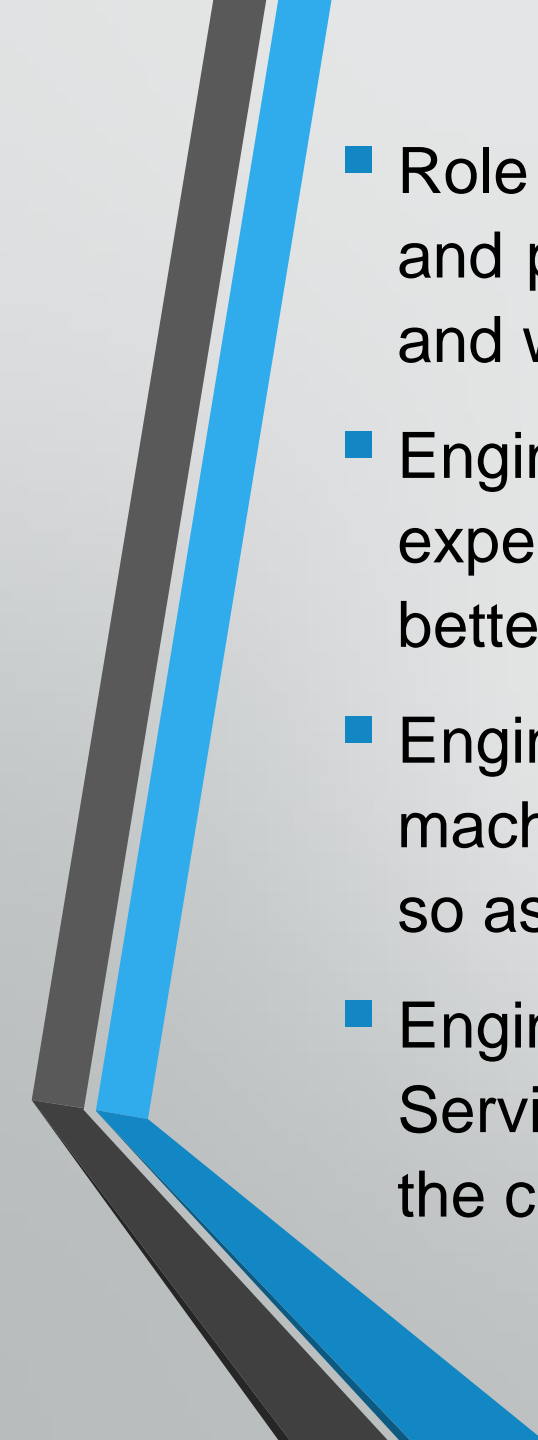


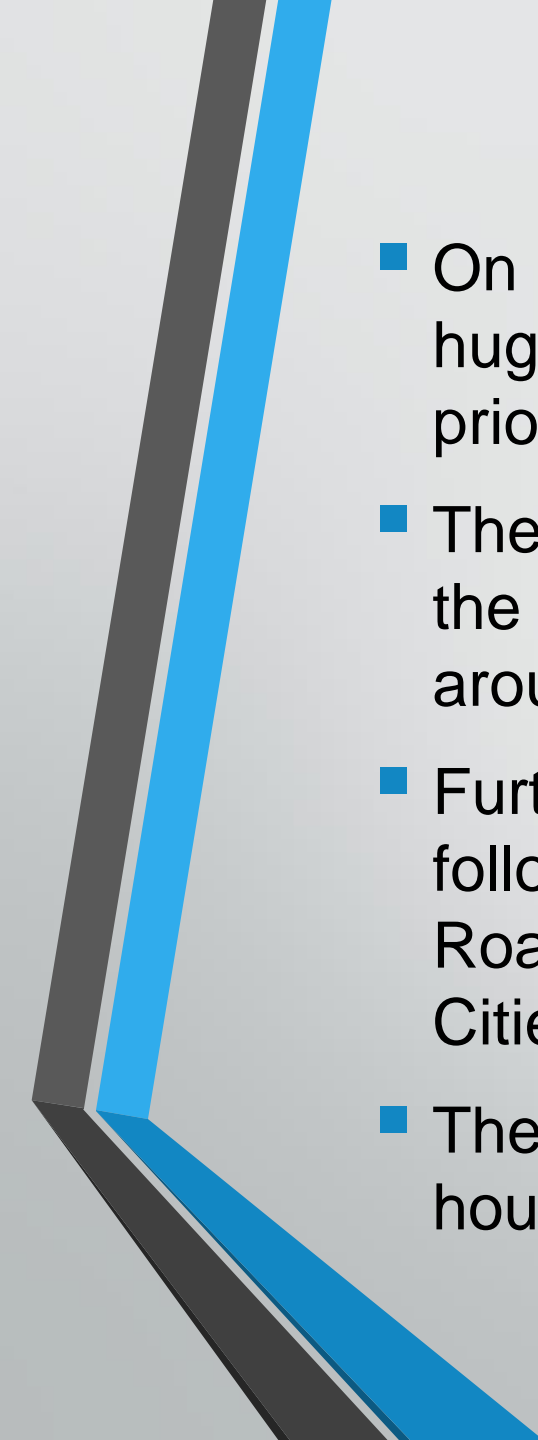


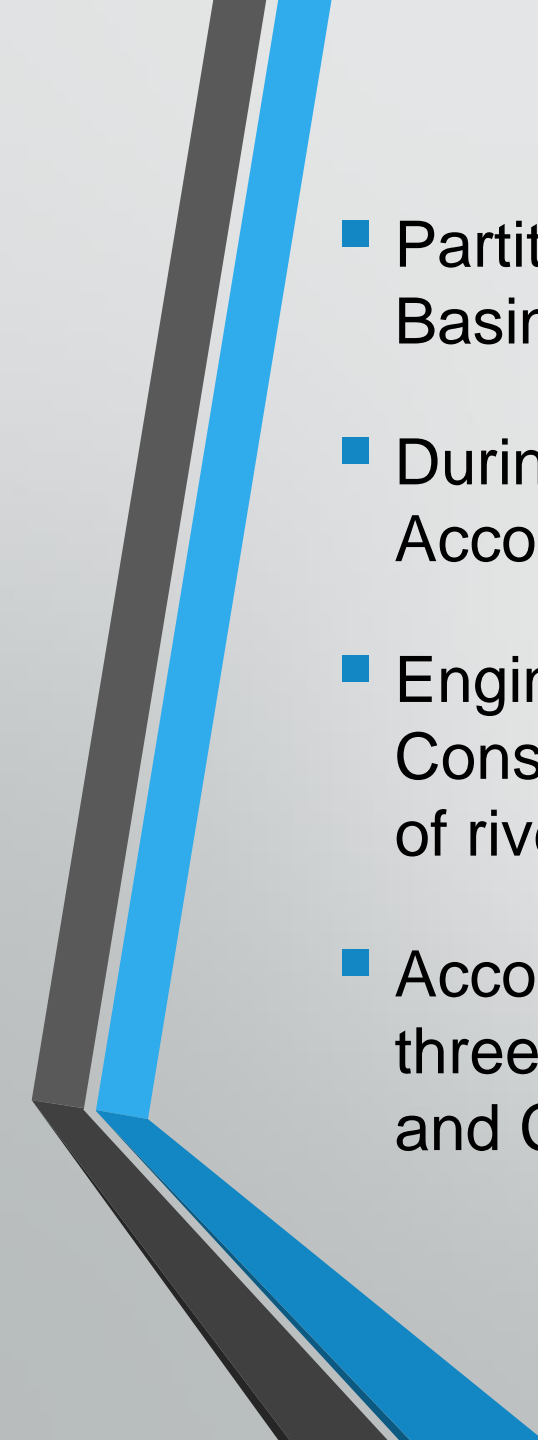
# **ROLE OF ENGINEERS IN THE DEVELOPMENT OF PAKISTAN**

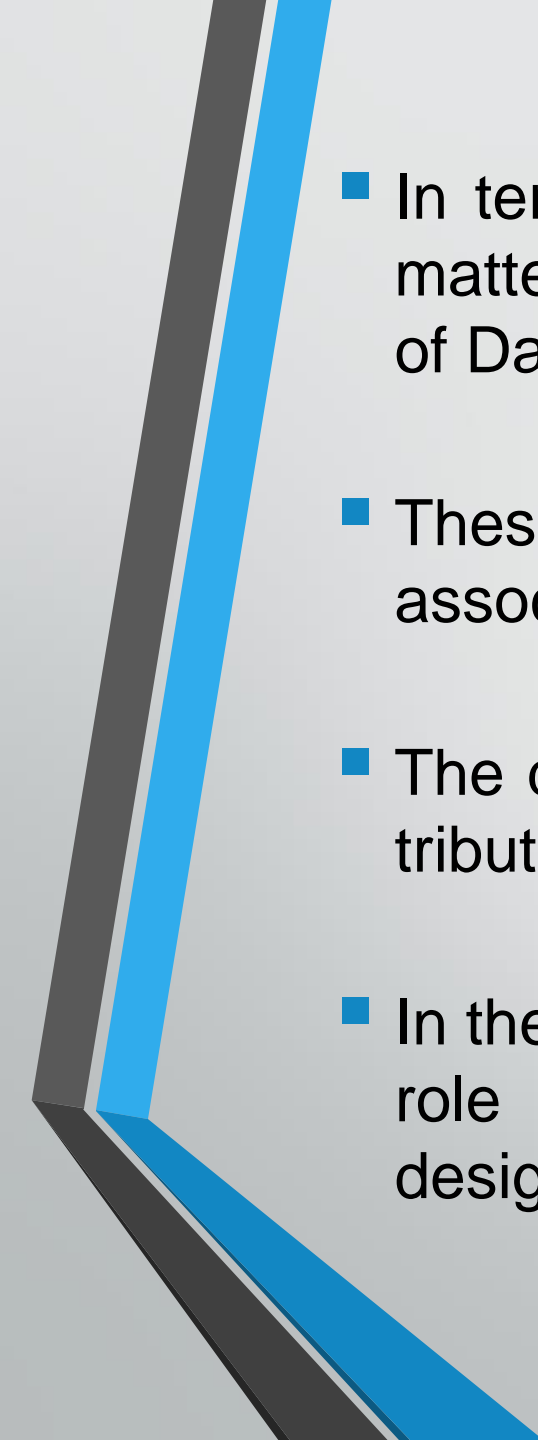
**PRESENTED BY: IJAZ H. KHILJI**

26<sup>th</sup> October 2019

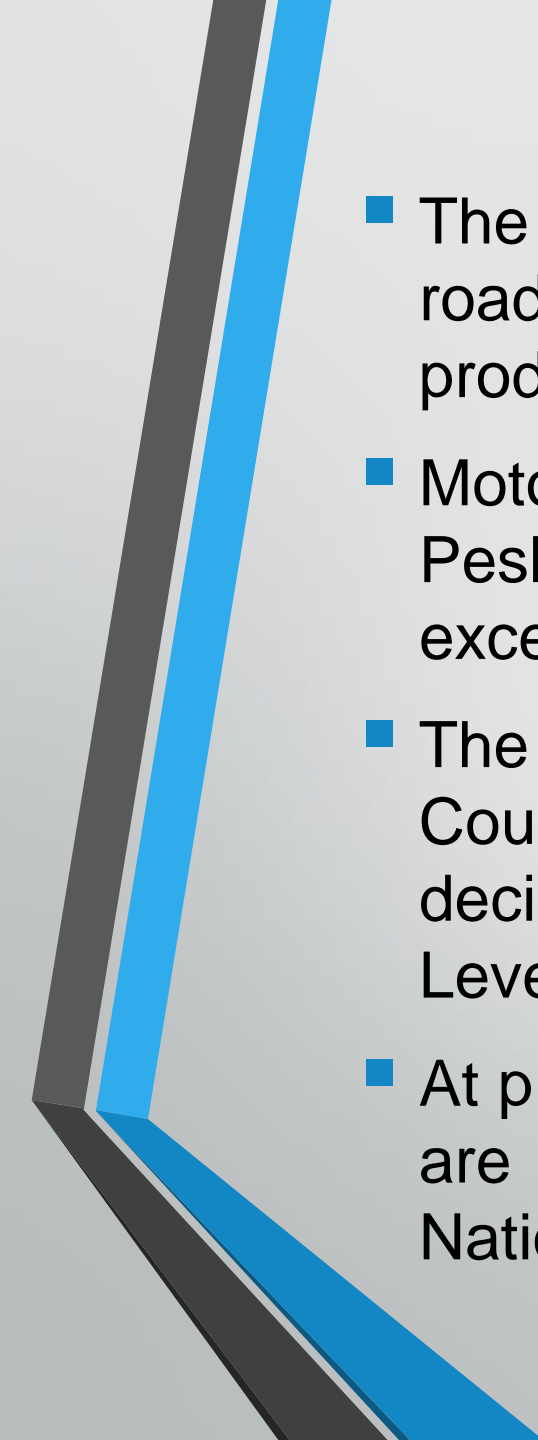
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- Role of Engineering in society is to apply the principles of science, maths and provide innovations to shape our society and improve the way we live and work
  - Engineers are a significant source of technological innovation and expertise, focusing on solving problems, discovering new ways to make life better for General Public.
  - Engineers work on the various innovations like inventing and installation of machinery, design and construction of railroads, roadways, bridges, tunnels so as to help in the development of society.
  - Engineers contribute in providing Infrastructure Facilities, Public Health Services, Sanitation etc, essentially needed to improve the quality of life of the citizens in Villages, Towns and Cities

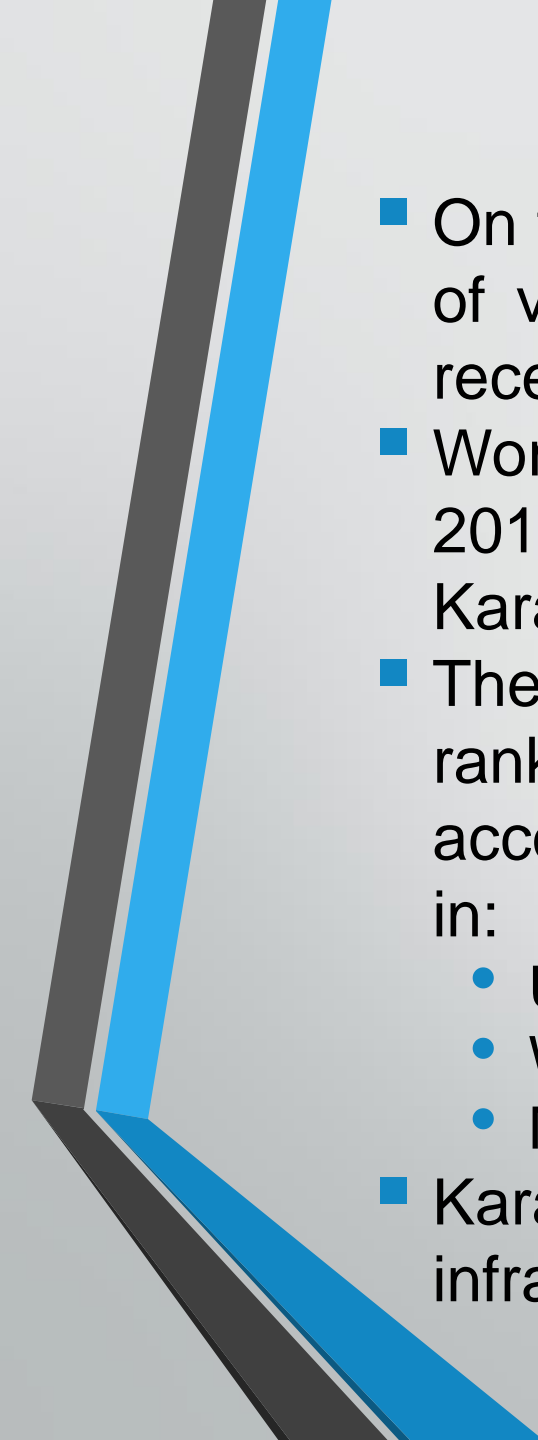
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- On Partition of the sub-continent and creation of Pakistan, there was a huge influx of unplanned migrants / refugees who had to be housed, on priority.
  - The Engineers concentrated on the issue, analyzed it and came up with the quick fix solutions like providing Aluminum quarters somewhere around the location of existing FTC Building.
  - Further improvised low cost housing was provided near Numaish area, followed by construction of low cost housing at Martin Road, Jehangir Road, Pak Colony, Nazimabad etc. in Karachi as well as in the other Cities of the Country.
  - The Engineers also designed and provided the public utilities in all these housing sectors.

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- Partition of the sub-continent created a conflict over the waters of the Indus Basin which all had the origin in the area, under the control of India.
  - During the initial years, the water was apportioned by the Inter-Dominion Accord of May 1948, but India created problems.
  - Engineers of Pakistan worked hard on the issue along with World Bank Consultants and hammered out an Engineering Solution for the distribution of rivers between the two Countries.
  - Accordingly, Indus Water Treaty was signed in 1960 with India in which three rivers – Ravi, Beas and Satluj were given to India and Indus, Jehlum and Chenab to Pakistan.


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- In terms of the Treaty, the Engineers immediately took cognizance of the matter, analyzed the situation and came out with the solutions in the shape of Dams to store water for the requirements of the Country.
  - These Dams - Tarbela, Mangla were designed and constructed, in association with the International Engineering Consultants.
  - The dams were linked with the existing canal system through a network of tributaries to provide Water to the various areas of the Country.
  - In the late 50's Industrialization was started and the Engineers took the lead role under the umbrella of PIDC, providing expertise in the planning, designing and installation of the Industries in the various sectors.

- The Sindh Industrial Trading Estate was established in Karachi where, infrastructure facilities were provided and Industries of various sectors were established thereby providing a sound Industrial base to the Country.
- The Pakistan Railways network in South of Punjab passed along the Indian Border, the Railway Engineers worked on an alternate option and planned a Rail Link from Kashmore, Dera Ghazi Khan – Kot Addu (305 kms). The construction was started in 60s and completed in early 70s, providing a new Rail Link.
- The Railway Engineers planned and improved the Rail network raising speeds to 90 KMH and 120 KMH for freight and passenger trains respectively.
- After a number of trial runs the composition of a passenger train was increased from 8 to 16 coaches with the necessary technological advancement in the braking system, signaling system etc.

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- The Road Network i.e G.T Road, was improved providing dualization and road network to farms was provided to give a boost to the Agriculture produce, which initially formed 80% of our economy.
  - Motorways have been provided from Karachi upwards to Lahore and Peshawar with proper service centers and requirements of Motorways, except for a missing link of Hyderabad to Sukkur.
  - The Engineers, though made contribution in the development of the Country in various sectors, but have been denied the placement at the decision making level, resulting in misplaced priorities at the National Level, in the context of development Projects.
  - At present, Ministries of the Govt. of Pakistan related to Technical Subjects are not headed by an Engineer. This anomaly requires rectification in the National Interest.

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- On the National level the contribution of the Engineers in the development of various Sectors has been briefly mentioned, however the cities also received attention of the Engineers but not to the extent it required.
  - World Bank on the request of Govt. of Sindh, prepared a report in 2014-2016, under the Title of “Karachi Diagnostic Study” for transforming Karachi into a livable and competitive Mega city.
  - The said report mentions that Karachi with the population of 16 million is ranked among the bottom 10 cities in the Global Livability Index on account of its poor Infrastructure and service delivery needs, particularly in:
    - Urban Transport
    - Water Supply and Sanitation
    - Municipal Solid Waste
  - Karachi needs USD 9 to 10 billion in financing for providing the required infrastructure and delivery system.



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- Funds to be generated inter alia by leveraging:
    - Real Estate.
    - Water Fronts.
    - Environmental Sites.
    - Heritage Sites.
    - Examples of Medellin, Bogota, Rio De Janerio can be followed.
  - The report provides the basis for discussion with the Local and Provincial Governments on Key Pathways toward the transformation of the city of Karachi into a livable, inclusive and competitive City.

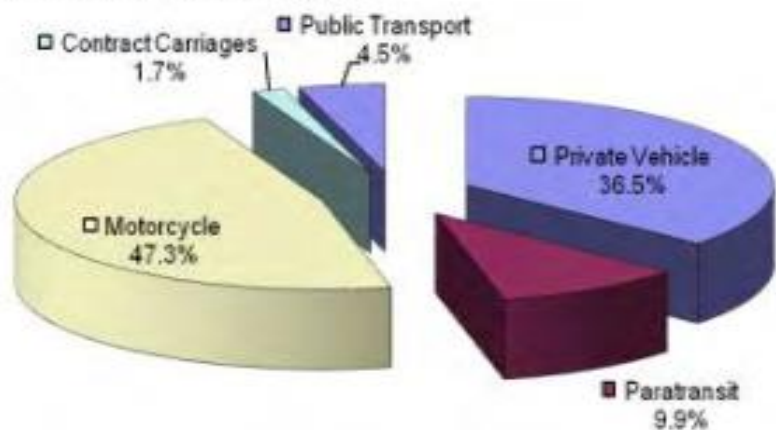
# URBAN TRANSPORT

- The city of Karachi had a Mass transit System in the shape of Tramways, almost covering the old city of Karachi, in combination with an efficient bus operation.
- The Tramways were abandoned in the year 1975 due to increase in the vehicular traffic, leading to denial of accessibility of Right-of Way to trams.
- The first master plan of the city of Karachi was prepared in the year 1952 by Swedish consultants MRVP who had recommended the provision of a mass transit in the shape of Karachi Circular Railway (KCR).
- In late 1950's the planning and construction of KCR was undertaken by the railway management and KCR was commissioned in November 1964 and extended in 1970, having the route length of 43.1 kms with 14 stations and was highly patronized.
- In the year 1984, 104 trains were operating on the system. But due to lack of continued investment in KCR, the operating efficiency was marginalized, resulting in reduction of ridership and number of Trains, eventually KCR was closed for traffic in December 1999.

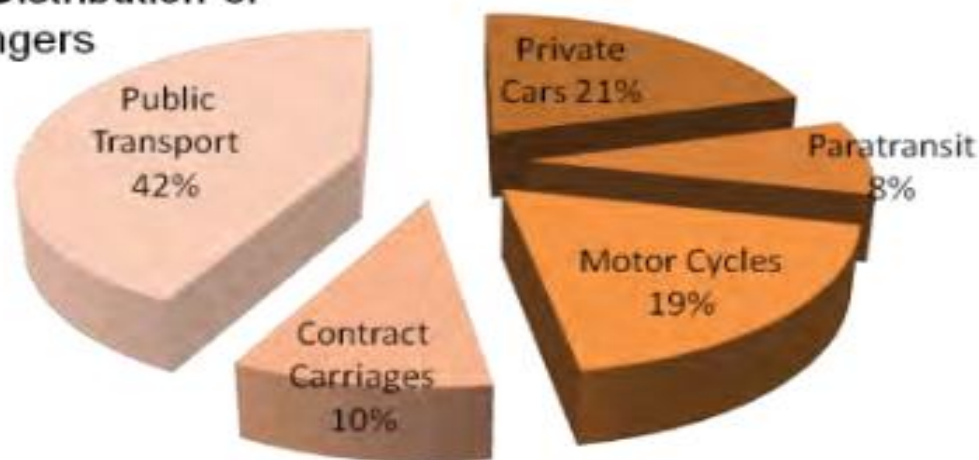
- There are 13.5 million mechanized trips each day of which 42% are by Public transport.
- The needs of 5.67 million commuter trips are catered by **12000** buses, Mini buses plying on 267 routes.
- The number of buses is decreasing in quality and quantity.
- The **Passengers competing for one seat, in Karachi are 45**, in Mumbai are 12 and only 8 in Hong Kong.
- Provision of a Mass Transit System is essentially required along with following measures:
  - Bus routes are on radial directions requiring route hierarchy for the bus network and feeder system.
  - Provision of Parking Lots.
  - Enforcement of Traffic and other related regulations.

# STATUS OF EXISTING PUBLIC TRANSPORT (VEHICLE COUNT V/S OCCUPANCY COMPARISON)

Modal Distribution of Vehicles

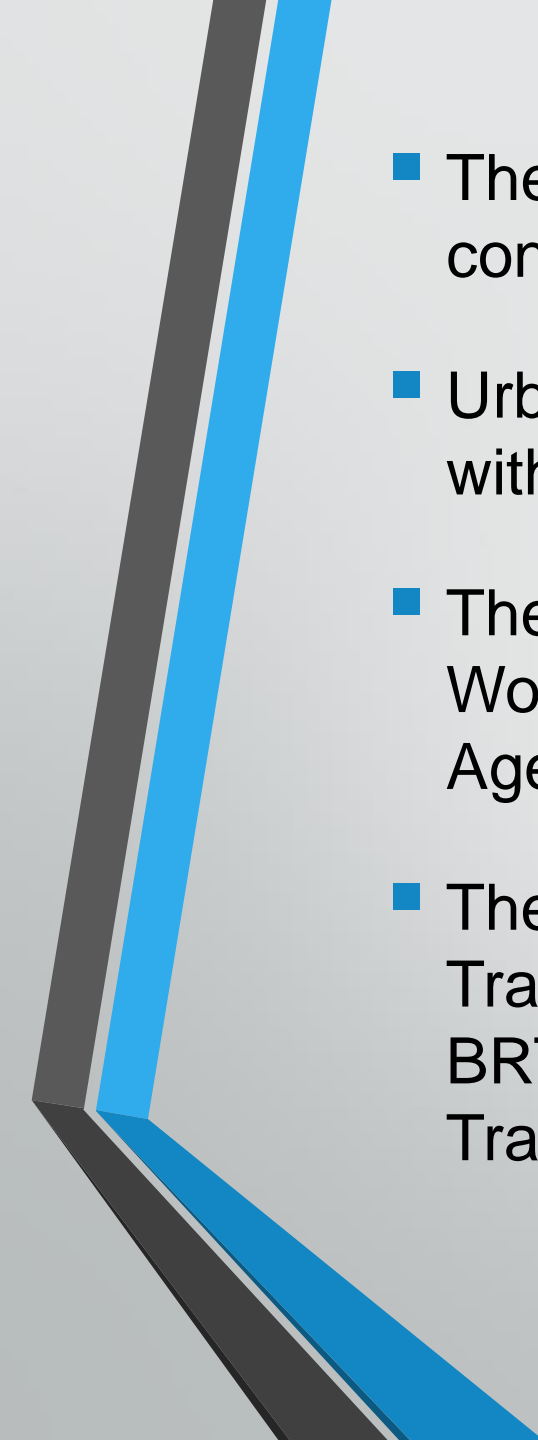


Modal Distribution of Passengers



- 4.5% composition of Public Transport Vehicles carry 42% of Total Persons Traveling in the City.
- Private Cars which is 36.5% of Total Vehicular Traffic carries only 21% of Persons. Showing Lesser Average Vehicle Occupancy.
- The above leads to the conclusion that there is still deficiency of Public Transport availability on all Major Routes in the city.



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- The existing highly centralized but fragmented governance, land contestation among many government entities need to be reformed.
  - Urban Planning Management and service delivery have not kept pace with population growth.
  - The Transport problem of the City has been receiving the attention of World Bank, Asian Development Bank, Japan International Corporation Agency (JICA).
  - The latest study was carried out by JICA under the Title of “Karachi Transport Improvement Plan (KTIP)” in which they had recommended Six BRT Corridors + Two MRT with KCR as an integral part of the Mass Transit System.

## WHY KCR?

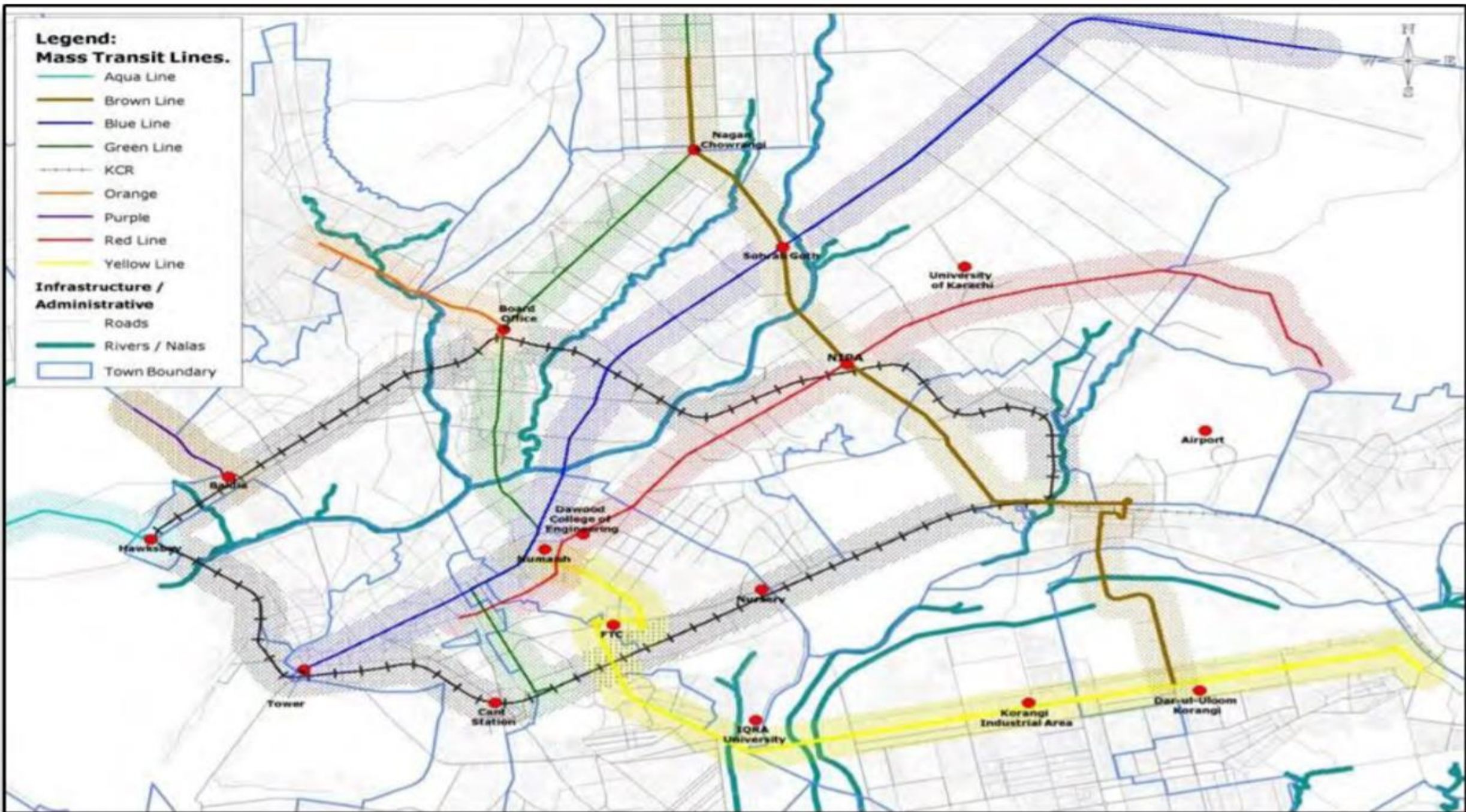
- It is a matured project.
- Right of Way is available.
- All the technical, environmental and re-settlement studies have been completed.
- There is no shifting / relocation of any utilities.
- It has extensions planned to Karachi airport.
- It has been exempted by GOP and GOS from all taxes, import duties, levies etc, duly notified by the ECC.

**Legend:**  
**Mass Transit Lines.**

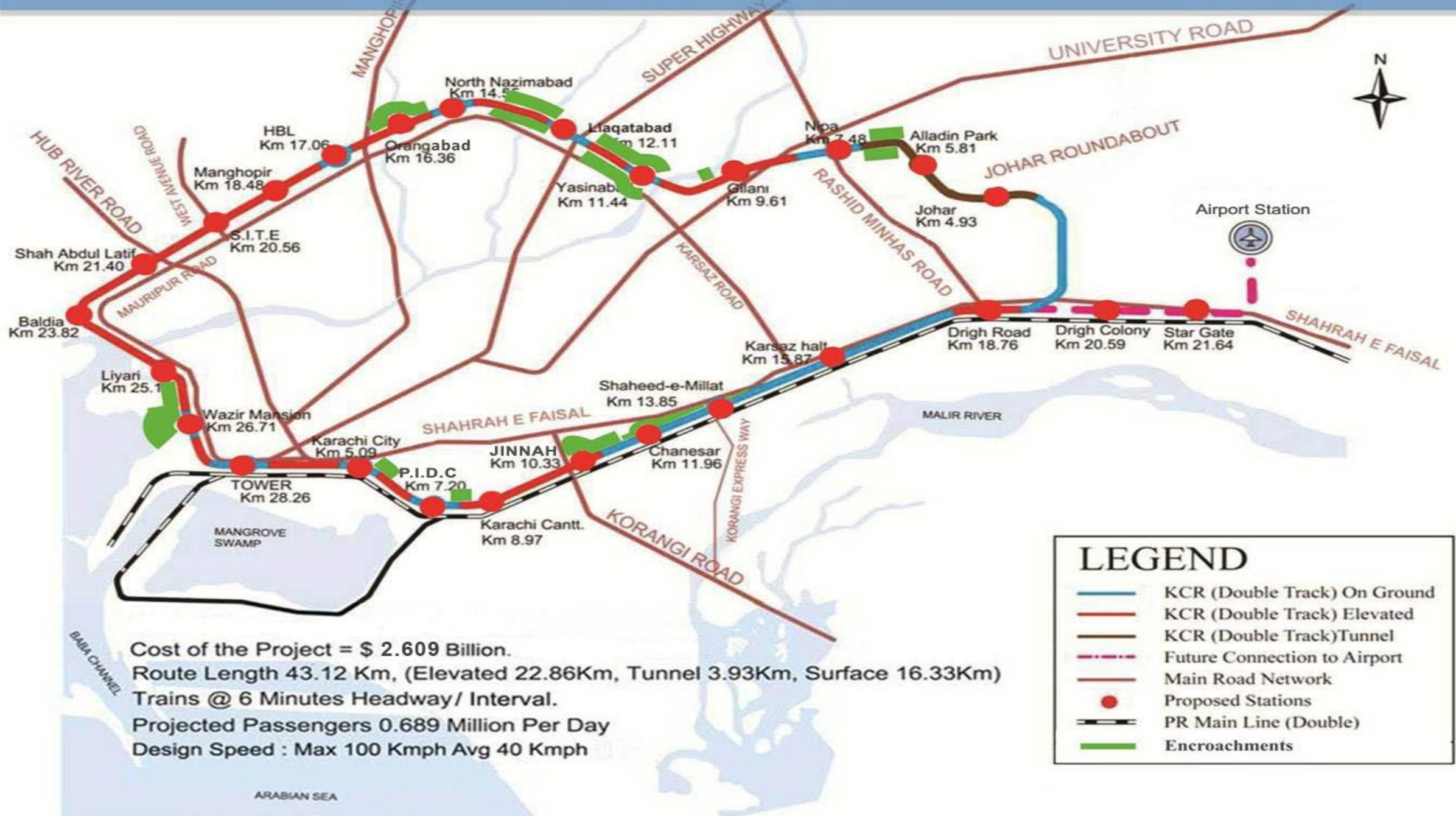
- Aqua Line
- Brown Line
- Blue Line
- Green Line
- KCR
- Orange
- Purple
- Red Line
- Yellow Line

**Infrastructure / Administrative**

- Roads
- Rivers / Nalas
- Town Boundary



# KCR ROUTE ALIGNMENT

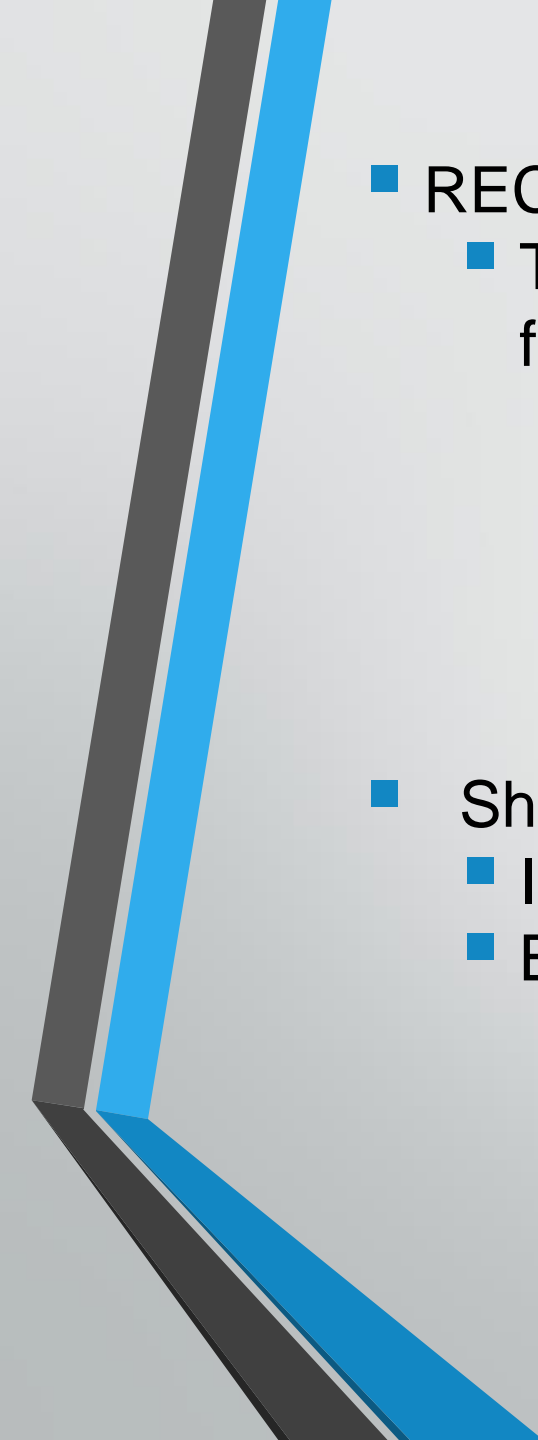



Cost of the Project = \$ 2.609 Billion.  
 Route Length 43.12 Km, (Elevated 22.86Km, Tunnel 3.93Km, Surface 16.33Km)  
 Trains @ 6 Minutes Headway/ Interval.  
 Projected Passengers 0.689 Million Per Day  
 Design Speed : Max 100 Kmph Avg 40 Kmph

### LEGEND

- KCR (Double Track) On Ground
- KCR (Double Track) Elevated
- KCR (Double Track) Tunnel
- - - Future Connection to Airport
- Main Road Network
- Proposed Stations
- PR Main Line (Double)
- Encroachments



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- RECOMMENDATIONS In the present day scenario;
    - The solution to the mobility problems in the city of Karachi can be as follows:-
      - Optimize traffic corridors
      - Promote public transport
      - Cleaner fuels
      - Green vehicles
  
  - Short Term
    - Implementation of Revival of KCR Project
    - BRT Projects
      - Green Line
      - Red Line
      - Yellow Line
      - Orange Line

- 
- Long Term
  - MRT Projects
    - Brown Line
    - Blue Line
  - Implementation of:
    - KCR Extension to Airport
    - KCR Extension to Steel Mill, Port Qasim
  - BRT Corridors
    - Purple Line
    - Aqua Line
  - Provision of underground Metro to be explored in the CBD Area.

ZONE A

ZONE B

ZONE C

ZONE D

ZONE E

ZONE F

PHASE V

PHASE VI

DMR MOUNTAIN TOWER & COMMERCIAL COMPLEX

OUTDOOR SPORTS & WALKWAY

PIEDIMANTAL VIEWING DECKS  
JOGGING TRACK & WALKWAY

FOOD COURT

PLAY LAND

PROMENADE & BOARD WALK

VIEWING DECKS & SEATING

PROMENADE & BOARD WALK

SPORT CENTER  
SCULPTURE COURT  
& AMPHITHEATER  
COMPLEX

HOTEL BLOCK

HIGH RISE  
RECREATIONAL COMPLEX

WATER SPORTS

BEACH

WATER & COMMUNITY  
COMPLEX

UNDER WATER  
WORLD & DOLPHIN PARK



OFFICE COMPLEX

OUTDOOR SPORTS & WATER PARK



AMPHITHEATER

AMPHITHEATER



AMPHITHEATER



TOURIST  
RESORTS

HOTEL

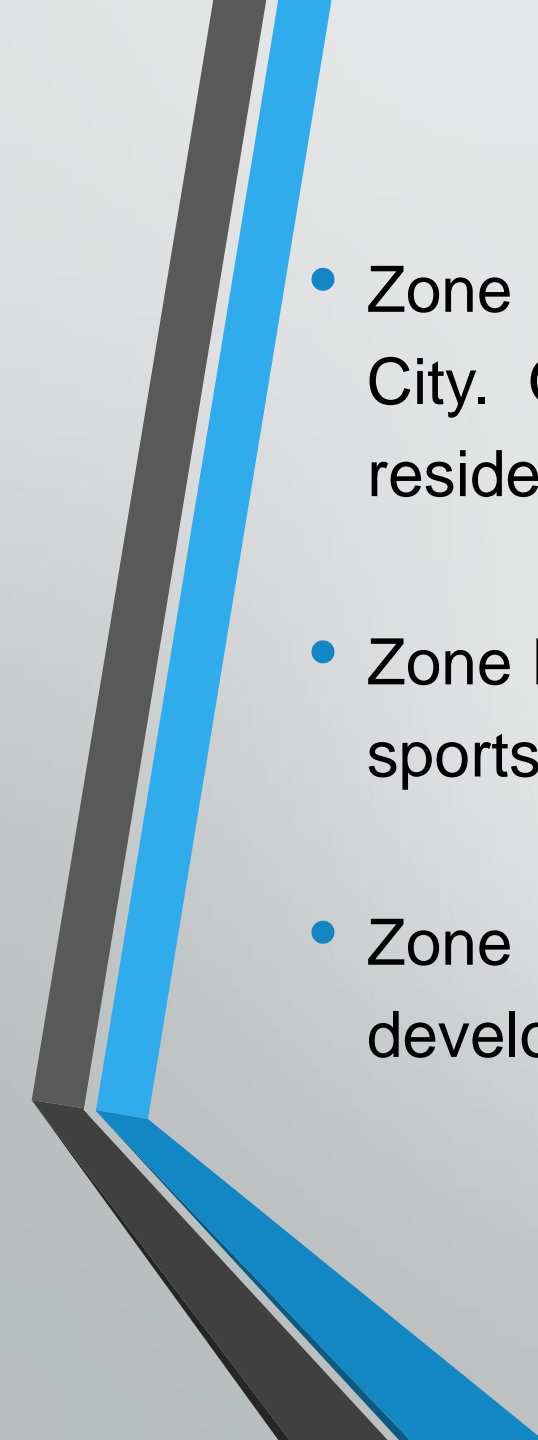
LADDOON

BEACH

BEACH

# WATER FRONT

- The brief description of each zone of Waterfront Development Project is as follows:
- Zone A: It is a sector between Dolmen Mall Clifton to McDonald Restaurant. Half of this zone will hold parking areas for nearly 3000 vehicles and rest for office building complex and fifty commercial stores.
- Zone B: It is between McDonald Restaurant and Darakhshan Villas. This zone would have 600 ft high-rise tower, revolving restaurant, indoor game facilities, viewer decks, promenades, children parks, and water slides.
- Zone C: It is along Darakhshan Villas and would include an amusement park, performance decks, offshore amphitheatre for 6000 audiences and food courts.
- Zone D: It is at Phase-8 extension and would include jogging tracks and promenade.

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- Zone E: It would be at the south corner of DHA peninsula covering Creek City. Other development would include a hotel, tourist resort, high rise residential complex, vocational dwellings, club house and residential estate.
  - Zone F: This zone would be upto DHA Golf Course and is reserved for water sports and have a Dolphin park and an aquarium.
  - Zone G: This area is reserved for high-rise residential complexes to be developed on modern style.

# WATER SUPPLY

- The main issue in the water supply of the City is the lack of proper distribution network and leakages / pilferage.
- Manila with the population of 12.8 million had similar issues of water supply. Manila water company was Incorporated as a publicly-listed company.
- When the Philippine government enacted the National Water Crisis Act, Metropolitan Waterworks and Sewerage System (MWSS) to turn over the operation of water utilities in the East Zone concession to Ayala-led Manila Water.
- The availability of water from 26% has increased to 100%.
- Manila Water Company, Inc. is the exclusive provider of water and used water services to over six million people.
- This successful role model of Water Supply Company can be adapted for the water supply system in Karachi by making number of District wise companies.

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- City seems to be heading towards spatially unsustainable, inefficient and unlivable form.
  - Public open spaces and cultural heritage sites are under threat from commercial development.
  - Urban green space is shrinking, and is now only 4 percent of the City's built-up area.
  - All these are accompanied by insufficient basic services.
  - The Finance and real estate sectors are important for Karachi's future development.
  - They emerge as Key Growth Drivers as Manufacturing Stalls.

# CREATING A SMART KARACHI

- Great cities innovate with smart policies and smart solutions to manage city services; enhance competitiveness; facilitate stakeholder engagement and participation; use city assets creatively, efficiently, and sustainably; and make better project investments.
- Karachi can leverage information and communication technologies for planning and improving citizen services.
- E-governance platforms, if appropriately designed and implemented, can greatly enhance the efficiency, transparency, and convenience of services for businesses and citizens.





**THANKS**