty of business observation with the remaining structures by field observation by the local consultant. The per cent of the loss of floor area is between 69 % and 71 %.

The owner of the structure in which 3 shops are located was also interviewed. The owner knows that his structure is built on KMC land, and at any time he will remove the structure when asked to do so without any payment as compensation.

Table 2-2-108 Businesses structures (Permanent/Temporal)

Line	Required for structure displacement by clearance of ROW	Affected structures	Affected workers	ID	PAPs
1	* Roadside businesses structure on ROW, and * High possibility of business closure at the same place by clearance of ROW	3	9	AL-01 AL-02 AL-03	Counted
2	Owner of business	(2)	-		
3	Manager of business (employed by business owner)	(1)	-		

Mosque is included in Table 2-2-109.
Source: Survey Team

5) Public and community structures (Permanent/Temporal)

There are total 8 structures on ROW that has public and community functions but are required to be removed before the construction works. Those are project affected structures and their function for public safety and health are necessary to remain in the same area during and after the Construction Phase.

Table 2-2-109 Public and community structures (Permanent/Temporal)

	Line	Required for structure displacement by clearance of ROW	Affected structures	ID
Permanent structure	4	* Religious structure (mosque) on ROW, and * Need for closure by clearance of ROW	1	AR-01
	5	* Public structure (Police, Ranger, Traffic Police) on ROW, and * Need for closure by clearance of ROW	5	AL-12 AL-13 AL-14 AL-15 AR-06
	6	* Signboard of a public hospital on ROW, and * No impacts on the hospital closure by the Project	1	AR-07
	7	Total	7	
Temporal structure	8	* Temporal structure of ambulance dispatcher on ROW, and * Set-back space in adjacent vacant area is available * Shall remain open after the set-back before the construction works	1	CR-48

Source: Survey Team

6) Other business operations observed on ROW

Roadside businesses habitually using ROW and hawkers and temporal structures on ROW were classified not to be affected.

(7) Programs and measures to mitigate the impact of the Project

Table 2-2-110 explains the programs and measures of KMC to mitigate the impact of the Project.

KMC does not have specific gazettes or any other legal basis to overrule the instruction of the Anti-Encroachment Act regarding the obligation of owners of private structures and assets on public land, and to allow KMC to provide public assistances, such as compensation or livelihood assistance, to the owners who voluntary remove their assets from public land. Due to such backgrounds, the contents of the programs and measures are not to be disclosed by KMC open to the public prior to the detailed design stage of the Project. Responding to the discussion with the Survey Team that the Survey and the Project are required to comply with the JICA Guidelines for Environmental and Social Considerations, KMC informed the contents to the PAPs during the door-to-door surveys and consultations on the individual contact basis.

As shown in Legal Framework Related to the Land Acquisition, Resettlement and other Social Impacts of the present report, KMC is governed by Anti-Encroachment Act that KMC may require the person responsible for encroachment to remove the structures. On the other hand, the JICA Guidelines requires that people who must be resettled involuntarily and people whose means of livelihood will be hindered or lost must be sufficiently compensated and supported by project proponents in a timely manner. Programs and measures have been developed in consultation among KMC and the Survey Team, based on both the relevant rules of the laws in Pakistan and the JICA Guidelines. KMC accepted advice from the Survey Team to comply with the JICA Guidelines as far as they comply with the Pakistani laws.

Table 2-2-110 Programs and measures to mitigate the impact of the Project

Asset	Severity of impact	Affected PAPs/Structures (Number)	Programs and measures	Implementation policy
* Owning or using permanent structures on ROW (public land)	* All or major part of the structure need to be cleared, and * Activities or business on the	Public facilities (Police station, Traffic police station, Ranger station) (5)	* In the Planning Phase, temporal set-up for the Construction Phase shall be negotiated between KMC and affected institutions. Temporal facilities shall be constructed in the vicinity of existing structure before clearance of ROW * Site for permanent facilities shall be provided on ROW * Replacing structures shall be constructed by KMC	Programs and measures are to be implemented under KMC's customary operation, while respecting the requirements of the JICA Guidelines.
		Community facility (Mosque) (1)	* Site for permanent facilities shall be provided on the lot owned by KMC and designated for religious facilities before the clearance of ROW * If necessary, replacing structures may be constructed by KMC	
		Shops (3)	* For the structure owners, no program shall be provided	Programs and measures are to

Asset	Severity of impact	Affected PAPs/Structures (Number)	Programs and measures	Implementation policy
	site need to be relocated		* The due date for the clearance shall be notified well before the final date * Voluntary clearance of the ROW shall be required	be implemented under KMC's Anti-Encroachment Act, while respecting the requirements of the JICA Guidelines.
			* For the business owners, Anti-Encroachment Cell of KMC shall provide transportation assistance such as a truck, a driver, fuel, moving staff, and take the business assets and business staff to the location according to the PAP request. * The due date for the clearance shall be notified well before the final date * In the Construction Phase, KMC shall monitor the change of sales. When found necessary, KMC shall consult with PAPs for assistance of sales increase.	Programs and measures are not regulated under the Pakistani laws, but special attentions are to be paid to the eligible PAPs under the JICA GL.
	* Signboard of public hospital need to be cleared * Function of the hospital shall not be affected	Signboard of public hospital (1)	* Temporal set-up shall be negotiated during the Construction Phase between KMC and affected institutions. * Site for permanent facilities shall be provided on ROW, if requested by the hospital.	Programs and measures are to be implemented under KMC's customary operation, while respecting the requirements of the JICA Guidelines.
* Habitually placing movable assets on ROW for business purpose	* Temporal structure need to be cleared. * Business will keep open after set back to the adjacent open area	Ambulance dispatcher (1)	* Assets shall be moved to adjacent vacant area, outside of ROW, by the owner * The due date for the clearance shall be notified well before the final date * For the purpose of public good, if requested by the PAP, KMC may assist the coordination between the moving business and the surrounding businesses	Programs and measures are to be implemented under KMC's Anti-Encroachment Act, while respecting the requirements of the JICA Guidelines.

Source: Survey Team

(8) Public consultation

The schedule of the consultations with residents and stakeholders are shown in Table 2-2-111. The consultations are planned according to the SEPA requirement. Also, the interviewers of the PAPs survey and socio-economic survey are equipped with standardized project information so that the interviewees can ask questions in person regarding their concerns and all the interviewees are to be provided same information.

Table 2-2-111 Schedule of the EIA /RAP Survey and Consultations with Residents and Stakeholders

Year	2015							
Month	5	6	7	8	9	10	11	12
1 Scoping meeting (SEPA requirement) Consultations with stakeholders and representatives of the residents	●							

Year		2015							
Month		5	6	7	8	9	10	11	12
2	Parcelary survey (Land ownership survey) Consultations with residents and stakeholders	●							
3	Preparation of potential PAPs list Consultations with residents and stakeholders		●						
4	Household/Living standard survey (for residents on ROW) Business income and adaptability survey (for businesses on ROW) Adaptability survey (for roadside businesses with habitual use of ROW) Consultations with residents and stakeholders			●	●				
5	Replacement cost / Market price survey Livelihood rehabilitation needs survey (if found necessary) Consultations with residents and stakeholders				●				
6	Discussion and negotiation regarding eligibilities, measures of compensation and assistances, grievance redress system, and monitoring. Consultations with residents and stakeholders					●			
8	Public hearing meeting (SEPA requirement) Consultations with residents and stakeholders							●	
9	Preparation of the ARAP	●	●	●	●	●	●		
10	Review and approval of the RAP (KMC, SEPA)						●	●	●

Stakeholders includes non-residents such as business owners, workers, police and ranger, infrastructure providers, and public offices (i.e. Anti-encroachment division of KMC).
Source: Survey Team

1) Scoping Meeting

The results of the scoping meeting held in May 27, 2015 is summarized in Table 2-2-112. During the scoping meeting, the objectives and general schedule of the Project were explained to the participants using explanation in Urdu and slides in English. The venue was prepared for both male and female attendants, and female attendants were escorted to a reserved area by the staff for their comfortableness.

The last half of the meeting was used for question and answer session. One question was raised regarding the scope of the encroachment and resettlement issue that may be involved during the Project. KMC staff answered to the question as summarised in the following table.

Table 2-2-112 Summary of the Scoping Meeting, May 2015

Objectives	● To disclose: 1. The Project description 2. Planned EIA survey methodology 3. Preliminary assessment of the potential environmental impacts 4. Expected EIA approval procedure ● To collect opinions and concerns of the participants on the Project ● To collect advices and suggestions for the Survey ● To obtain consensus (agreement) on the implementation of the Survey	
Planning of the meeting	● All three parties, KMC, the Survey Team, and the local consultant, sat together to form the preliminary invitation list. ● The local consultant visited the invitee and handed the invitation letter to encourage their attendance in the meeting. ● When the invited person feels appropriate, he/she were allowed bring other stakeholders to the meeting. ● The meeting was chaired by the local consultant hired by the Engineering Division, KMC. ● KMC explained the Project, and answered the questions from the participants.	
Attendants	● Representatives of the local residents (All 3 UCs along the target section was represented)	Chief, UC 6 Gulshan-e-Hadeed Chief, UC 4 Quaidabad Chief, UC 5 Landhi
	● Expert on resettlement issues in Karachi	Department of Sociology, University of Karachi Institute of Business Management
	● Road users, owners of structures on ROW	Port Qasim Authority District Jail Malir

		Landhi Association of Trade and Industry Indus Motors (car maker on Port Qasim Industrial Area)
	● Utility companies	Karachi Water and Sewerage Board National Telecommunication Corporation Pakistan Telecommunication Company Limited
	● Environmental institutions	Sindh EPA Sindh Wildlife Department Sindh Forest Department Sindh Dept. of Antiquities IUCN
	● Manager of public land, Responsible institution of ROW clearance	Anti-Encroachment Cell, KMC
	● Transport planner	Transport and Communication Department, KMC
Discussion on social impact and resettlement	● QUESTION ➢ What will be the encroachment and resettlement issue that may be involved during the Project ? ● ANSWER ➢ Encroachment is not a huge issue for the project as such and that no concrete structure will be removed except for mosques that are coming within ROW. ➢ For mosques KMC would negotiate, and if required, it will be relocated. ➢ People have mainly extended their businesses into the government land. ➢ Such extension will be cleared during the project. ➢ For this reason, KMC has invited officials from Anti-Encroachment Cell to the meeting in order to bring the Cell for future assistance.	

Source: Survey Team

2) Information dissemination and opinion collecting during the Survey

During the Potential PAPs Survey conducted in July/August 2015, the interviewer, staff of local consultant, carried the typical cross section of the planned N5, explained about the Project, and took notes of the opinions of the interviewees.

The interviewer also informed the interviewees that the purpose of the Survey is to record the condition of the N5 ROW and create the list of ROW users as of July 1, 2015, which is the cut off date of the Survey.

The contents of the information for dissemination was prepared by the Survey Team and the local consultant, then was reviewed and approved by KMC.

The interviewers of the PAPs survey and socio-economic survey were equipped with standardized project information so that the interviewees can ask questions in person regarding their concerns and all the interviewees were provided same information.

3) Follow-up target group meeting

For those potential PAPs who were not available during the Survey, who refused to be interviewed, and who expressed negative opinion about the Project, follow-up target group meetings were conducted on October 12, 2015 to listen to their opinions and provide information they wish to know directly from KMC staff.

Local consultant joined in the meeting as the impartial third party.

The results of the interviews are included in '(5) Results of interview survey.' Figure 2-2-69 shows the record photo of the meetings.

	
AL-01, AL-02, Al-03 (At 0+000) Consultation with Owner of 3 Shops	AL-01 Consultation with Shop Tenant
	
AL-02 Consultation with Shop Tenant	AL-03 Consultation with Shop Tenant
	
Al-04 Consultation with Drum Godown Owner	AR-02 Consultation with Gul Ahmed Representative
	
CR-48 (BR-01) Consultation with Chhipa Representative	CL-01 Consultation with Owner of Puncture Shop

Source : Survey Team

Figure 2-2-69 Record photo of the follow-up target group meeting

4) Public hearing

The Public Hearing chaired by SEPA was held on November 12, 2015. The general public, concerned citizens, civil society organizations and all other stakeholders were requested to attend this

public hearing. All others who are interested to offer their comments in writing may communicate the same to Director General, SEPA or through email at epasindh@gmail.com before the Public Hearing.

Since there is no official procedure in Pakistan for information dissemination about resettlement and relocation action plan, this Public Hearing with wide and free attendance was used for information dissemination about resettlement and relocation action plan, and for questions and discussions on those matters.

According to the requirement of SEPA, KMC published the Public Notice in well circulated 2 national newspapers (one English (Dawn) and one Urdu (Jang)) on October 29 for wide coverage of information and participation of stakeholders and general public in the public hearing. The public notice must appear at least 15 days before the hearing date in order to invite the comments of stake holders and general public. KMC also disseminated the information of the meeting to the chiefs of the UCs by direct telephone calls.

During the review period, the EIA report was made available to the general public, stakeholders, and experts for review the EIA report in the office of SEPA. The report was also made available on website of (http://emc.com.pk/wp-content/uploads/PDFs/Final%20Report%20-%20N5.pdf) as shown below.

The coordination, attendance and discussions in the Public Hearing is explained in ‘2-2-4-1 (9) Stakeholder Meeting (Scoping meeting and Public Hearing)’, Table 2-2-63 Contents of the Public Hearing, and Table 2-2-64. Major Queries /Concerns from Participants and Answers/Responses in the Public Hearing. The venue was prepared for both male and female attendants, and female attendants were escorted to a reserved area by the staff for their comfortableness.

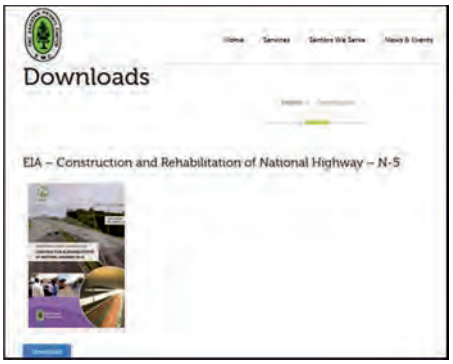


Figure 2-2-69 EIA Report publication on local web site

5) Public announcement in the later phase of the Survey

In the consultations with residents and stakeholders in the later stage of the Survey, the Survey Team is to assist KMC so that the Project shall follow the guiding principles of the JICA GL and the advices and suggestions given by the JICA Advisory Committee of Environmental and Social Considerations.

KMC Engineering Division will assign a field liaison officer to be positioned at the Site Office of the Contractor both to monitor the construction works and to be the window for the local

residents, businesses and road users to submit or express their grievances and opinions. Such assignment of site staff is the regular operation of KMC and the location and contact number of the field liaison office shall be published on the sign boards at the construction works, mosques, and the posts of police, traffic police and ranger in the Project Area.

(9) ARAP implementation schedule

The clearance of the structures and other private properties on ROW by their owners shall be finished before the bidding of the construction works, which is currently expected in April, 2016. The detailed design is currently expected to finish in December 2016.

Therefore, it is expected that Engineering Division and Anti-Encroachment Unit KMC shall publicly notify in December 2015 the date to finish the clearance as March 31, 2015, and shall start negotiation with PAPs. KMC shall encourage the voluntary clearance of ROW in January through March. Anti-Encroachment Unit shall provide transportation assistances when the eligible PAPs become ready to move. Whatever left on ROW by the asset owner shall be cleared by Anti-Encroachment Unit KMC in late March, if necessary.

Regular procedure of the road works of KMC is summarizes as follows.

1. KMC selects the Contractor.
2. The Contractor brings in the construction equipment and be ready to start the works.
3. One week before the commencement of the works, KMC publishes the work plan and detour route by notice board on site and by mass media. For the Project, KMC is planning to use the Mehran Road as the detour route.
4. The Contractor conducts final Survey, marks the work area boundary, and determines the structures that need to be cleared, if there is any.
5. KMC legally notify the owners of the structure about the necessary clearance.

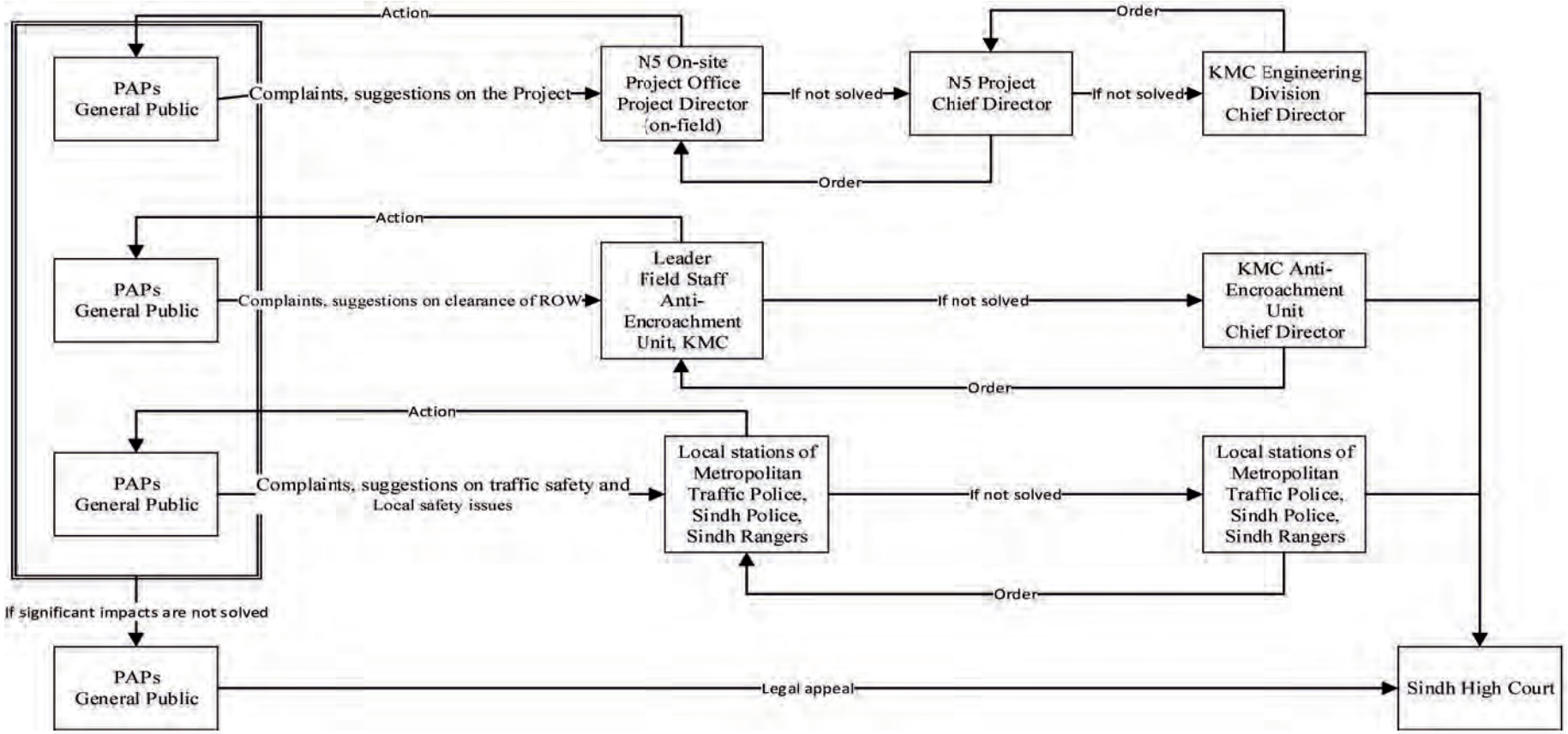
(10) Grievance Redress Mechanism

The grievance redress mechanism of the Project is shown in Figure 2-2-71.

KMC Engineering Division will assign a field liaison officer to be positioned at the Site Office of the Contractor both to monitor the construction works and to be the window for the local residents, businesses and road users to submit or express their grievances and opinions. Such assignment of site staff is the regular operation in NHA project and KMC can easily copy. The location and contact number of the field liaison office shall be published on the sign boards at the construction works, mosques, and the posts of police, traffic police and ranger in the Project Area.

Any grievances and opinions raised will be recorded and reported to the KMC Engineering Division together with the progress report of the works.

The grievances and opinions must be forwarded to the responsible section of the cause, the decision of remedy, if necessary, must be realized within scheduled timing.



Source: Survey Team

Figure 2-2-71 Grievance Redress Mechanism

(11) Monitoring Measures and Monitoring Formats

All the removal of structures and assets from ROW shall be finished prior to the announcement of P/Q (Prequalification). of the tender in the Detailed Design Phase.

Table 2-2-113 Survey and Monitoring Issues in Coming Phases of the Project

Timing	Survey and Monitoring Issues	Responsible Body
Detailed Design Phase	* Monitoring of design change * Additional survey, if necessary, on the PAPs based on the design change * Update of the understanding of ROW condition for necessary arrangement and negotiation between KMC and related stakeholders * Monitoring of the arrangement between KMC and underground utility managers so that the construction shall be started without delay	KMC with assistance of the Consultant
Between Detailed Design Phase and Construction Phase	* Monitoring of assistance measures provided by KMC * Monitoring of voluntary clearance by property owners * Monitoring of grievances and redress of them, if any * Monitoring of the progress of clearance	KMC with assistance of the Consultant
Construction Phase	* Monitoring of the allocated lot for the Camp Site to confirm that no resettlement or land acquisition is necessary * Monitoring of the Project Site to confirm that no additional negative impacts on the structures and residents out of ROW are caused by the Project * Monitoring of the livelihood recovery condition of the PAPs	KMC with assistance of the Contractor and the Consultant

Source: Survey Team

Table 2-2-114 Monitoring Format

Detailed Design Phase	**Entry Date**	**Findings**	**Next Action Necessary**
1. **Monitoring of design change**			
2. **Additional survey, if necessary, on the PAPs** based on the design change			
3. **Update of the understanding of ROW condition** for necessary arrangement and negotiation between KMC and related stakeholders			
4. **Monitoring of the arrangement between KMC and underground utility managers** so that the construction shall be started without delay			

Use one line for one entry. Add lines for each events during the reporting period.

Between Detailed Design Phase and Construction Phase	**Entry Date**	**Findings / Action Taken / No. of Clerared Structures / No. of Remaining Structures**	**Next Action Necessary**

1. **Monitoring of assistance measures** provided by KMC			
2. **Monitoring of voluntary clearance** by property owners			
3. **Monitoring of the progress of clearance**			
4. **Monitoring of grievances and redress of them**, if any			

Use one line for one entry. Add lines for each events during the reporting period.

Construction Phase	Entry Date	Findings / Action Taken	Next Action Necessary
1. **Monitoring of the allocated lot for the Camp Site** to confirm that no resettlement or land acquisition is necessary			
2. Monitoring of the Project Site to confirm that **no additional negative impacts on the structures and residents out of ROW are caused by the Project**			
3. **Monitoring of the livelihood recovery condition of the PAPs**			

Use one line for one entry. Add lines for each events during the reporting period.

(12) Budget allocation for implementation of ARAP

Following Table2-2-115 lists the actions, actors and budget sources for implementation of ARAP. As explained in the table, all the necessary budget for the implementation shall be allocated from the regular personnel and non-personnel budget of KMC and SEPA.

Table 2-2-115 Actions, Actors and Budget Source for Implementation of ARAP

	Actions	Actors	Budget Sources
1	Preparation of ARAP	Engineering Division, KMC	Regular personnel expenses
2	Submission of ARAP to SEPA	Engineering Division, KMC	Regular personnel expenses
3	Review of ARAP	Director General (Technical), SEPA (Environmental Protection Agency Sindh, Dept. of Environmental and Alternate Energy)	Regular personnel expenses, SEPA
4	Announcement and negotiation for voluntary clearance	Engineering Division, KMC Anti-Encroachment Unit, KMC	Regular personnel expenses
5	Provision of assistance for eligible PAPs	Anti-Encroachment Unit, KMC	Regular personnel expenses, Regular nonpersonnel expenses
6	Legal clearance of ROW by Anti-Encroachment Unit (if necessary)	Anti-Encroachment Unit, KMC	Regular personnel expenses, Regular nonpersonnel expenses
7	Monitoring of the voluntary clearance, monitoring of the	Engineering Division, KMC	Regular personnel expenses Regular nonpersonnel expenses (for

	livelihood recovery condition of the PAPs		commissioning external monitoring)

Source: Survey Team

(13) Implementation Structure

Institutions listed in Table 2-2-116 shall be responsible for implementation of the Project.

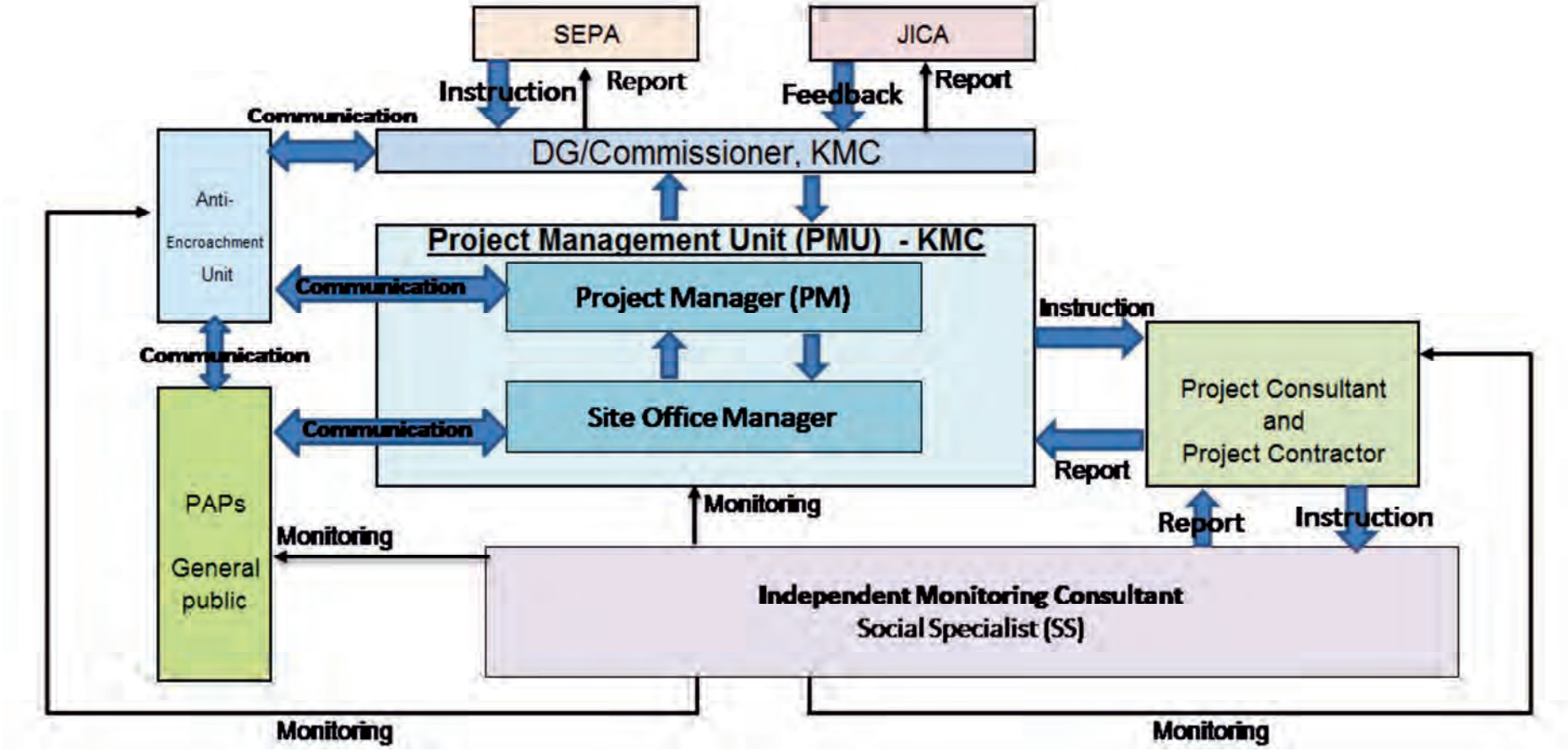
Table 2-2-116 Institutions Responsible for Implementation of the Project

Responsibilities	Responsible Institutions
Project owner	Design & Construction Management, Technical Services Department, KMC
Responsible for ROW clearance	Anti-Encroachment Unit, KMC
Preparation of the Abbreviated Resettlement Action Plan	Design & Construction Management, Technical Services Department, KMC
Review of the ARAP	Sindh Environmental Protection Agency
Funding :Pakistani side	KMC, under Minister of Local Government, Government of Sindh
Funding :Japanese side	JICA

Source : Survey Team

ARAP implementation structure is shown in Figure 2-2-72.

Site Office of the Project Management Unit and Anti-Encroachment Unit will coordinate their activities to face with the PAPs and general public in the Project Area as well as the N5 users. The Consultant and the Contractor shall employ either in-house or oursourced social specialist to conduct the monitoring activities. The Project report and the monitoring report shall be submitted from Director General or the Commissioner of KMC to SEPA and JICA.



Source: Survey Team

Figure 2-2-72 Coordination of the Organizations and Stakeholders for ARAP Implementation