L.K BUILDERS & DEVELOPERS

ENVIRONMENTAL IMPACT ASSESSMENT

METRO ADDRESS

RESIDENTIAL CUM COMMERCIAL BUILDING PROJECT

APRIL - 2026



EMC Pakistan Private Limited

ENVIRONMENTAL IMPACT ASSESSMENT (EIA)

METRO ADDRESS

Residential-cum-Commercial Building

Final Report

April 2026

Ref: EIA/13/04/26

EMC PAKISTAN PVT. LTD.

503, Anum Estate, Opp. Duty Free Shop, Main Shahrah-e-Faisal, Karachi.

Phones: 9221-34311466, 34324680, Fax: 9221-34311467.

E-mail: mail@emc.com.pk, info@emc.com.pk

Website: www.emc.com.pk

Disclaimer: This report has Attorney – Client Privilege. EMC Pakistan Pvt. Ltd has prepared this report in accordance with the information provided by M/s. L.K Builders and Developers for their sole and specific use. Any other person(s) who use any information contained herein do so at their own risk. This report cannot be used in the court of law for any negotiation or standardization.
© EMC Pakistan Pvt. Ltd. 2026

Executive Summary

This report presents the findings of the Environmental Impact Assessment (EIA) submitted to the Sindh Environmental Protection Agency (SEPA) for approval of a proposed project "Metro Address" residential-cum-commercial building. The project is proposed by M/s L.K Builders & Developers at "Plot No. 13, CL-07, Civil Line Quarters, District South, Karachi". The location map of the proposed project is attached in **Fig ES.01**. Also, the second reason to conduct EIA study to comply the direction of technical committee of Sindh Culture Heritage, Department of Culture, Tourism, Antiquities & Archives, Government of Sindh (For details see Annexure-II) because in middle of project plot "Jennings Private School" (a Heritage site) is situated that will manage to preserve and maintain with same facade of School building during construction and usage of building for resident and convert that school into club.

The proposed development comprises a high-rise structure with B-2 + B-1 + Ground + 46 floors, planned on a plot area of 4,152 square yards with a total gross covered area of 616,259.64 square feet. The project includes a total of 136 residential flats and 9 commercial shops, with a building height of approximately 480 feet above ground level (AGL). The layout consists of Basement-2 designated for services, Basement-1 for parking, automated racking system (ARS), and services, while the Ground Floor accommodates parking, shops, and services. The 1st Floor is allocated for parking and services, followed by the 2nd to 10th Floors designated entirely for parking. Recreational facilities are planned on the 11th and 12th Floors, and residential apartments are proposed from the 13th to the 46th Floors. The roof level will include solar panels, a machine room, overhead water tanks, and a helipad.

The EIA study was undertaken to identify applicable regulatory requirements related to environmental protection, health, and safety; to assess the potential environmental impacts of the project during both construction and operational phases; and to recommend appropriate mitigation measures to minimize any adverse effects.

M/s L.K Builders & Developers is an emerging real estate developer focused on delivering modern and sustainable developments aligned with contemporary urban living standards. The proposed project reflects this approach by integrating residential and commercial components within a single, well-planned structure.

The project site falls within a land use category permitted by the relevant authority, and its development is duly authorized. Located in Civil Lines, a well-developed urban area of Karachi, the site benefits from established infrastructure and compatible surrounding land uses, including residential, commercial, and institutional developments. The project is strategically positioned along Aamir Khusro Road, with connectivity to major roads such as Fatima Jinnah Road and Claremont Road, ensuring easy access to the broader city network. Prominent nearby landmarks include Pakistan American Cultural Center, Bank House, Taj Safa Tower, Solid Homes, Sterling Homes, The Grand Marquee, Royal Residency, and Mehran Sky Tower, indicating that the project is situated within a mature and active urban environment.

The ownership of the plot rests with M/s L.K Builders & Developers, with no disputes regarding the project site. The proponent will obtain all necessary No Objection Certificates (NOCs) from relevant agencies to ensure regulatory compliance prior to construction.

As part of the EIA process, a detailed site survey was conducted in March 2026, which included monitoring of ambient air quality, ambient noise levels, and raw water sampling. The results indicate that all environmental parameters are within the permissible limits set by the Sindh Environmental Quality Standards (SEQS), confirming compliance with applicable environmental regulations.

Consultations were carried out with both primary and secondary stakeholders, and the concerns raised during these engagements have been addressed in the EIA. Where necessary, appropriate mitigation measures have been proposed and incorporated into the project planning.

The project is designed as a self-contained development with adequate parking provisions and essential utilities. A compact wastewater treatment system will be installed, and options for reuse of treated wastewater and efficient water consumption will be explored to enhance sustainability.

Fire safety measures will comply with the Building Code of Pakistan and relevant international standards, including NFPA guidelines. Emergency staircases will be equipped with pressurization systems in accordance with NFPA 92, and integrated smoke control and automatic fire alarm systems will be implemented to ensure occupant safety. In addition, a comprehensive 24-hour security system will be established to provide a safe and secure environment for residents and users.

Considering the rapid urbanization of Karachi and increasing pressure on urban infrastructure, the project incorporates sustainability principles with a focus on efficient resource utilization and environmental management to support sustainable urban growth.

Based on the findings of the EIA, it is concluded that the potential environmental impacts associated with the construction and operation of the project are manageable. These impacts can be effectively mitigated through the implementation of the Environmental Management and Monitoring Plan, which forms an integral part of the EIA. The assessment, based on literature review, baseline data, and expert evaluation, has identified potential impacts on the physical, biological, and socioeconomic environment, and appropriate mitigation measures have been proposed to address them.

In conclusion, it is recommended that the EIA be approved, subject to the condition that all proposed mitigation measures are implemented and the Environmental Management Plan is followed in full compliance.



Figure ES.01: Project Location Map

Table of Contents

Executive Summary i
Chapter 1 Introduction 1
1.1 General 1
1.2 Overview of Proponent 1
1.3 Project Overview 1
1.4 Objectives of Project 2
1.5 Location of Project 3
1.6 Methodology Adopted for EIA 5
1. Scoping 5
2. Review of Legislation and Guidelines 5
3. Baseline Data Collection 5
4. Identification of Aspects 6
5. Impact Assessment & EMP 6
6. Preparation of Report 6
1.7 Structure of EIA Report 7
1.8 EIA Study Team 7
Chapter 2 Policy, Legal & Administrative Framework 8
2.1 National Laws and Regulations 8
2.1.1 National Environmental Policy, 2005 8
2.1.2 National Conservation Strategy, 1992 8
2.1.3 National Climate Policy, 2012 9
2.1.4 Pakistan Climate Change Act, 2017 9
2.1.5 Pakistan Penal Code, 1860 9
2.1.6 Land Acquisition Act, 1894 and Land Acquisition (Sindh Amendment) Act 2009 10
2.1.7 National Disaster Management Act, 2010 10
2.1.8 Building Code of Pakistan, 2007 10
2.1.9 Guidelines for the Preparation and Review of Environmental Reports, 1997 10
2.1.10 Guidelines for Environmental Assessment 10
2.2 Sindh Environmental Protection Act, 2014 11
2.3 Sindh EPA (Review of IEE and EIA) Regulations, 2021 13
2.4 Guidelines for Public Consultation 14
2.5 Sindh Environmental Quality Standards 16
2.6 Sindh Prohibition of Child Employment Act, 2017 19

2.7 Archaeological Relics 20
2.8 The Sindh Cultural Heritage (Preservation) Act, 1994 20
2.9 Pakistan Penal Code, 1860 (PPC) 20
2.10 Sindh Solid Waste Management Board Act, 2014 20
2.11 Disaster Management Act, 2010 21
2.12 Sindh Drinking Water Policy, 2017 21
2.13 Sindh Sanitation Policy, 2017 23
2.14 Laws and Regulations on Urban Development 23
2.15 Civil Aviation Rules, 1994 25
2.16 Building Code of Pakistan, Fire Safety Provisions 2016 25
2.17 The Sindh Occupational Safety and Health Act, 2017 26
2.18 IFC General EHS Guidelines 26

Chapter 3 Project Description 28
3.1. The Project 28
3.2. Project Location 28
3.3. Project Details 30
3.4. Status of Approvals 36
3.5. Construction & Commissioning 36
3.5.1. Construction Schedule 36
3.5.2. Pre-Construction/Design Phase 36
3.5.3. Construction Activities 36
3.5.3.1. Construction Office & Camp 37
3.5.3.2. Foundations 37
3.5.3.3. Building Shell and Core Construction 37
3.5.3.4. Interior Construction and Finishing 37
3.5.3.5. Civil Works 38
3.5.3.6. Construction Equipment & Machinery 38
3.5.3.7. Construction Material and other Supplies 38
3.5.3.8. Site Restoration 38
3.6. Utilities 38
3.6.1. Plumbing System 38
3.6.1.1 Design Codes & Standards: 38
3.6.1.2 Plumbing Fixtures Requirements: 38
3.6.1.3 Scope of Plumbing System: 39
3.6.2. Water Supply 39
3.6.2.1 Source of Water 39
3.6.2.2 Design of Water Supply System 39

3.6.2.3 Water Requirement 40
3.6.2.4 Sewerage System 40
3.6.2.5 Storm Water Drainage 40
3.6.3. Fire Detection & Protection Systems 40
3.6.3.1 Fire Detection & Alarm System 41
3.6.3.2 Fire Protection Systems: 41
3.6.3.3 Design Codes & Standards 41
3.6.4. Electrical & Allied Works 41
3.6.4.1 Scope of Services 41
3.6.5. Electricity Supply 42
3.6.6. Gas Supplies 42
3.7. Solid Waste Generation 42
3.8. Parking Facilities 42
Chapter 4 Description of Environment 43
4.1 Overview 43
4.2 Description of Physical Environment 43
4.2.1 Geology 43
4.2.2 Geomorphology of Karachi 44
4.2.3 Soil 45
4.2.4 Seismicity 46
4.2.4.1 Seismic Coefficient 47
4.2.4.2 Earthquakes 47
4.2.4.3 Seismicity of the Site 48
4.2.4.4 Liquefaction Features Caused by Earthquake 49
4.3 Meteorology and Climate 50
4.3.1 Temperature 51
4.3.2 Precipitation 52
4.3.3 Humidity 53
4.3.4 Wind Speed & Direction 54
4.3.5 Urban Heat Island (UHI) Effect 55
4.4 Ambient Air Quality & Noise 56
4.4.1 Ambient Air and Noise at Project Site 56
4.5 Water Resources, Water Quality and Drainage 58
4.5.1 Surface Storm Water 58
4.5.2 Water Supply, Demand and Sewerage System 58

4.5.3 Water Quality 60
4.5.3.1 Raw Water Quality at Project Site 61
4.6 Biological Environment 62
4.6.1 The Ecology of Macroenvironment 62
4.7 Description of Socio-Economic Environment 63
4.7.1 Macro Environment of the Project Area 64
4.7.1.1 Administrative Context 64
4.7.1.2 Land Use 64
4.7.1.3 Demography 64
4.7.1.4 Religion 67
4.7.1.5 Transportation 68
Figure 4.11: Registered Vehicles in Karachi by Vehicle Type (2017) ... **Error! Bookmark not defined.**
4.7.1.6 Education 69
4.7.1.7 Health 70
4.7.2 Micro Environment of Project Area 72
4.7.2.1 Education Facilities 72
4.7.2.2 Healthcare 72
4.7.2.3 Waste Management 72
4.7.2.4 Water Supply and Drainage 73
4.7.2.5 Electricity & Gas Supply 73
Chapter 5 Information Disclosure, Consultation & Participation 74
5.1 Consultation Objectives 74
5.2 Stakeholders Identification and Analysis 75
5.3 Consultation and Participation Process 75
5.3.1 Consultation with Stakeholders 76
5.4 Consultation Feedback and Analysis 76
5.4.1 Stakeholders 76
Chapter 6 SCREENING OF POTENTIAL IMPACTS & PROPOSED MITIGATION MEASURES 81
6.1 Impact Assessment Methodology 82
6.2 Screening of Environmental Aspects related to Siting of Project 82
6.3 Assessment of Impacts at the Construction stage of the Project 83
6.3.1 Demolition of Structure(s) 83
6.3.2 Building Stability 83
6.3.3 Erosion of Soil 84

6.3.4 Excavation 84
6.3.5 Construction Waste 85
6.3.6 Topography and Geology 85
6.3.7 Air Quality 85
6.3.8 Construction Noise 87
6.3.9 Water Sourcing 87
6.3.10 Soil Contamination 88
6.3.11 Wastewater Generation & Disposal 88
6.3.12 Solid Waste Generation and Management 88
6.3.13 Materials Selection 89
6.3.14 Seismic Hazards 90
6.3.15 Operation of Vehicular Traffic 90
6.3.16 Occupational & Community Health and Safety Impacts 91
6.4 Assessment of Impacts at the Operation Stage of the Project 93
6.4.1 Solid Waste Generation and Disposal 93
6.4.2 Wastewater Generation and Disposal 94
6.4.3 Water Consumption and Quality Assurance 94
6.4.4 Energy Consumption 95
6.4.5 Air Emissions 95
6.4.6 Fire Hazards and Life Safety 96
6.4.7 Positive Socioeconomic Impacts 96
6.4.8 Cultural Resources 97
6.4.9 Land-use and Aesthetics 97
Chapter 7 Environmental Management Plan 98
7.1 Introduction 98
7.1.1 General 98
7.1.2 Objectives 98
7.2 Structure of the EMP 99
7.3 Legislation and Guidelines 99
7.4 Organizational Structure and Roles and Responsibilities 99
7.4.1 Organizational Structure 99
7.4.2 Roles and Responsibilities 99
7.5 Maintenance of the EMP 102
7.6 Environmental Health and Safety Management System 102
7.6.1 Health and Safety during Construction Phase 102

7.6.2 Health and Safety during Operation Phase 103
7.7 Emergency Response Plan 103
7.7.1 Objectives 103
7.7.2 Emergency Response Manuals 103
7.8 Environmental Compliance Reporting, Documentation and Trainings . 103
7.9 Mitigation Management Matrix 104
7.10 Environmental Monitoring Program 105
7.10.1 Compliance Monitoring 105
7.10.2 Effects Monitoring 105
7.10.3 Environmental compliance Reporting and Documentation 105
7.11 Change Management Plan 106
7.11.1 Changes to the EMP 106
7.11.2 Changes to the Operation 106
7.12 Training Program 107
7.12.1 Objectives 107
7.12.2 Roles and Responsibilities 107
7.12.3 Training Program 107
Chapter 8 Conclusion 122

Annexures

Annexure - I: Architechtural Approval & Construction Permit of SBCA & Culture Department Approvals

Annexure - II: Minutes of Meeting of Technical Committee under Culture Department

Annexure - III: Drawings

Annexure - IV: Environmental Monitoring Report

Annexure - V: Soil Investigation Report

Annexure - VI:Traffic Study

Chapter 1 Introduction

1.1 General

This Environmental Impact Assessment (EIA) report presents the assessment of environmental impacts that may arise due to the development of proposed "Metro Address" Residential cum commercial project which will be developed by L.K Builders & Developers. This document has been prepared in compliance with the mandatory requirement of Section 17 of Sindh Environmental Protection Act (SEPA) 2014. Compliance with provisions of Section 17 requires that "no proponent of a project will commence construction or operation unless he has filed with the Agency an environmental impact assessment and has obtained from the Agency approval in respect thereof". Also, EIA study is conducted in compliance of the direction of technical committee of Sindh Culture Heritage, Department of Culture, Tourism, Antiquities & Archives, Government of Sindh (For details see Annexure-II).

M/s EMC Pakistan Private Limited has been commissioned by L.K Builders & Developers to assess the project's environmental and social viability through various environmental components like air, water, noise, including land, biological along with the parameters of human interest and to prepare Environmental Management Plan (EMP) for mitigation of adverse impacts along with chalking out of post project environmental monitoring program.

Presented in this report are the findings of the EIA study submitted to the Sindh Environmental Protection Agency for its approval for construction of residential-cum-commercial building project named Metro Address located at Plot No.13, CL-07, Civil Line Quarters, District South Karachi.

1.2 Overview of Proponent

M/s L.K Builders & Developers is an emerging entity in the real estate and construction sector, committed to delivering quality-driven and sustainable urban developments. With a focus on innovation, functionality, and modern design principles, the company aims to contribute to the evolving landscape of urban living by developing projects that meet contemporary lifestyle demands.

Although relatively new in the industry, L.K Builders & Developers is dedicated to maintaining high standards of planning, construction quality, and timely execution. The company strives to integrate aesthetic design with practical living solutions, ensuring comfort, safety, and long-term value for its residents.

Through its ongoing and upcoming developments, L.K Builders & Developers envisions establishing a strong presence in the real estate market, particularly in Karachi, by offering projects that reflect reliability, modern architecture, and customer satisfaction.

1.3 Project Overview

The "Metro Address" building project comprises **B-2 + B-1 + G +** 46 floors with Basement-2 (Services) + Basement-1 (Parking + ARS + Services) + Ground Floor (Parking + Shops + Services) + 1st Floor (Parking + Services) + 2nd to 10th Floors (Parking + Services) + 11th to 12th Floors (Recreation Area + Services) + 13th to 46th Floors (Flats) + Roof Plan (Solar Panel

+ Battery Room + Helipad + Services).

The salient features of the project are discussed below:

Table 1.1: Salient Features of the Project	
Project Name	Metro Address Residential-cum-Commercial
Category	Residential-cum-Commercial
Proponent	M/s L.K Builders & Developers
Plot Area	4152.00 SQ YDS (0.8578 acres)
Gross covered area	616,259.64 SQ FT
Net area after exemptions	298,918.64 SQ FT
Stories	B-2 + B-1 + G + 46
Location	Plot No. 13, CL-07, Civil Line Quarters, District South, Karachi
Basement-2 Plan (Services)	Utility areas including service rooms and infrastructure facilities.
Basement-1 Plan (Parking + ARS + Services)	Parking area, ARS, pump rooms and other associated services.
Ground Floor Plan (Parking + Shops + Services)	Parking spaces, commercial shops, reception and service areas.
1st Floor Plan (Parking + Services)	Parking area along with associated services.
2nd to 10th Floor Plan	Parking floors with supporting services.
11th to 12th Floor Plan (Recreation Area + Services)	Recreational facilities including community and leisure spaces.
13th to 46th Floor Plan (Flats)	Residential apartments with associated services.
Roof Plan (Solar Panel + Battery Room + Machine Room + OHWT + Helipad)	Includes solar panels, overhead water tanks, machine room, battery room and helipad
Total Parking	Total Project Parking: 331 Cars and 375 Motor Bikes
Totals Flats	Total 136 Flats
Total Shops	**1** shops
Height of the Building	480 feet Above Ground Level (AGL)

1.4 Objectives of Project

In launching the Project, the proponent aims to achieve the following objectives:

- To provide an organized residential-cum-commercial building structure conducive to the current demand of fast degrading environment;

- To promote development in the Housing Sector which at present is among the worthwhile contributors to the growth of GDP;
- To meet the increasing demand of residential and commercial accommodation in urban Karachi;
- Respond to the need of integrating residential and commercial units in this part of Karachi which has of recent attracted the population from other towns of the city.

1.5 Location of Project

The proposed project, “Metro Address”, is located at Plot No. 13, CL-07, Civil Line Quarters, District South, Karachi (24°50'42.12"N and 67°02'11.33"E). The project falls within a land use category permitted by the relevant authority, and its siting by M/s L.K Builders & Developers is duly authorized.

Situated in Civil Lines, the project area represents a well-established urban setting with a mix of residential, commercial, and institutional developments. The site is positioned along Aamir Khusro Road, with connectivity to Fatima Jinnah Road and Claremont Road through the surrounding road network.

The immediate vicinity comprises several prominent developments, including a heritage building “Jenning Private School” in the middle of plot that will manage to preserve and maintain with same facade of School building during construction and usage of building for resident and convert that school into club. Othe prominent landmarks are includes the Pakistan American Cultural Center to the northwest, Bank House to the north, and Taj Safa Tower and Solid Homes towards the northeast. Sterling Homes lies across Aamir Khusro Road to the east, while The Grand Marquee and Royal Residency are located to the south and southeast, respectively. Mehran Sky Tower is situated further southwest along Claremont Road.

The location benefits from strong accessibility via major roads such as Aamir Khusro Road, Fatima Jinnah Road, and Claremont Road, linking the site with key areas of Karachi and supporting ease of movement within this central urban zone.

The project location map is attached in **Fig 1.1**.



Figure 1.1: Project Location Map

1.6 Methodology Adopted for EIA

This environmental impact assessment was conducted in the following manner:

1. Scoping

A scoping exercise was undertaken to identify the potential issues that are to be considered in the environmental impact assessment. The scoping exercise included the following tasks:

- **Data Compilation:** A generic description of the proposed activities relevant to this environmental assessment was compiled with the help of the Project Proponent.
- **Review of Published Literature:** All available published and unpublished information pertaining to the micro and macro environment of the study area was obtained and reviewed. It included the earlier studies conducted in the study area, environmental & social baseline and impact assessment studies conducted by different consultants in past. Secondary data was very helpful in understanding the issues that were identified by other consultants.
- **Review of Applicable Legislation:** Information on relevant legislation, regulations, guidelines, and standards was reviewed and compiled.
- **Identification of Potential Impacts:** The information collected in the above procedures was reviewed and potential environmental issues identified.
- **Initial Site Visit:** An initial site visit was conducted to get an overview of site conditions and the surrounding areas.
- **Stakeholder Consultation:** A stakeholder consultation was undertaken to document the concerns of the local community & other stakeholders, and to identify issues that may require additional assessment in order to address these concerns.

2. Review of Legislation and Guidelines

National & Provincial legislations, environmental guidelines, and best industry practices were reviewed to set environmental standards that the project will be required to follow during different stages of the project. Sindh Environmental Protection Act 2014, Sindh EPA (Review of IEE and EIA) Regulations, 2021 and Sectoral Guidelines for Housing were the basic guiding documents used during the study.

3. Baseline Data Collection

Detailed environmental baseline surveys were conducted to collect primary data on the Project Area to help identify sensitive receptors. The primary data were examined and compared with secondary data available from earlier environmental studies in the region. The scope of survey included collection of information on following key aspects:

- Climate and Rainfall
- Air Quality
- Noise Quality
- Topography

- Soil
- Geology
- Hydrology
- Vegetation
- Fauna
- Socioeconomic Resources

4. Identification of Aspects

Identification of environmental aspects and their significance is fundamentally important for determination of severity of incidence of impacts at different stages of the project. This step is aimed at obtaining an inventory of the aspects. The aspects identified during this step cover all activities during construction and operation, in order to determine those which, have or can have significant impact on the environment.

5. Impact Assessment & EMP

Environmental experts at EMC analyzed and assessed the anticipated impacts that are likely to arise due to the identified aspects. Each of the potential impacts identified during the scoping session was evaluated using the environmental, socioeconomic, & project information collected. In general, the impact assessment discussion covers the following aspects:

- Present baseline conditions
- Potential change in environmental parameters likely to be affected by Project related activities
- Prediction of potential impacts
- Evaluation of the likelihood and significance of potential impacts
- Defining of mitigation measures to reduce impacts to as low as practicable
- Prediction of any residual impacts, including all long and short-term, direct and indirect, and beneficial and adverse impacts
- Monitoring of residual impacts.

Environmental Management Plan (EMP) was compiled and included in the environmental assessment report to make it more comprehensive & self-sustaining with the specific purpose of providing working guidelines for the project Proponent and Management personnel who shall be responsible for the construction and operations of the project, so as to enable them to maintain the environmental and social conditions in conformity with the SEPA regulations. The management plan outlines the details required to manage environmental, safety and community risks arising from the project activities as well as social issues.

6. Preparation of Report

This EIA report has been prepared in accordance with the guidelines of the Pakistan Environmental Protection Agency (PEPA) and Sindh Environmental Protection Agency (SEPA). All pre-requisites of report writing in structural format, contents and presentation have been considered and met as per the standard format of the EIA document.

1.7 Structure of EIA Report

The EIA report has been structured on the standard format, prescribed by the Sindh Environmental Protection Agency (SEPA). The report has been presented in the following sections:

Section 1 - Introduction to Project and EIA Processes
Section 2 - Overview of National and Provincial Legislation & Guidelines relevant to Project
Section 3 - Description of Project
Section 4 - Description of Environment of Project Area
Section 5 - Stakeholders Consultation
Section 6 - Screening of Environmental and Proposed Mitigation Measures
Section 7 - Environmental Management and Monitoring Plan (EMP)
Section 8 - Conclusion and Recommendations

1.8 EIA Study Team

The study was assigned to Environmental Management Consultant (EMC) Pakistan Private Limited. EMC organized the following team to carry out the study:

Table 1.2: Members of EIA Study Team of EMC Pakistan (Pvt.) Limited

S.#	Name of Experts	Position in EIA Study Team
1.	Mr. Syed Nadeem Arif	Project Manager
2.	Mr. Syed Omar Arif	Director
3.	Mr. Muhammad Haseeb	Director
4	Mr. Ashkar Dawar	Expert/Technical Advisor
5.	Mr. Fahad Afzal	Environmental Scientist/Team Lead
6.	Mr. Hafiz Waqad	Environmental Engineer
7.	Ms. Eeman Qureshi	Environmental Engineer
8.	Mr. Sheharyar	Sociologist
9.	Mr. Hasan Mengal	Field Officer
10.	Mr. Shahab Uddin	GIS Analyst
11.	Mr. Zain	Graphic Designer/CAD Specialist

Chapter 2 Policy, Legal & Administrative Framework

This section provides detailed review of policies, legislation, and guidelines that have relevance to the proposed project and review of administrative framework as well as institutional set-up relevant to the environmental and social management of the proposed subproject.

2.1 National Laws and Regulations

Pakistan's statute books contain a number of laws related to the regulation and control of the environmental and social aspects. However, the enactment of comprehensive legislation on the environment, in the form of an act of parliament, is a relatively new practice. Most of the existing laws on environmental and social issues have been enforced over an extended period of time, and are context-specific. After the Eighteenth amendment in the Constitution of Pakistan, many federal subjects devolved to provincial legislation. The Concurrent List in fourth schedule of the Constitution containing entries of subjects wherein federal and provincial legislation could legislate has been abolished. Since project coverage is in province of Sindh; therefore, only those national laws and regulations are discussed here which have application in the project. There are still several federal laws which have not been repealed by the provinces and applicable in provinces with its original titles. The laws relevant to the proposed subproject are briefly reviewed below.

2.1.1 National Environmental Policy, 2005

The National Environmental Policy, 2005 aims to protect, conserve and restore Pakistan's environment in order to improve the quality of life for the citizens through sustainable development. It provides an overarching framework for addressing the environmental issues facing Pakistan, particularly pollution of fresh water bodies and coastal waters, air pollution, lack of proper waste management, deforestation, loss of biodiversity, desertification, natural disasters and climate change. It also gives direction for addressing the cross sectorial issues as well as the underlying causes of environmental degradation and meeting international obligations.

The National Environmental Policy, 2005 while recognizing the goals and objectives of the National Conservation Strategy, National Environmental Action Plan and other existing environment related national policies, strategies and action plans, provide broad guidelines to the Federal Government, Provincial Governments, Federally Administrated Territories and Local Governments for addressing environmental concerns and ensuring effective management of their environmental resources.

2.1.2 National Conservation Strategy, 1992

The Pakistan National Conservation Strategy (NCS) is the principal policy document for environmental issues in the country. The NCS was developed and approved by the Government of Pakistan in 1992. The NCS works on a ten-year planning and implementation cycle. It deals with fourteen core areas as follows:

- Maintaining soils in cropland;
- Increasing irrigation efficiency;
- Protecting watersheds;
- Supporting forestry and plantations;

- Restoring rangelands and improving livestock;
- Protecting water bodies and sustaining fisheries;
- Conserving of biodiversity;
- Increasing energy efficiency;
- Developing and deploying material and energy renewable;
- Preventing and abating pollution;
- Managing urban wastes;
- Supporting institutions for common resources;
- Integrating population and environmental programs;
- Preserving the cultural heritage

2.1.3 National Climate Policy, 2012

The National Climate Change Policy provides a framework for addressing the issues that Pakistan faces or will face in future due to the changing climate. In view of Pakistan's high vulnerability to the adverse impacts of climate change, in particular extreme events, adaptation effort is the focus of the policy document. The vulnerabilities of various sectors to climate change have been highlighted and appropriate adaptation measures spelled out. These cover policy measures to address issues in various sectors such as water, agriculture, forestry, coastal areas, biodiversity and other vulnerable ecosystems. Notwithstanding the fact that Pakistan's contribution to global greenhouse gas (GHG) emissions is very small, its role as a responsible member of the global community in combating climate change has been highlighted by giving due importance to mitigation efforts in sectors such as energy, forestry, agriculture and livestock.

2.1.4 Pakistan Climate Change Act, 2017

The Prime Minister established Pakistan Climate Change Council which coordinates and supervises the enforcement of the provisions of the Act, monitor implementation of the international agreements relating to climate change, approve and monitor implementation of comprehensive adaptation and mitigation policies, strategies, plans, programs, projects and other measures formulated by the authority to meet Pakistan's international obligations, monitor the implementation of National Adaptation Plan and its constituent provincial and local adaptation action plans, approves guidelines for the protection and conservation of renewable and nonrenewable resources, species, habitats and biodiversity adversely affected or threatened by climate change.

The Act is applicable to proposed project as the proposed project involves the solid waste management activities that may contribute to generation of greenhouse gases.

2.1.5 Pakistan Penal Code, 1860

The Code deals with the offences where public or private property or human lives are affected due to intentional or accidental misconduct of an individual or organization. The Code also addresses control of noise, noxious emissions and disposal of effluents.

The provisions of the Penal Code, 1860 are applicable to the Project in terms of penalties for effecting human lives and public property. It also addresses the control of noise, air emissions

and effluent disposal.

2.1.6 Land Acquisition Act, 1894 and Land Acquisition (Sindh Amendment) Act 2009

The primary law for acquisition of land for public purposes in Pakistan is the "Land Acquisition Act (LAA), 1894" (hereinafter referred as the Act). The land acquired under the Act vests in the province and it is only thereafter that the province may transfer it to someone else. The Sindh Amendment 2009 of LAA 1894 specifically related to Section 16, Section 23, Section 24 and Section 28-A.

2.1.7 National Disaster Management Act, 2010

National Disaster Management Act, 2010 was passed by Parliament of Pakistan in 2010. The Act applies to whole Pakistan. The Act was passed in backdrop of 2010 Floods in Pakistan and strengthens Disaster Management system.

2.1.8 Building Code of Pakistan, 2007

The provision of Building Code of Pakistan shall apply for engineering design of building-like structure and related components. The construction in violation of the building code shall be deemed as violation of professional engineering work. Moreover, a certificate for the proposed action will be obtained from Provincial Building Control Authority.

These codes shall be used in structural design of building area components constructed under this proposed Project.

2.1.9 Guidelines for the Preparation and Review of Environmental Reports, 1997

These guidelines describe the format and content of IEE/EIA reports to be submitted to EPA for obtaining NOC/approval.

The guidelines present:

- The environmental assessment report format;
- Assessing impacts;
- Mitigation and impact management and preparing an environmental & Social management plan;
- Reporting;
- Review and decision making;
- Monitoring and auditing; and
- Project Management.

These guidelines serve to describe the format, practices, and procedures to be employed when reporting environmental assessments.

2.1.10 Guidelines for Environmental Assessment

Pak-EPA has published a set of environmental guidelines for conducting environmental assessments and the environmental & Social management of different types of development Projects. The guidelines that are relevant to the proposed Project are listed below.

- Guidelines for the Preparation and Review of Environmental Reports, Pakistan Environmental Protection Agency, 1997;
- Guidelines for Public Consultation, Pakistan Environmental Protection Agency, May, 1997; and
- Sectoral Guidelines: Pakistan Environmental Assessment Procedures, Pakistan Environmental Protection Agency, October 1997.

2.2 Sindh Environmental Protection Act, 2014

The Sindh Environmental Protection Act, 2014 (2014 Act) was passed by the Sindh Assembly on February 24, 2014. The 2014 Act is the basic legislative tool empowering the provincial government to frame regulations for the protection of the environment. The 2014 Act envisages protection, improvement, conservation & rehabilitation of environment of Sindh with the help of legal action against polluters and green awakening of communities. It equally lays emphasis for the preservation of the natural resources of Sindh and to adopt ways and means for restoring the balance in its eco-system by avoiding all types of environmental hazards. The 2014 Act is applicable to a broad range of issues and extends to air, water, industrial liquid effluent, marine, and noise pollution, as well as to the handling of hazardous wastes.

The following provisions of the SEPA 2014 have a direct bearing on the proposed Project:

- Section 11(1): 'Subject to the provisions of this Act and the rules and regulations therein, no person shall discharge or emit or allow the discharge or emission of any effluent, waste, pollutant, noise or any other matter that may cause or likely cause pollution or adverse environmental effects, as defined in Section 2 of this Act, in an amount, concentration or level which is in excess to that specified in Sindh Environmental Quality Standards…'
- Section 11(2): 'All persons, in industrial or commercial or other operations, shall ensure compliance with the Environmental Quality Standards for ambient air, drinking water, noise or any other Standards established under section 6(1)(g)(i); shall maintain monitoring records for such compliances; shall make available these records to the authorized person for inspection; and shall report or communicate the record to the Agency as required under any directions issued, notified or required under any rules and regulations.'
- Section 14 (1): 'Subject to the provisions of this Act and the rules and regulations, no person shall cause any act, deed or any activity', including;
  - (b) disposal of solid and hazardous wastes at unauthorized places as prescribed;
  - (c) dumping of wastes or hazardous substances into coastal waters and inland water bodies; and
  - (d) release of emissions or discharges from industrial or commercial operations as prescribed.
- Section 15 (1): 'Subject to the provisions of this Act, no person shall operate or manufacture a motor vehicle or class of vehicles from which air pollutants or noise are being emitted in an amount, concentration or level which is in excess of the Sindh Environmental Quality Standards or, where applicable, the standards established under sub-clause (i) of clause (g) of sub-section (1) of section 6'.

- Section 17(1): 'No proponent of a project shall commence construction or operation unless he has filed with the Agency an initial environmental examination or environmental impact assessment, and has obtained from the Agency approval in respect thereof'
- Section 17(2): The agency shall;
  - ❖ a) review the initial environmental examination and accord its approval, subject to such terms and conditions as it may prescribe, or require submission of an environmental impact assessment by the proponent; or
  - ❖ (b) review the environmental impact assessment and accord its approval subject to such terms and conditions as it may deem fit to impose or require that the environmental impact assessment be re-submitted after such modifications as may be stipulated or decline approval of the environmental impact assessment as being contrary to environmental objectives.
- Section 17(3): 'Every review of an environment impact assessment shall be carried out with public participation and, subject to the provisions of this Act, after full disclosure of the particulars of the project'.
- Section 17(4): 'The Agency shall communicate its approval or otherwise within a period of two months from the date that the initial environmental examination is filed, and within a period of four months from the date that the environmental impact assessment is filed complete in all respects in accordance with the regulations, failing which the initial environmental examination or, as the case may be, the environmental impact assessment shall be deemed to have been approved, to the extent to which it does not contravene the provisions of this Act and the rules and regulations'.
- Section 20(1): 'The Agency shall from time to time require the person in charge of a project to furnish, within such period as may be specified, an environmental audit or environmental review report or environmental management plan containing a comprehensive appraisal of the environmental aspects of the project'.
- Section 20(2): The report of a project prepared under sub-section (1) shall include:
- (a) analysis of the predicted qualitative and quantitative impact of the project as compared to the actual impact;
- (b) evaluation of the efficacy of the preventive, mitigation & compensatory measures taken with respect to the project; and
- (c) recommendations for further minimizing or mitigating the adverse environmental impact of the project.
- Section 20(3): 'Based on its review of the environmental audit report, the Agency may, after giving the person in charge of the project an opportunity of being heard, direct that specified mitigation and compensatory measures be adopted within a specified time period and may also, where necessary, modify the approval granted by it under section 17'.
- Section 31(1): 'The Agency shall cause relevant details of any proposed project regarding which an Environmental Impact Assessment has been received to be published, along with an invitation to the publish to furnish their comments thereon within a specified period'.
- Section 31(3): 'All comments received under sub-section (1) and (2) shall be duly considered by the Agency while reviewing the environmental impact assessment or strategic impact assessment, and decision or action taken thereon shall be communicated to the persons who have furnished the said comments.

2.3 Sindh EPA (Review of IEE and EIA) Regulations, 2021

The Sindh Environmental Protection Agency (Environmental Assessment) Regulations 2021, revised from the preceding document introduced in 2014, define Schedules (I, II, & III) of projects falling under the requirement of an Environmental Checklist, IEE, or EIA respectively.

Schedule I: The project falls into Schedule I if it is considered as having minimal environmental impact, and the screening of the project through a checklist, documents its environmental compliance.

Schedule II: The project falls in Schedule II if it is likely to have adverse environmental impacts, but of lesser degree or significance and all the mitigation measures to handle the impact is manageable. Such types of projects need IEE report inducing EMP.

Schedule III: Projects are categorized in Schedule III if they generate significant adverse environmental impacts that require a comprehensive management plan, or if the project is located within or passes through: a) Areas declared by the Government of Pakistan as environmentally sensitive (National Parks/Sanctuaries/Game Reserve), b) Areas of international significance (e.g. protected wetland as designated by the RAMSAR Convention), or c) Areas designated by the United Nations Educational, Scientific and Cultural Organization (UNESCO) as cultural heritage sites.

According to Sindh Environmental Protection Agency Environmental Assessment Regulations, 2021, a project falling in any category listed in Schedule III shall file an EIA with the Sindh Environmental Protection Agency (SEPA). This specific project can be categorized as:

Schedule III: Projects Requiring an EIA

Category (I) Urban Development and Tourism

(2) Residential, Commercial High-rise buildings subject to compliance of building bylaws of relevant organizations more than 500,000 sq. feet

Filing: Regulation 9 requires submission of two hardcopies and two electronic copies accompanied by an application form (schedule-V), copy of receipt of payment of review fee, NOC from relevant departments (where applicable).

Preliminary Scrutiny: Regulation 10 states that at any time after the submission of the report, the agency shall review the report and inform the proponent for submission of the need for any additional information at any time.

Review: The agency shall review the report after issuing confirmation of completeness as per Regulation 9.

Validity: Regulation 15 defines the validity period of approval of an IEE or EIA to be three years from date of construction and must start within three years of report approval. A three-year extension at a time may be granted upon the agency's discretion with or without the submission of a fresh IEE or EIA.

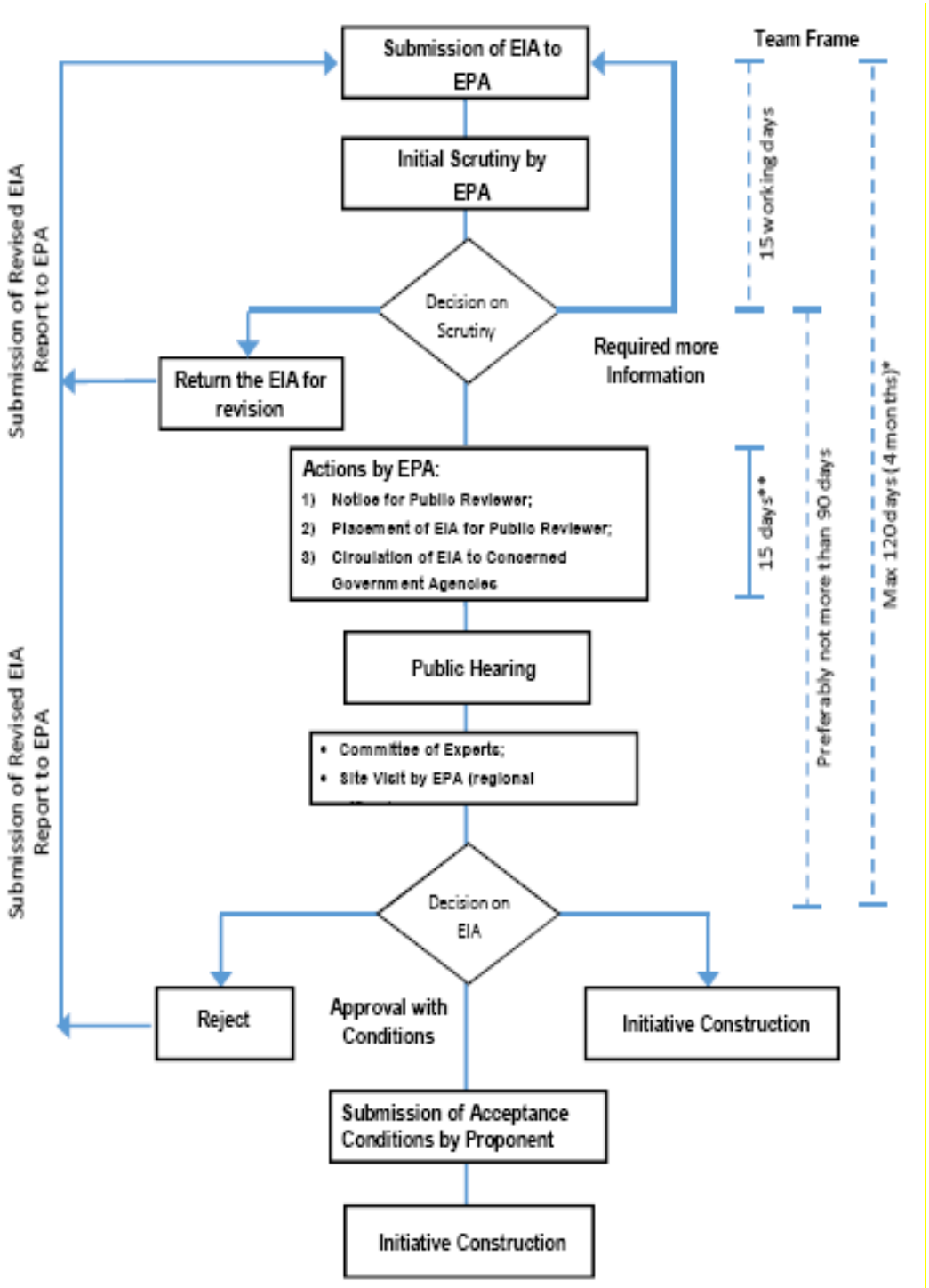


Figure 2.1: Procedure for EIA Review and Approval process

2.4 Guidelines for Public Consultation

Public consultation is mandated under 2014 Act. Regulation 11 of the 2014 Regulations provides the general requirements whereas the sectoral guidelines indicating specific assessment requirements are provided in the Guidelines for Public Consultation 1997 (the 'Guidelines'). These are summarized below:

Objectives of Public Involvement: 'To inform stakeholders about the proposed project, to provide an opportunity for those otherwise unrepresented to present their views and values, providing better transparency and accountability in decision making, creating a sense of ownership with the stakeholders';

Stakeholders: 'People who may be directly or indirectly affected by a proposal will clearly be the focus of public involvement. Those who are directly affected may be project beneficiaries, those likely to be adversely affected, or other stakeholders. The identification of those indirectly affected is more difficult, and to some extent it will be a subjective judgment. For this reason, it is good practice to have a very wide definition of who should be involved and to include any person or group who thinks that they have an interest. Sometimes it may be necessary to consult with a representative from a particular interest group. In such cases the choice of representative should be left to the group itself. Consultation should include not only those likely to be affected, positively or negatively, by the outcome of a proposal, but should also include those who can affect the outcome of a proposal';

Mechanism of Consultations: 'Provide sufficient relevant information in a form that is easily understood by non-experts (without being simplistic or insulting), allow sufficient time for stakeholders to read, discuss, consider the information and its implications and to present their views, responses should be provided to issues and problems raised or comments made by stakeholders, selection of venues and timings of events should encourage maximum attendance';

Timing and Frequency: Planning for the public consultation program needs to begin at a very early stage; ideally it should commence at the screening stage of the proposal and continue throughout the EIA process;

Consultation Tools: Some specific consultation tools that can be used for conducting consultations include; focus group meetings, needs assessment, semi-structured interviews; village meetings & workshops;

Other Important Considerations: The development of a public involvement program would typically involve consideration of the following issues; objectives of the proposal and the study; identification of stakeholders; identification of appropriate techniques to consult with the stakeholders; identification of approaches to ensure feedback to involved stakeholders; and mechanisms to ensure stakeholders' consideration are considered.

As above, the Guidelines for Public Consultation introduces effective ways to inform the contents of the project to the general public during the planning stage and that eventually consensus building toward the implementation of project is reached. However, there are instances where in middle of a project on direction of tribunal or court environmental assessment carried out with public consultation.

Incorporating public involvement into the stages of environmental assessment is explained in the guidelines that public consultation meeting has to be carried out after the works on

"developing options and assessing and mitigating impacts" for comments and assessment.

2.5 Sindh Environmental Quality Standards

On January 28, 2016, the Sindh Environmental Industrial Waste Water, Effluent, Domestic, Sewerage, Industrial Air Emission and Ambient Air, Noise for Vehicles, Air Emissions for Vehicles and Drinking Water Quality Standards, 2015 have been notified by Sindh EPA.

Table 2.1 shows SEQS for ambient air.

Table 2.1: Sindh Environmental Quality Standard for Ambient Air

Pollutant	Time-weighted average	Concentration in Ambient Air	Method of Measurement
Sulfur Dioxide (SO_2)	Annual Average*	80 µg/m^3	Ultraviolet Fluorescence Method
	24 hours**	120 µg/m^3	
Oxides of Nitrogen as (NO)	Annual Average*	40 µg/m^3	Gas Phase Chemiluminescence
	24 hours**	40 µg/m^3	
Oxides of Nitrogen as (NO_2)	Annual Average*	40 µg/m^3	Gas Phase Chemiluminescence
	24 hours**	80 µg/m^3	
O_3	1 hour	130 µg/m^3	Non dispersive UV absorption method
Suspended Particulate Matter (SPM)	Annual Average*	360 µg/m^3	High volume Sampling, (Average flow rate not less than 1.1m^3/minute)
	24 hours**	500 µg/m^3	
Respirable Particulate Matter (PM_{10})	Annual Average*	120 µg/m^3	B Ray absorption method
	24 hours**	150 µg/m^3	
Respirable Particulate Matter ($PM_{2.5}$)	Annual Average*	40 µg/m^3 ***	B Ray absorption method
	24 hours**	75 µg/m^3	
	1 hour	15 µg/m^3	
Lead (Pb)	Annual Average*	1 µg/m^3	ASS Method after sampling using EPM 2000 or equivalent Filter paper
	24 hours**	1.5 µg/m^3	
Carbon Monoxide (CO)	8hours**	5 mg/m^3	Non Dispersive Infra Red (NDIR) method
	1hours	10 mg/m^3	

*Annual arithmetic means of minimum 104 measurements in a year taken twice a week 24 hourly at uniform interval.

**24 hourly / 8 hourly values should be met 98% of the in a year. 2% of the time, it may exceed but not on two consecutive days.

*** or 9 µg/m^3 plus baseline, whichever is low

Table 2.2 shows the standards for motor vehicle noise.

Table 2.2: The Motor Vehicle Ordinance (1965) and Roles (1969)		
Parameter	**Standards (maximum permissible limit)**	**Measuring method**
Noise	85dB(A)	Sound-meter at 7.5meter from the source

Table 2.3 shows the proposed national environmental quality standard for noise.

Table 2.3: Sindh Environmental Quality Standard for Noise			
S. No.	**Category of Area / Zone**	**Effective from 1st January, 2015**	
		Limit it in dB(A) Leq*	
		Day Time	**Night Time**
1	Residential area (A)	55	45
2	Commercial area (B)	65	55
3	Industrial area (C)	75	65
4	Silence Zone (D)	50	45
Note: 1	Day time hours: 6.00 a. m to 10.00 p. m		
2	Night time hours: 10.00 p. m to 6.00p. m		
3	Silence zone; Zone which are declared as such by competent authority. An area comprising not less than 100 meters around hospitals, educational institutions and courts.		
4	Mixed categories of areas may be declared as one of the four above-mentioned categories by the competent authority.		
*dB(A)Leq	Time weighted average of the level of sound in decibels on scale A which is relatable to human hearing.		

The SEQS for effluents are shown in **Table 2.4**.

Table 2.4: Sindh Environmental Quality Standard for Municipal & Liquid Industrial Effluents					
S. #	**Parameter**	**Into Inland Waters**	**Into Sewage Treatment**	**Into Sea**	**unit**
1	Temperature or Temp. increase	<3	<3	<3	°C
2	pH value (H^+)	6-9	6-9	6-9	
3	Biological Oxygen Demand $(BOD)_5$ at 20°C	80	250	80	mg/l
4	Chemical Oxygen Demand (COD)	150	400	400	mg/l
5	Total Suspended Solids (TSS)	200	400	200	mg/l
6	Total Dissolved Solids (TDS)	3500	3500	3500	mg/l
7	Oil and Grease	10	10	10	mg/l
8	Phenolic Compounds (as Phenol)	0.1	0.3	0.3	mg/l
9	Chloride (as Cl^-)	1000	1000	SC	mg/l

10	Fluoride (as F^-)	10	10	10	mg/l
11	Cyanide (as CN^-) total	1.0	1.0	1.0	mg/l
12	An-ionic detergents (as MBAS)	20	20	20	mg/l
13	Sulphate (SO_4^{2-})	600	1000	SC	mg/l
14	Sulphide (S^{2-})	1.0	1.0	1.0	mg/l
15	Ammonia (NH_3)	40	40	40	mg/l
16	Pesticides	0.15	0.15	0.15	mg/l
17	Cadmium	0.1	0.1	0.1	mg/l
18	Chromium (trivalent and hexavalent)	1.0	1.0	1.0	mg/l
19	Copper	1.0	1.0	1.0	mg/l
20	Lead	0.5	0.5	0.5	mg/l
21	Mercury	0.01	0.01	0.01	mg/l
22	Selenium	0.5	0.5	0.5	mg/l
23	Nickel	1.0	1.0	1.0	mg/l
24	Silver	1.0	1.0	1.0	mg/l
25	Total toxic metals	2.0	2.0	2.0	mg/l
26	Zinc	5.0	5.0	5.0	mg/l
27	Arsenic	1.0	1.0	1.0	mg/l
28	Barium	1.5	1.5	1.5	mg/l
29	Iron	8.0	8.0	8.0	mg/l
30	Manganese	1.5	1.5	1.5	mg/l
31	Boron	6.0	6.0	6.0	mg/l
32	Chlorine	1.0	1.0	1.0	mg/l

The SEQS for drinking water are shown in **Table 2.5**.

Table 2.5: Sindh Environmental Quality Standards for Drinking Waters (mg/l)

S.#	Properties / Parameters	Standard Values for Pakistan	S.#	Properties / Parameters	Standard Values for Pakistan
Bacterial			**Chemical**		
1	All water intended for drinking (E. coli or Thermo tolerant Coliform bacteria)	Must not be detectable in any 100-ml sample	Essential Inorganics (mg/liter)		
			13	Aluminum (Al) mg/l	≤ 0.2
			14	Antimony (Sb)	≤ 0.005
2	Treated water entering the	Must not be detectable in any	15	Arsenic (As)	≤ 0.05
			16	Barium (Ba)	0.7

	distribution system (E. coli or thermo tolerant coliform and total coliform bacteria)	100-ml sample	17	Boron (B)	0.3
3	Treated water in the distribution system (E.coli or thermo tolerant coliform and total coliform bacteria)	Must not be Detectable in any 100-ml sample. In case of large supplies, where sufficient samples are examined, must not be resent in 95% of the samples taken throughout any 12-month period.	18	Cadmium (Cd)	0.01
			19	Chloride (Cl-)	< 250
			20	Chromium (Cr)	≤ 0.05
			21	Copper (Cu)	2
			Organic (mg/L)		
			22	Phenolic compounds	<0.0002
			Toxic Inorganics (mg/liter)		
			23	Cyanide (CN)-	≤ 0.05
			24	Fluoride (F)	≤ 1.5
			25	Lead (Pb)	≤ 0.05
			26	Manganese (Mn)	≤ 0.5
Physical			27	Mercury (Hg)	≤ 0.001
4	Color	< 15 TCU	28	Nickel (Ni)	≤ 0.02
5	Taste	Non-objectionable/ Acceptable	29	Nitrate (NO_3)-	≤ 50
6	Odor	Non-objectionable/ Acceptable	30	Nitrite (NO_2)-	≤ 3
7	Turbidity	< 5 NTU	31	Selenium (Se)	≤ 0.01
8	Total Hardness as $CaCO_3$	< 500 mg/l	32	Residual Chlorine	0.2-0.5 At consumer end 0.5-1.5 at source
9	TDS	<1000			
10	pH	6.5-8.5			
Radioactive					
11	Alpha Emitters bq/L	0.1	33	Zinc (Zn)	5.0
12	Beta emitters	1			

2.6 Sindh Prohibition of Child Employment Act, 2017

Article 11(3) of the Constitution of Pakistan prohibits employment of children below the age of

14 years in any factory, mines or any other hazardous employment. In accordance with this Article, the Prohibition of Child Employment Act (PCEA) 2017 disallows the child labor in Sindh. The PCEA defines a child as a person who has not completed his/her fourteenth years of age, and an adolescent means a person who has completed fourteenth year of age but has not completed eighteenth years of his age. No child shall be employed or permitted to work in any establishment including construction but an adolescent can be employed or permitted to work under strict guidelines provided in the PCEA and rules. An adolescent shall not be employed in any hazardous work included in the schedule to the PCEA.

2.7 Archaeological Relics

After the Eighteenth amendment in the constitution the subject of "Ancient and historical monuments, archaeological sites and remains" the entry No.37 of the concurrent legislative list has also devolved to provincial legislations. There are two laws that are directly relevant for archaeological relics. The first is The Antiquities Act, 1975, which ensures the protection of Pakistan's cultural resources. The Act defines "antiquities" as ancient products of human activity, historical sites or sites of anthropological or cultural interest, national monuments, etc. The Act is designed to protect these antiquities from destruction, theft, negligence, unlawful excavation, trade, and export. The law prohibits new construction in the proximity of a protected antiquity and empowers the GoP to prohibit excavation in any area that may contain articles of archaeological significance. Under the Act, the Project proponents are obligated to ensure that no activity is 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.

2.8 The Sindh Cultural Heritage (Preservation) Act, 1994

The Sindh Cultural Heritage (Preservation) Act, 1994 is the provincial law for the protection of cultural heritage. Its objectives are similar to those of the Antiquity Act, 1975. No antiquity protected under these two laws is identified in the vicinity of the proposed project area.

2.9 Pakistan Penal Code, 1860 (PPC)

Chapter XIV of the PPC deals with the offences affecting the public health, safety, convenience, decency and morals. Person may be guilty of public nuisance if his act or omission causes common injury, danger or annoyance to the public or results in spread of infection of disease dangerous to life. The chapter also deals with environmental pollution.

2.10 Sindh Solid Waste Management Board Act, 2014

The Sindh Solid Waste Management Board (SSWMB) Act, 2014 was enacted to establish a Board for collection and disposal of all solid waste, to arrange effective delivery of sanitation services, to provide pollution free environment and to deal with other relevant matters. The Board established under the Act headed by the Chief Minister or his nominee and constitutes of thirteen other ex officio members of other relevant departments. Some of the salient features and functions of the Board are; it has the right over the solid waste related issues, assets, funds and liabilities of the Councils and shall possess sole rights on all kinds of solid waste within the limits

of all Councils established under the Local Government Act 2013, it has the authority to grant permission to individuals, institutions industries, factories, workshops, furnaces, compost making and power generation from the solid waste, for segregation of the recyclable material from the waste, collection, treatment, sale and purchase, recycling or disposal of any kinds of waste.

Solid waste management of the area falls under the jurisdiction of SSWMB. The condition of solid waste management in the project area is good. The project area is quite clean and the residents are satisfied with the solid waste management in the area.

2.11 Disaster Management Act, 2010

This Act was enacted to provide for the establishment of a National Disaster Management System for Pakistan. Sindh Disaster Management Authority enforces the Act. The Act defines 'disaster' as a catastrophe or a calamity in an affected area, arising from natural or man-made causes or by accident which results in a substantial loss of life or human suffering or damage to, and destruction of, property. Disaster management includes preparedness and response. The Act provides establishment of disaster management authorities at national, provincial and district levels. The authorities require preparing and implementing disaster management plan for their area.

2.12 Sindh Drinking Water Policy, 2017

Public Health Engineering & Rural Development Department, Government of Sindh, with the approval of Chief Minister Sindh issue the drinking water policy on 3rd May 2017.

Principles: The main principles of Sindh Drinking Water Policy, adopted from the National Drinking Water policy 2009, and aligned with the Sustainable Development Goals, are as follows:

- Access to safely managed drinking water is a fundamental right of every citizen and that it is the responsibility of the Government to ensure its provision to all citizens,
- Water allocation for drinking purpose shall be given priority over other uses,
- In order to ensure equitable access, special attention shall be given to removing the existing disparities in coverage of safe drinking water and for addressing the needs of the poor and the vulnerable on priority basis.
- Recognizing that inadequate and unsafe water supply and sanitation are a major cause of diarrhea and nutritional deficiency in children, which as a consequence contribute towards child mortality. Safely managed drinking water supply and sanitation shall be integrated in health, nutrition and school health programs.
- Access shall be increased to high quality nutrition-sensitive services, including access to water, sanitation facilities, and hygiene.
- Key hygiene actions (safe drinking water, hand washing with soap, safe disposal of excreta, food hygiene) shall be integrated as essential components in all nutrition programs.
- Realizing the fact that access and availability of safe drinking water affects all aspects of life of a citizen, a multi sectoral approach, involving different departments of the government, shall be adopted to address the issues related to safe drinking water.

- Being cognizant of the fact that women are the main providers of domestic water supply and maintainers of hygienic household environment, their participations in planning, implementation, monitoring and operation & maintenance of water supply systems shall be ensured, and WASH shall be integrated in maternal and neonatal health programs.
- Responsibilities and resources shall be delegated to local authorities to enable them to discharge their assigned functions with regard to provision of safe water supply.
- A supportive policy framework shall be developed that encourages alternate options through private provision, public private partnerships, the role of NGOs and community organizations
- The execution of component-sharing model for government programs and projects shall be promoted to ensure financial sustainability and community and private sector involvement in development and O&M.
- Low-cost technologies in water and sanitation, that are easy and cost-effective to maintain shall be developed and used.

Goals and Objectives:

Overall Goal: The goal of the Sindh Drinking Water Policy is to improve the quality of life of people of Sindh by reducing morbidity and mortality caused by water-borne diseases through provision of safely managed and potable drinking water to the entire population that is located on premises, available when needed, and free from contamination, affordable and of sufficient quantity, and in a way, that is efficient, equitable and sustainable.

Objectives: Introduce legislative measures and regulations to create an enabling framework for safely managed drinking water supply, regulation of water usage, extraction, treatment, transportation and distribution.

- Ensure that all drinking water resources and supply systems are protected with community involvement.
- Develop district level drinking water availability plans for urban and rural areas to ensure improved planning for equitable access.
- Enhance the coverage of safely managed drinking water supply in the province to achieve the Sustainable Development Goals (SDGs) targets of universal access.
- Develop criteria for installation of new drinking water supply schemes and ensure that all new schemes are safely managed, rationalized and constructed through need-based criteria so that all areas and communities are served.
- Develop standardized service delivery models for both urban and rural drinking water supply schemes to improve efficiency, cost-effectiveness, monitoring & sustainability.
- Develop mechanisms for reuse, recycle and recharge of wastewater for other municipal and productive uses.
- Ensure that all drinking water supply systems are designed and constructed in line with the national drinking water quality standards and all municipal discharges comply with National Environment Quality Standards (NEQS).
- Install water treatment plants at existing drinking water supply schemes where required and incorporate water treatment facilities in all new drinking water supply schemes.
- Ensure development of water safety plans for all drinking water supply systems.

- Develop and sustain regular drinking water quality monitoring & surveillance, and institute mechanisms for remedial action.
- Increase public awareness about water borne and water related diseases (including polio), nutrition and hygiene, and enhance the role of communities for household water treatment/storage, water safety and conservation, and safe hygiene practices.
- Ensure that drinking water supply projects are nutrition sensitive and integrated in health, nutrition and school health programs.
- Institutionalize Water, Sanitation & Hygiene (WASH) in schools (infrastructure and 3 starts) and introduce curricular change to incorporate health, nutrition and hygiene and improve safe water and sanitation practices among school children.
- Institute adaptation measures and disaster risk reduction and mitigation strategies to minimize the impact of climate events on drinking water supply system.

The proponent shall ensure supply of clean drinking water to the construction staff.

2.13 Sindh Sanitation Policy, 2017

The goal of the Provincial Sanitation policy is to ensure that the entire population of Sindh has access to a safely managed sanitation service and sanitary environment that is also nutrition-sensitive and hygienic. The motto of the policy was 'Saaf Suthra Sindh' (Neat and Clean Sindh).

The key targets of this policy are:

1. To eradicate open defecation from Sindh province by 2025, while 70%villages 0f 13 high priority districts achieve the status of open defecation free by 2020.

2. That 100% household in Sindh have access to and use sanitary latrines by 2025, while 70% of rural households in high priority districts will achieve this by 2020.

3. To strengthen and implement liquid waste management with sewer lanes and covered/improved drains with 85% coverage of urban areas and 60% coverage in rural areas.

4. To create and develop wastewater treatment mechanisms to cover 75% of urban areas and 40% rural areas by 2025.

5. To implement integrated solid waste management with 100% coverage in urban area and 60% in rural areas by 2025.

2.14 Laws and Regulations on Urban Development

Sindh Government also has some laws and regulations for building control:

1) Buildings Control Ordinance, 1979
2) Karachi Building Control Licensing Regulations, 1982
3) Sindh Regulation & Control (Use of Plots & Construction of Buildings) Ordinance, 2002

Karachi Building Control Authority (KBCA) has been established under these ordinances, in

order to implement and enforce the above regulations. The Government of Sindh on 14th February 2011 notified extension of the jurisdiction of KBCA to the whole of Sindh and renamed the KBCA to Sindh Building Control Authority (SBCA). The SBCA (Karachi region) is responsible to oversee that the land development process & construction activities do not violate the Karachi Building and Town Planning Regulations, 2002.

Karachi Building and Town Planning Regulations, 2002 is the fundamental regulation for 'Building & Town Planning' for the whole City District of Karachi, except for the cantonment areas and the projects of National Security declared by the Federal Government, which supersedes 'Karachi Building and Town Planning Regulations-1979'. Eight (8) public agencies are individually designated as 'Concerned Authorities for respective areas and purposes', following City District Government Karachi (CDGK), such as:

- Cantonment Boards of the Ministry of Defense
- Karachi Port Trust (KPT)
- Pakistan Railways (PR)
- Ministry of Works, Government of Pakistan (GOP)
- Sindh Industrial Trading Estates, Karachi (SITE)
- Sindh Katchi Abadis Authority
- Board of Revenue

For reference, there are many agencies holding lands in Karachi and no dominant ones. An outline of existing condition of land holdings in Karachi is illustrated as follows.

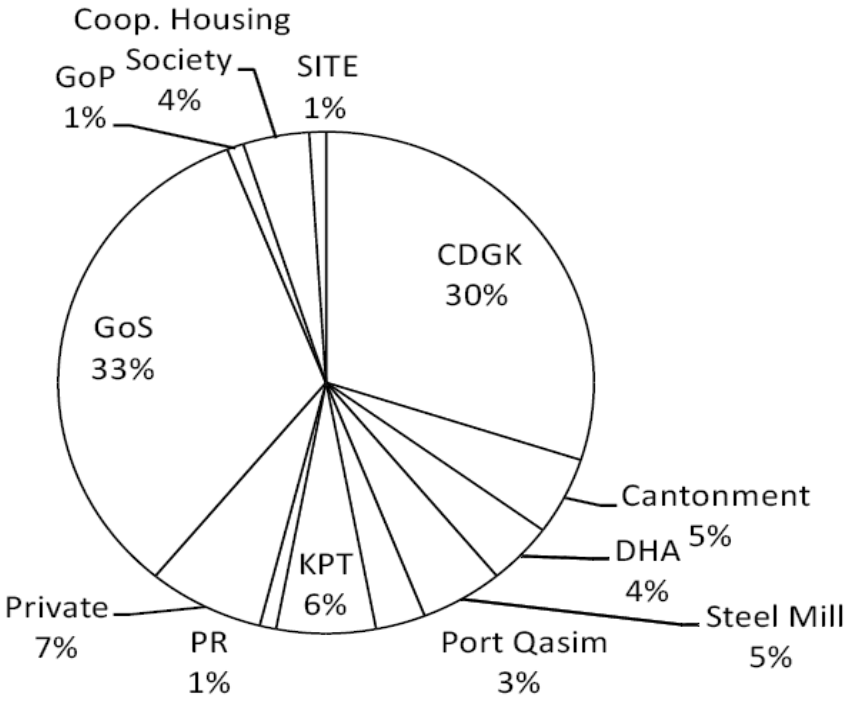


Figure 2.2: Land Holdings by Agency in Karachi (Source: KMP 2020)

The above-mentioned regulations have been quite frequently amended as needs arose, since its commencement, especially among the detailed provisions.

2.15 Civil Aviation Rules, 1994

The Civil Aviation Rules 1994 has mandated it for all the builders and developers to obtain No Objection Certificate (NOC) from Civil Aviation Authority (CAA) under rule 68, section-3 of Civil Aviation Rules, 1994 for "Height Clearance" for projects/buildings within the radius of 25 km of all airports. The rule 68, section 3 (Safe Guarding at Aerodromes (68) Limitation of obstructions) reads as under: "No person shall erect any temporary or permanent structure, nor position a vehicle or other mobile object on or in the vicinity of any aerodrome to which these rules are applicable, that will be within the clearance area, or will protrude through an obstacle limitation surface, at that aerodrome".

For height clearance of the project, No Objection Certificate (NOC) from CAA will be obtained and submitted in due time.

2.16 Building Code of Pakistan, Fire Safety Provisions 2016

The Building Code of Pakistan-Fire Safety Provisions-2016 provide rules for fire prevention, life safety in relation to fire and fire protection of building and structures as prescribed. All the federal and provincial governments, organizations, authorities, both public and private are mandated to adopt and implement Building Code of Pakistan-Fire Safety Provisions-2016, as notified. Any construction and modification of buildings in violation of Building Code of Pakistan (Fire Safety Provisions-2016) shall be considered as violation of professional engineering works as specified under clause (xxv) of section 2 of the Act.

The implementation and enforcement of this bye-law shall vest with the Authority Having Jurisdiction (AHJ) within their respective jurisdictions and circles as follow:

1) Building Control, Housing and Development Authorities
2) District Administration
3) Tehsil or Town Administration
4) Municipal Administration
5) Station Headquarters (Army, Air Force and Navy)
6) Cantonment Administration
7) Union Council Administration
8) Autonomous Bodies
9) Industrial Estates
10) Directorates of Civil Defense
11) Export Processing Zones
12) Other Federal/Provincial Authorities as and when notified

This Bye-law shall come into force upon being notified and all the concerned AHJs shall implement the same immediately in the prescribed manner.

All relevant AHJs shall ensure compliance and implementations of this Code and accordingly

adopt or amend their relevant regulations, Bye-laws or rules as the need be.

This Bye-law shall apply to both new and existing buildings.

a. buildings permitted for construction after the adoption of these Provisions shall comply with the provisions stated herein for new buildings forthwith.
b. existing buildings constructed prior to adoption of these provisions shall comply with the provisions stated herein as soon as possible but not later than three years of notification of these provisions; and
c. minimum fire protection requirements such as provision of fire alarm and detection system, fire extinguishers, emergency response plans and fire drills shall however be in place as soon as possible but not later than one year of notification of these provisions.

Any person who fails to comply with this Bye-law or fails to carry out an order made pursuant to these provisions, or violates any condition attached to a permit, approval, or certificate shall be subject to the penalties in accordance with the regulations of AHJ.

In operational phase, the fire safety provisions will be followed accordingly.

2.17 The Sindh Occupational Safety and Health Act, 2017

The Sindh Occupational Safety and Health Bill 2017 has been approved by the Provincial Assembly of Sindh (Ref. Sindh Bill No. 27 of 2017) and enacted as the Sindh Occupational Safety and health Act, 2017. The Act makes provision for Occupational Safety and Health conditions at all workplaces for the protection of persons at work places against risk of injury arising out of the activities at work places and the promotion of safe, healthy and decent working environment adapted to the physical, physiological and psychological needs of all persons at work.

During construction and operational phase, the health and safety of workers and the maintenance staff shall be considered in accordance with Sindh Occupational Safety and Health Act 2017.

2.18 IFC General EHS Guidelines

The EHS guidelines published by IFC are technical reference documents that address IFC's expectations regarding the industrial pollution management performance of its projects; however, these guidelines have been benefited from for other projects as well. They are designed to assist managers and decision makers with relevant industry background and technical information. This information supports actions aimed at avoiding, minimizing, and controlling EHS impacts during construction, operation, and decommissioning phase of a project or facility. Environmental issues associated with the construction and maintenance activities may include, among others, noise and vibration, soil erosion, and threats to biodiversity including habitat alteration and impacts to wildlife.

Examples of the impacts addressed in the General EHS Guidelines include:

- Construction site waste generation;
- Soil erosion and sediment control from materials sourcing areas and site preparation activities;
- Fugitive dust & other emissions (e.g. from vehicle traffic, land clearing activities, & materials stockpiles);
- Noise from heavy equipment and truck traffic;
- Potential for hazardous materials and oil spills associated with heavy equipment operation and fueling activities.

Chapter 3 Project Description

3.1. The Project

The proposed project, Metro Address is planned to be constructed at Plot No. 13, CL-07, Civil Line Quarters, District South, Karachi, by M/s L.K Builders & Developers, having a plot area of 4152.00 SQ YDS. The project comprises B-2 + B-1 + Ground + 46 stories and is designed as a residential-cum-commercial building project.

3.2. Project Location

The project falls within the appropriate zoning category that permits the proposed land use as approved by the relevant authority. The siting of the proposed project, Metro Address, located at Plot No. 13, CL-07, Civil Line Quarters, District South, Karachi (coordinates: 24°50'42.12"N and 67°02'11.33"E), by M/s L.K Builders & Developers is duly authorized.

The project is situated in Civil Lines, Karachi, a well-developed urban locality characterized by a mix of residential, commercial, and institutional developments. According to the location map, the project site is bounded by Fatima Jinnah Road to the southwest, Aamir Khusro Road to the east, and internal streets connecting towards Claremont Road.

The immediate surroundings of the project include a heritage building “Jenning Private School” in the middle of plot that will manage to preserve & maintain with same facade of School building during construction and usage of building for resident and convert that school into club. Other prominent landmarks. Pakistan American Cultural Center is located to the northwest of the site, while Bank House lies in close proximity to the north. Taj Safa Tower and Solid Homes are situated towards the northeast, and Sterling Homes lies further east across Aamir Khusro Road. To the south of the project site is The Grand Marquee, while Royal Residency is located towards the southeast. Additionally, Mehran Sky Tower is situated towards the southwest along Claremont Road. These surrounding developments indicate that the project is located in a dense and established urban setting.

The project site is easily accessible via major road networks including Fatima Jinnah Road, Aamir Khusro Road, and Claremont Road, which connect the area to other key parts of Karachi. The presence of well-developed road infrastructure ensures convenient access from surrounding residential, commercial, and institutional zones. The proposed project 3D Conceptual view is attached in **fig 3.1**.



Fig 3.1: 3D Conceptual view of the proposed project

3.3. Project Details

Salient Features of the Project are provided below:

Table 3.1: Salient Features of the Project	
Project Name	Metro Address Residential-cum-Commercial Building
Category	Residential-cum-Commercial
Proponent	M/s L.K Builders & Developers
Plot Area	4152.00 SQ YDS (0.8578 acres)
Gross covered area	616,259.64 SQ FT
Net area after exemptions	298,918.64 SQ FT
Stories	B-2 + B-1 + G + 46
Location	Plot No. 13, CL-07, Civil Line Quarters, District South, Karachi
Basement-2 Plan (Services)	Utility areas including service rooms and infrastructure facilities.
Basement-1 Plan (Parking + ARS + Services)	Parking area, ARS, pump rooms and other associated services.
Ground Floor Plan (Parking + Shops + Services)	Parking spaces, commercial shops, reception and service areas.
1st Floor Plan (Parking + Services)	Parking area along with associated services.
2nd to 10th Floor Plan	Parking floors with supporting services.
11th to 12th Floor Plan (Recreation Area + Services)	Recreational facilities including community and leisure spaces.
13th to 46th Floor Plan (Flats)	Residential apartments with associated services.
Roof Plan (Solar Panel + Battery Room + Machine Room + OHWT + Helipad)	Includes solar panels, overhead water tanks, machine room, battery room and helipad
Total Parking	Total Project Parking: 331 Cars and 375 Motors Bike
Totals Flats	Total 136 Flats
Total Shops	**1** shops
Height of the Building	480 feet Above Ground Level (AGL)

The floor-by-floor layouts of the proposed project, including basement, typical floors, roof plan, and elevation details, are presented in **Figures 3.2** to **3.6**.

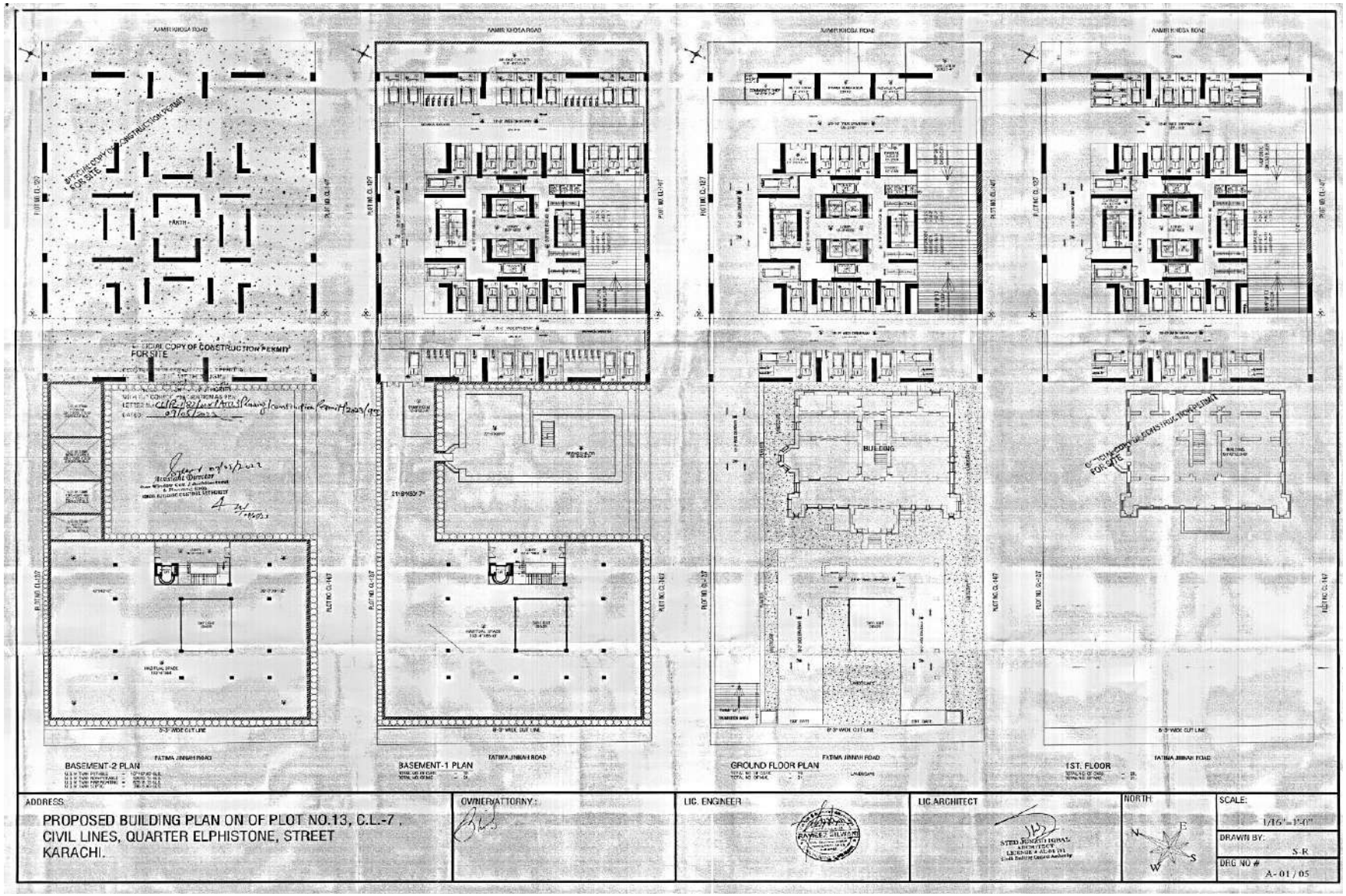


Figure 3.2: Basement-2, Basement-1, Ground Floor and 1st Floor Layouts

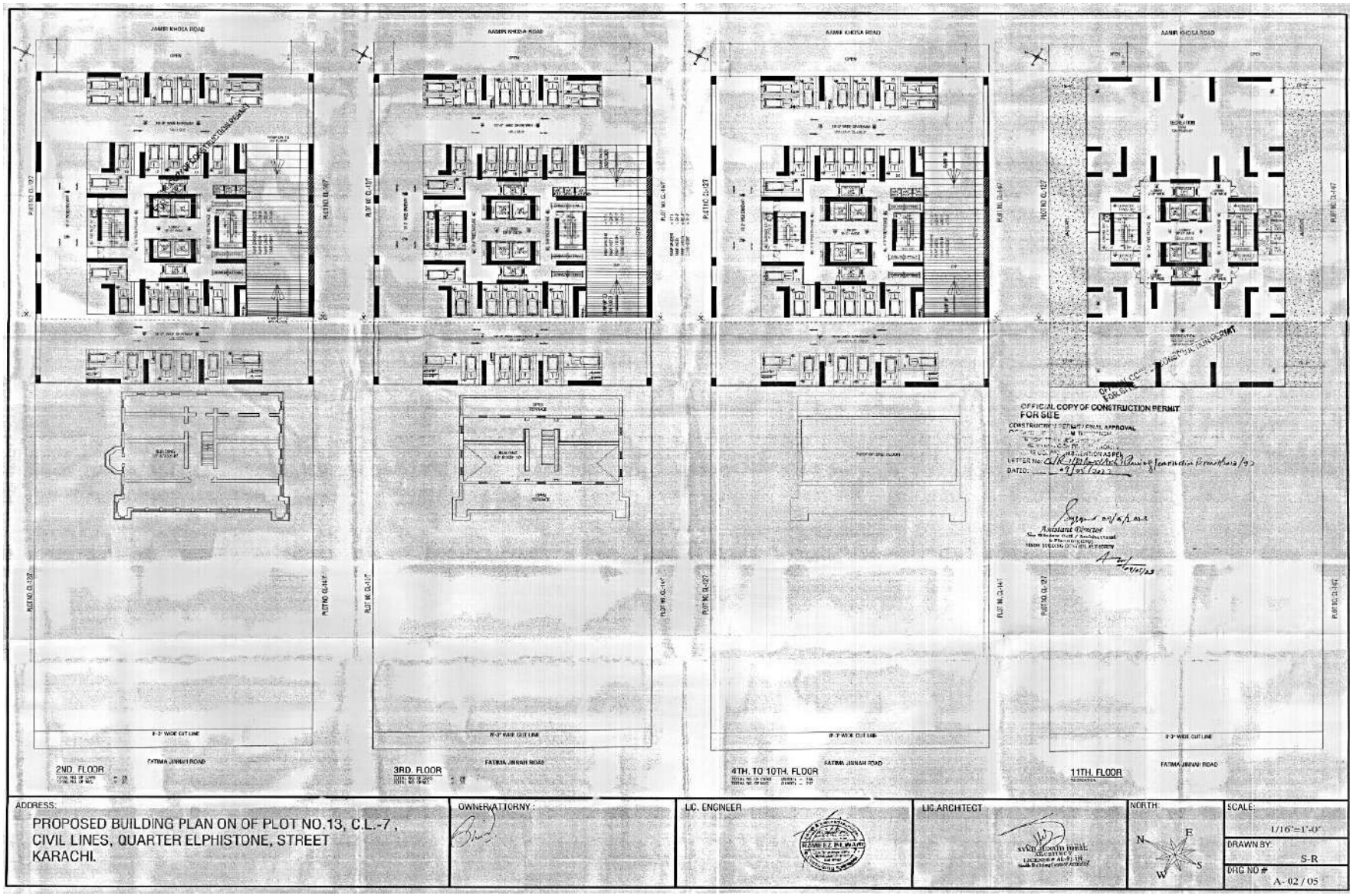


Figure 3.3: 2nd Floor, 3rd Floor, 4th to 10th Floor and 11th Floor Layouts

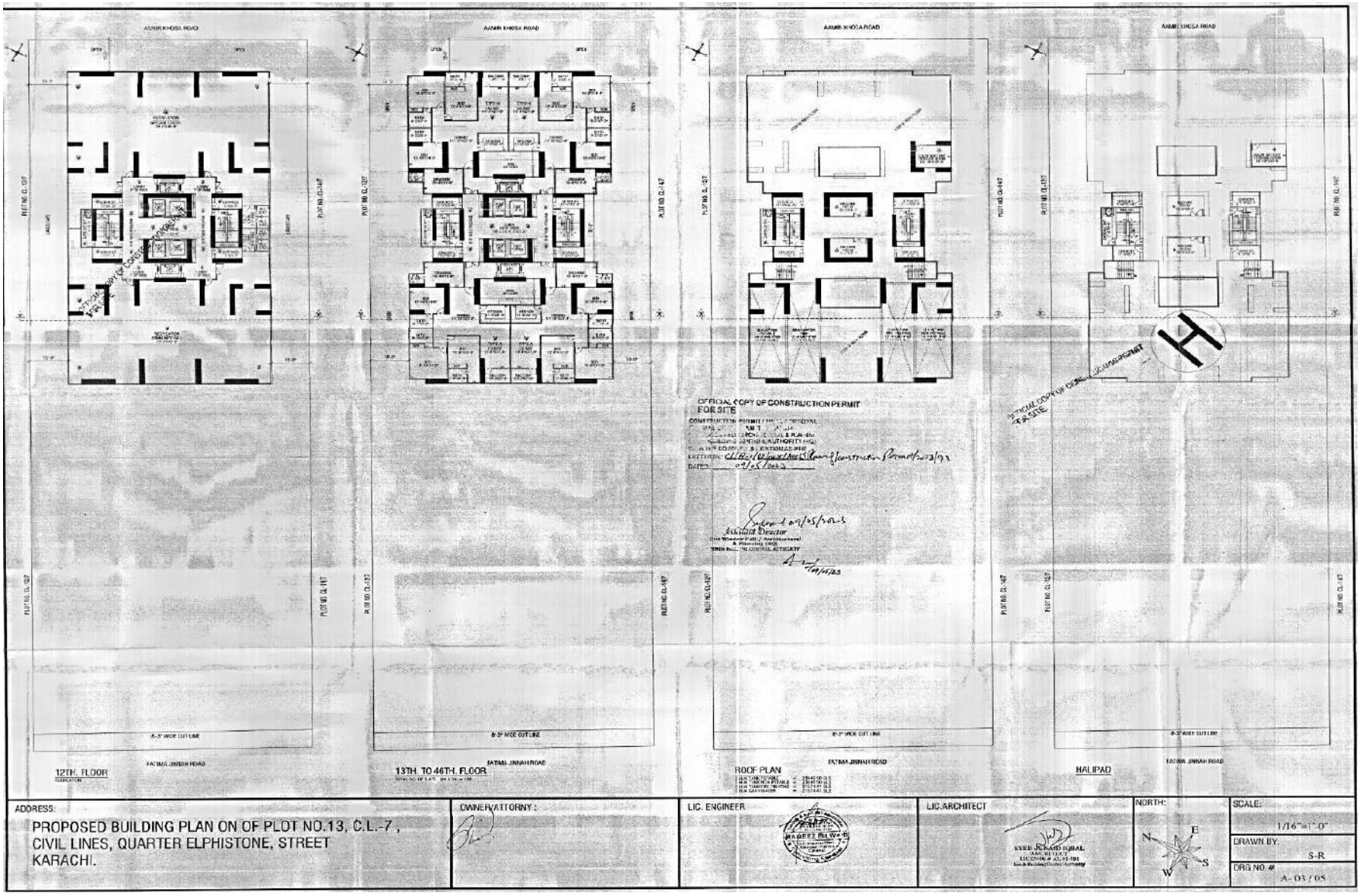


Figure 3.4: 12th Floor, 13th to 46th Floor, Roof Plan and Helipad Layouts

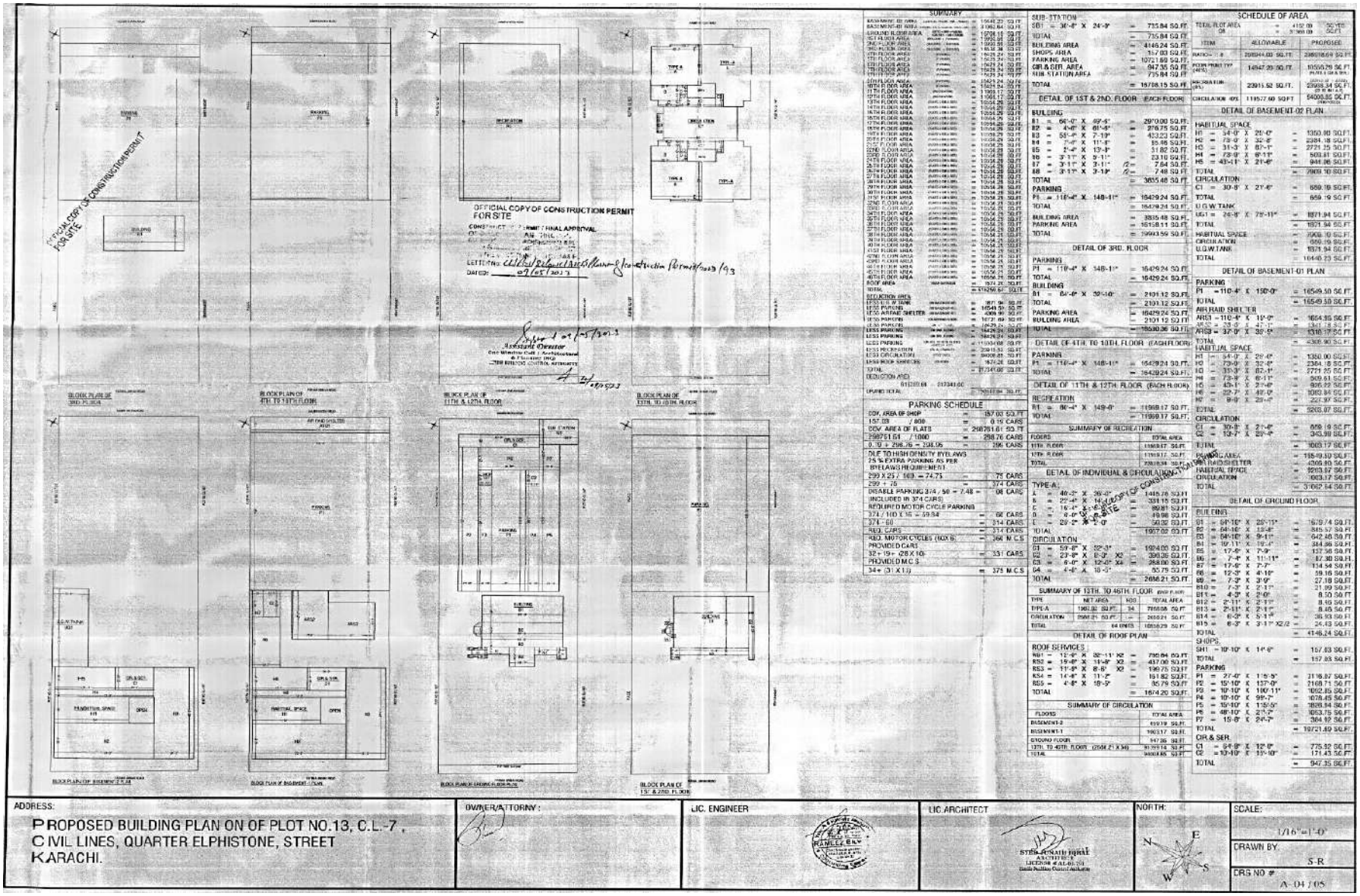


Figure 3.5: Block Plans, Parking Layouts and Area Schedule Details

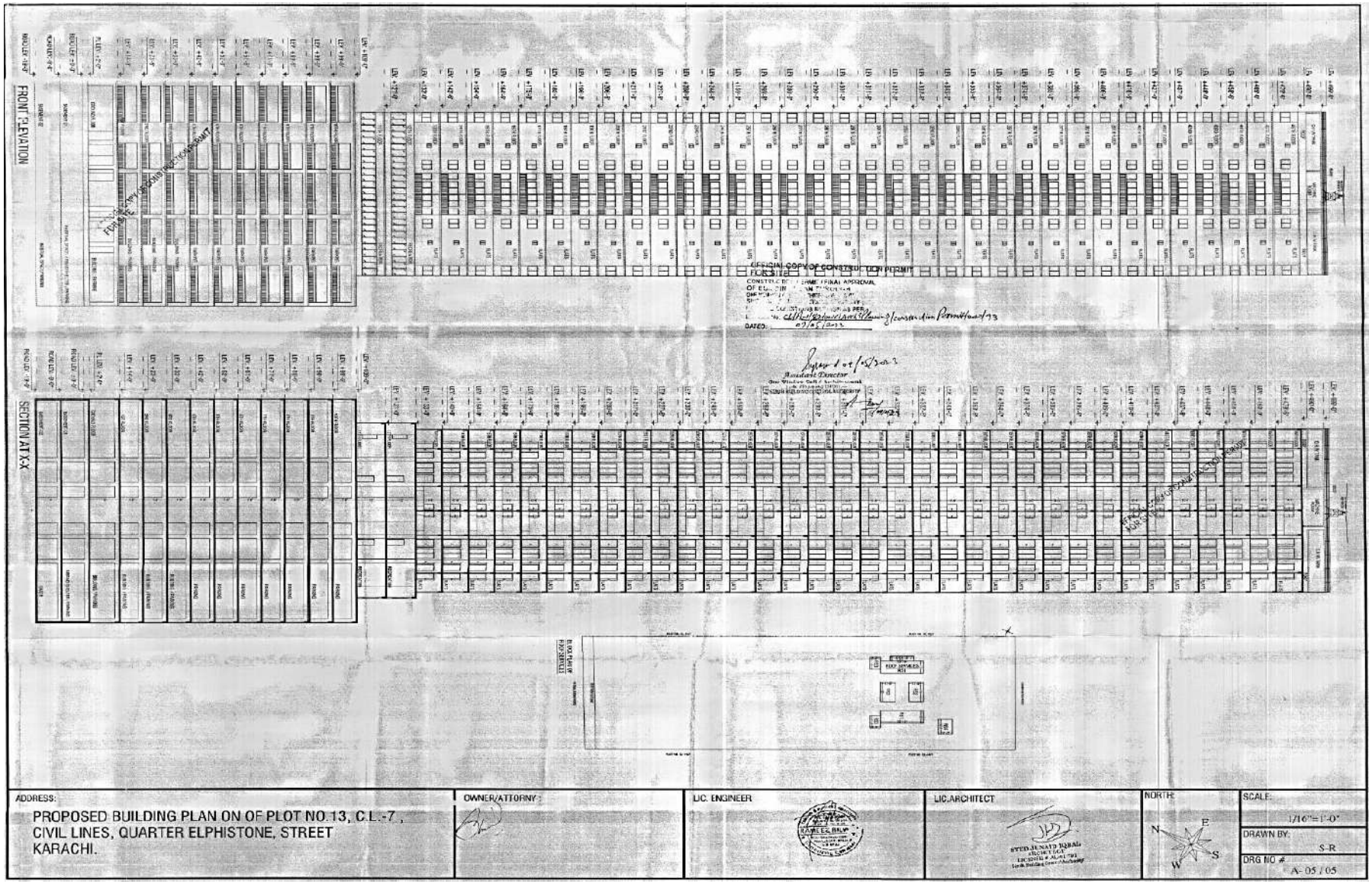


Figure 3.6: Building Elevation and Sectional Views

3.4. Status of Approvals

The necessary approvals and NOCs for the proposed project have been obtained from the relevant authorities. These include approval from the Sindh Building Control Authority (SBCA) for construction of the project, as well as clearance from the Culture, Tourism, Antiquities & Archives Department is under process for permitting construction with specified conditions that at the middle of project plot a heritage building "Jenning Private School" is situated that will manage to preserve and maintain with same facade of School building during construction and usage of building for resident and convert school into club. Additionally, height clearance has been obtained from the Civil Aviation Authority (CAA), subject to compliance with prescribed limits.

Furthermore, the Environmental Impact Assessment (EIA) report has been submitted to the Sindh Environmental Protection Agency (SEPA) in accordance with Section 17 of the Sindh Environmental Protection Act, 2014, and is currently under review. Approval from SEPA will serve as a mandatory requirement for obtaining final building plan approval from SBCA.

Other utility-related NOCs, including those from Karachi Water & Sewerage Corporation (KW&SC), K-Electric (KE), and Sui Southern Gas Company (SSGC), shall be obtained and submitted at the appropriate stage of project development.

3.5. Construction & Commissioning

3.5.1. Construction Schedule

The construction & commissioning phase will consist of following major activities:

- Construction of campsite including facilities and mobilization of contractors
- Construction of foundations and auxiliary structures (piling, civil works etc.)
- Internal and External finishing
- Mechanical, electrical and other works
- Demobilization and site restoration

3.5.2. Pre-Construction/Design Phase

This, the essential phase provides the basis for the construction program, the methodology to be adopted and the technologies to be involved. The project site has been assessed in terms of its geology, seismicity and seismo-tectonics. The pre-construction activities will involve earthworks & excavations.

3.5.3. Construction Activities

The sequence of construction should be as follows:

- Construction of earth retaining structure (secant pile wall, contiguous pile etc.)
- Drilling and installation of dewatering wells
- Excavation of plot upto groundwater level

- Dewatering
- Excavation upto Raft bottom level
- Construction of raft foundation followed by construction of substructure.

Standard and environmentally compatible construction materials (cement, sand, steel reinforcement, bricks etc.) & techniques/construction practices will be employed besides adopting Standard Operating Procedures (SOPs) set-out in the Environmental Management Plan.

3.5.3.1. Construction Office & Camp

The construction contractor will develop his own camp & offices for construction purposes within the project site. Development of campsite will include the following activities:

- Leveling and compaction of the area for office and campsite
- Provision of drainage works in and around the campsite
- Laying and compaction of the gravel topping in the office and campsite
- Construction of fuel storage tank area and water tank
- Provision of fence, access and emergency gates
- Construction of septic tanks
- Installation of membrane liner for fuel storage
- Installation of security guard cabins
- Installation of sewerage pipeline with manholes for the septic system & connecting it withSewer line
- Provision of signage for each activity center

3.5.3.2. Foundations

Excavation for the foundations work will be made in accordance with the standards. Excavated material will be disposed of off-site via trucks and sent to approve sites. The excavated soil will be sent to road construction contractors for appropriate utilization.

3.5.3.3. Building Shell and Core Construction

Construction of the exterior enclosure or “shell” of the building include construction of the building’s framework (installation of beams and columns), floor decks, facade (exterior walls and cladding), and roof construction. These activities require the use of, compressors, personnel and material hoists, front-end loaders, concrete pumps, on-site bending jigs and a variety of hand-held tools, in addition to the delivery trucks bringing construction materials to the site. At the same time, infrastructure connections are built. These include lines for water, sewer, storm water, electricity & telecommunications.

3.5.3.4. Interior Construction and Finishing

This stage includes the construction of interior walls, installation of lighting fixtures and interior finishes (flooring, painting, etc.), as well as mechanical & electrical works such as the:

- Internal and external pipe works

- Fire protection & Life safety systems
- Car Park Ventilation
- Electrical Distribution
- Emergency Lighting installations
- Lightning Protection

3.5.3.5. Civil Works

Civil works involves excavation, piling, formwork, reinforcement, concreting, masonry, plastering, painting, and also waterproofing work with gas-flame sticking, construction of light separating walls, hung ceilings, flooring, lining and facing.

3.5.3.6. Construction Equipment & Machinery

Conventional machinery and equipment will be used for construction activities. The equipment and machinery may include dozers, excavators, loaders, mobile crane, lorry, dump trucks, back hoe, bar bending machine, water bowsers, material hoist, passenger hoist, concrete placement booms & power generators.

3.5.3.7. Construction Material and other Supplies

Main construction material to be used during the construction phase will include ready mix concrete that will be sourced through reputable companies. Additionally, paints, glass, wood, tiles, aluminum, PVC/GI pipes, concrete/cement pipes, electric cables, etc. will be used during the different phases of construction. The materials will be transported by trucks to the project site, where they will be stored until moved to different locations as and when required. Materials including paving stone, crush, gravel and sand will be brought from commercial quarries located in the Sindh Province.

3.5.3.8. Site Restoration

On the completion of the construction phase, the entire site will be built-up thus no site restoration to original condition is required. External sites are not being used.

3.6. Utilities

3.6.1. Plumbing System

3.6.1.1 Design Codes & Standards:

The plumbing system is based on the following codes & standards:

- International Plumbing Code 2018.
- American Society for Plumbing Engineers (ASPE) Handbook – 2010.
- KBCA Bye Laws.

3.6.1.2 Plumbing Fixtures Requirements:

The plumbing system has been designed to meet the minimum plumbing fixture requirements

for space occupancy as per International Plumbing Code.

3.6.1.3 Scope of Plumbing System:

The scope of plumbing services is as follows:

- Domestic Water Supply
- Hot Water Supply
- Soil & Waste Water Drainage
- Storm Water Drainage
- Natural Gas Supply

The storm water drainage system shall be designed keeping in view the developed levels of the project area & shall be terminated from the building up to the road.

Fire protection system shall comprise of building fire hydrants, Fire hose reels, Fire sprinkler and portable fire extinguishers of various type as per appropriate needs and requirements. The fire water shall be provided through a separate pressurized main. The relevant codes and standard have been being followed in calculation and design of various parameters of the water supply, selection of equipment for the water supply, sanitary / plumbing, sewage disposal and fire protection systems. The related sections of following codes and standards shall be followed in the design of the above stated works.

ASTM	American Society for Testing and Material
NFPA	National Fire Protection Association (USA)
NPC	National Plumbing Code
ANSI	American Plumbing Code.
ASME	American Society of Mechanical Engineer
AWWA	American Water Works Association
BCP	Building Code of Pakistan

3.6.2. Water Supply

Water supply system shall consist of underground water storage tanks, water supply network & the internal plumbing works.

3.6.2.1 Source of Water

- Water will be provided from city supply connection. In case of water supply shortage, options to use water tankers may be explored.

3.6.2.2 Design of Water Supply System

- Pipe material used for water shall be of PPRc for internal plumbing works & G.I for externalwater supply network, pipe sizes shall be designed on the basis of total fixture units connected to the section.
- Table used to ascertain maximum numbers of fixture units that can pass through a pipeare adopted from National Plumbing Code USA.

- Conversion of plumbing fixture unit's ratings applicable to building units is adopted fromFundamental of Plumbing Design Volume.

3.6.2.3 Water Requirement

The estimated water demand for the entire project is about **24370** Gallons/day.

Table 3.2: Water Consumption Calculations

S. #	Nature of Use	Minimum Quantity of Water Per User (US Gallons/day)	No. of Users/unit	Total Quantity of Water (US Gallons/day)
For Residential Units				
1	Residential Units 136 Nos.	35	5	23800
For Commercial Unit				
2	Shop 9 Nos.	15	2	270
For Recreational Area				
3	Recreational Area (Community Hall / others) 2 Nos.	15	10	300
Total				**24370**

3.6.2.4 Sewerage System

According to the Japan International Cooperation Agency (JICA) Master Plan for Karachi, it is estimated that 60 to 80% of water demand may be utilized for sewage generation. Therefore, assuming 80% of used water is converted into sewage, approximately 19496 gallons per day of sewage water will be generated.

3.6.2.5 Storm Water Drainage

The storm water drainage shall be achieved through purpose made built-in slopes in the ground all around the structures and shall be terminated on gravity towards the Storm Water catchments/ gully's at the road side.

- Gravity drainage from building roofs to septic tank.
- Discharge of septic sank into nearby drain / *nallah*.

Following design criteria shall be adopted in his design of storm water drainage system.

- Local climate i.e., rainfall rate.
- Site conditions, elevation, water level and location of other utilities etc.

3.6.3. Fire Detection & Protection Systems

Fire protection system shall comprise of building fire hydrants, fire hose reels, fire sprinkler and portable fire extinguishers of various kind/types. The fire water shall be fed through a pressurized main to be installed all around the individual building/ block. Fire hydrant system including fire hose connection point hoses and nozzles to provide a readily accessible water

supply for fire department or occupants of the project area to combat fire instantly.

3.6.3.1 Fire Detection & Alarm System

Fire detection & alarm system shall be designed as per scope of works & in line with the design requirements and is covered in the electrical system design.

3.6.3.2 Fire Protection Systems:

- ✧ Fixed Fire Protection System
- ✧ Portable Fire Protection System
- ✧ Fire sprinkler system

3.6.3.3 Design Codes & Standards

The following standards have been followed in the design of fire suppression system.

- ✧ NFPA-10 – Standard for Portable Fire Extinguisher.
- ✧ NFPA-13 – Standard for the Installation of Sprinkler Systems.
- ✧ NFPA-14 – Standard for the Installation of Stand Pipe, Private Hydrant, & Hose Systems.
- ✧ NFPA-20 – Standard for the installation of Stationary Pumps for Fire Protection.
- ✧ Building Code of Pakistan – BCP 2016

3.6.4. Electrical & Allied Works

The electrical design development of the Project has been carried out in accordance with the prevailing international standards and local regulatory authorities to ensure the ease of maintenance, economy and safety from shock and fire hazards.

3.6.4.1 Scope of Services

- ✧ Utility Power Supply from K.E
- ✧ Backup Generator Supply
- ✧ Power Distribution including Small Wiring and accessories
- ✧ UPS / Emergency Supply
- ✧ Lighting and Controls
- ✧ Earthing & Grounding
- ✧ Lightning Protection System
- ✧ Fire Alarm and Detection System
- ✧ CCTV Surveillance System
- ✧ Audio / Audio-Video Intercom System

3.6.5. Electricity Supply

For electricity supply, the source will primarily be Karachi Electric (KE). Additionally, generators are also available to ensure uninterrupted power in case of outages.

3.6.6. Gas Supplies

The gas supply for the project would be provided by the Sui Southern Gas Company (SSGC) Ltd. Approval from SSGCL for gas connection is being obtained.

3.7. Solid Waste Generation

Average garbage (MSW) generation in Sindh is estimated at 0.4 – 0.7 Kg per person per day (SSWMB). It is estimated that approximately 412.225 kg per day of solid waste will be generated from the project in case of 100% occupancy. The solid waste generate on site will be collected daily by a solid waste contractor who will dispose it off in a responsible manner. Numbers of trash bins will be located inside the building and people will be appointed for collection of solid waste. Provision of garbage chute system is built in the project design.

Table 3.3: Solid Waste Generation Calculations

S. #	Nature of Use	Average garbage (MSW) generation (kg/person/day)	No. of Users/Flat	Total Quantity of Solid Waste (kg/day)
For Residential Units				
1	Residential Units 136 Nos.	0.55	5	374
For Shops				
2	Shops 1 No.	0.55	2	1.1
For Recreational Area				
3	Recreational Area 2 Nos.	0.55	10	11
Total Solid Waste Generation (*estimated*)				**386.1**

3.8. Parking Facilities

Adequate parking has been planned for residents & visitors. A total of 331 car parking spaces and 375 motorcycle parking spaces are provided, which meet the prescribed parking standards of SBCA for the project of 314 cars and 344 motorcycle. The parking is distributed from the basement and ground floor up to the 6th floor (Refer to Table 5.2 of the Traffic Impact Study. The detailed Traffic Impact Study is attached at Annexure – VI.

Chapter 4 Description of Environment

4.1 Overview

This chapter of the EIA presents the findings of the environmental and social baseline conditions of the project area, covering both the macro- and micro-environment. Relevant information from available literature pertaining to the baseline conditions of the project area, its surroundings, and Karachi was initially collected and reviewed. This was followed by detailed field surveys conducted by experts to assess and document the existing environmental and social conditions.

The project falls within a category that permits the proposed land use, as approved by the relevant regulatory authority. The siting of the Metro Address Residential cum Commercial Building, located at Plot No. 13, CL-07, Civil Lines Quarters, District South, Karachi (coordinates: 24°50'42.11"N and 67°02'11.33"E), by M/s L.K Builders & Developers, is duly authorized.

The proposed project is situated within Civil Lines Quarters, Karachi, in a well-developed urban setting. The site is bounded by Aamir Khosa Road to the north, Claremont Road to the southwest, and internal access lanes connecting to Deewan Street and adjacent residential streets to the east. The surrounding area comprises a mix of residential and commercial land uses, including Bank House, the Pakistan American Cultural Center, The grand marquee, Sterling homes, Solid homes, Tai safa tower and nearby mid-rise residential buildings.

The site is easily accessible through the existing road network, with primary access via Aamir Khosa Road and Fatima Jinnah Road/Claremont Road, which connect to major arterial routes within the city. The availability of established infrastructure, including paved roads and nearby commercial facilities, ensures good connectivity and facilitates both construction and operational activities. Site photographs are presented in the following figures.



Backside of Jenning Private School



Jenning Private School

(Front Side)

Figure 4.1: Current Status of Project Site

4.2 Description of Physical Environment

4.2.1 Geology

Karachi is the part of major synclinorium stretching from Ranpathani River in the east to Cape Monze in the west, Mehar and Mole Jabal (Mountains) in the north. Within the synclinorium a number of structures such as Pipri, Gulistan-e-Jauhar, Pir Mangho and Cape Monze are exposed. The presence of concealed structures under the Malir River valley, Gadap and Maripur plains can fairly be deduced.

Rock aggregates, sand, limestone and clay are some of the potentials for gainful utilization. The area is underlain by rocks of sedimentary origin ranging in age from Eocene to Recent. Major structural trends and the basin axis strike generally south but with a "bulge" to the east also called Karachi Arc (Bender and Raza 1995).

4.2.2 Geomorphology of Karachi

Karachi is located in the south of Sindh, on the coast of the Arabian Sea. It covers an area of approximately 3,600 km^2, comprised largely of flat or rolling plains, with hills on the western and northern boundaries of the urban sprawl. The city represents quite a variety of habitats such as the sea coast, islands, sand dunes, swamps, semi-arid regions, cultivated fields, dry stream beds, sandy plains, hillocks.

Geomorphologically the urban land of Karachi region has been divided into seven zones based on the nature and origin of the surfaces[1]. These zones are listed and illustrated in below:

- Controlled Relief
- Pediment
- Alluvial Fillings
- Dissected Erosional Surfaces
- Dissected Plateau
- Coastal Area and The
- Peripediment

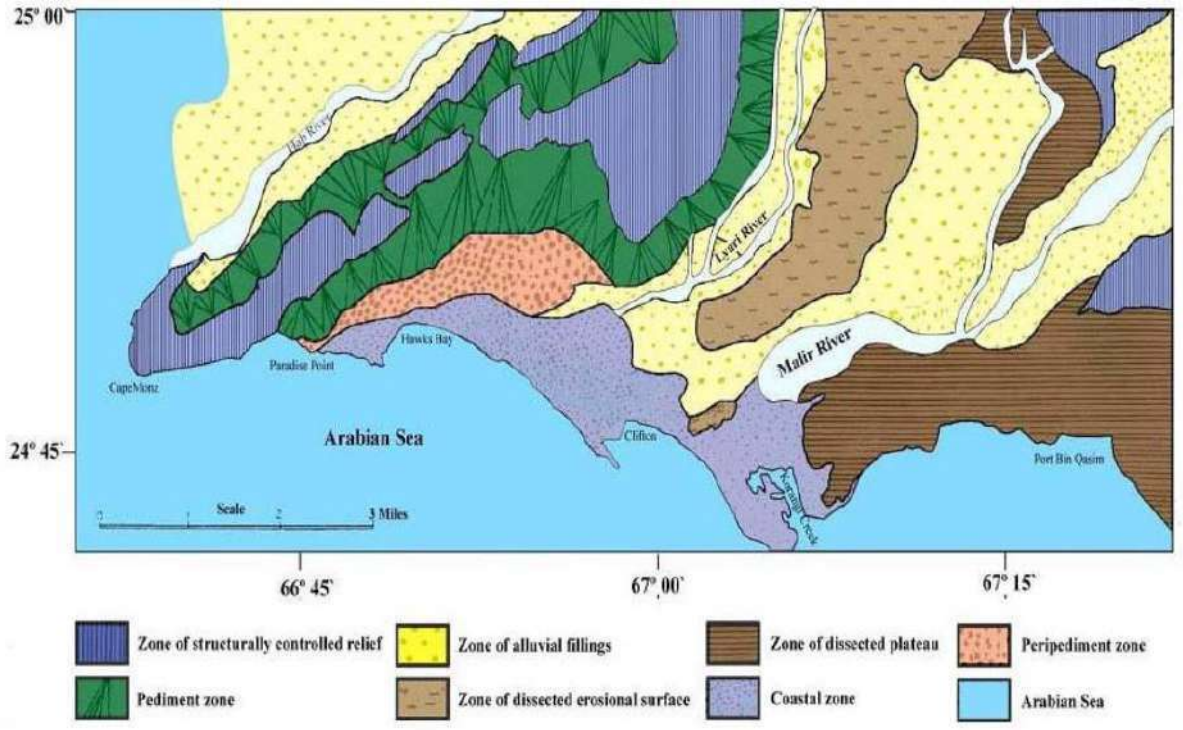


Figure 4.2: Geomorphological Zones of Karachi Region[2]

[1] Hamid, G., Hassan, K., Bilal, M., & Siddiqui, S. N. (2019). Soil Classification as a Tool for Evaluating Soil Behavior as Foundation Materials. *International Journal of Economic and Environmental Geology*, 41-46.
[2] **Hamid et al., 2019**

In each of these zones the dominant processes of denudation, the relief and the landform assemblages have been distinguished to asses and evaluate the ever-growing effects of population increase and construction of civil structures of varying magnitudes. Each of the above zones are significant geomorphic features and need due consideration to facilitate in assessing the textural characteristics of foundation material for the construction of safe civil structures of various types and laying of other related demographic facilities like sewage, water supply, roads and telecommunication lines on scientific ground and to cope with the existing problems in this connection.

Classified according to physiographic features, Karachi City District can be divided into three broad categories: Hilly Region (Mountain Highland), Alluvial Plain (Piedmont Plain) and Coastal Areas (Valley Floor). The metropolitan area is divided by two non-perennial river streams namely Lyari and Malir Rivers. The Malir River flows from the east towards the south and centre, and the Lyari River flows from north to the south west. Gujjar and Orangi are the two main tributaries of the Lyari River while Thaddo and Chakalo are the main tributaries of the Malir River. The dry weather flow of both rivers carries urban sewage that is ultimately drained in the Arabian Sea. Among the various physiographic features, low flat-topped parallel hills devoid of vegetation, interspersed with widespread plains and dry riverbeds are the main topographic characteristics of the city.

The greatest height of the region is 250 ft that gradually decreases to 5 ft above mean sea level along the coastline. The Karachi Harbour is a sheltered bay to the south-west of the city, protected from storms by the Sandspit Beach, the Manora Island and the Oyster Rocks.

The Arabian Sea beach lines the southern coastline of Karachi. Dense mangroves and creeks of the Indus delta can be found towards the south east side of the city. Towards the west and the north is Cape Monze, an area marked with projecting sea cliffs and rocky sandstone promontories.

4.2.3 Soil

A comprehensive sub-soil investigation was conducted at the project site to obtain critical geo-engineering data required for the structural and foundation design of the proposed development. The geotechnical investigation was carried out by Soil Testing Services, and the findings are detailed in the Soil Investigation Report attached as **Annexure I**.

The investigation included the drilling of six (06) boreholes, with depths ranging from 60 feet to a maximum of 100 feet below the existing ground level. Drilling was performed using the rotary drilling method, and Standard Penetration Tests (SPTs) were conducted in accordance with ASTM Designation D-1586 to evaluate the strength and consistency of the sub-surface materials.

Soil samples collected from the Split Spoon Sampler during SPTs were preserved in sealed plastic bags, labeled with borehole number and depth, and transported to the geotechnical laboratory for testing. Selected core samples were waxed to retain natural moisture content for accurate analysis.

Subsurface Characteristics: The analysis of borehole data indicates relatively uniform subsurface conditions across the site. The uppermost layer typically consists of hard conglomerate deposits extending to a depth of approximately 20–25 feet. These are underlain by deposits of friable to medium hard sandstone and medium hard claystone/siltstone, continuing down to the maximum

investigated depth of 100 feet. The major stratigraphic layers identified are as follows:

Layer I:

Brown, hard, Conglomerate, highly fractured

Layer II:

Brownish gray, friable to medium hard Sandstone

Layer III:

Brown/Gray, medium hard Claystone/Siltstone

Ground Water Observation: Groundwater was encountered at a shallow depth of approximately 2.0 feet below the existing ground level during drilling activities across the site.

4.2.4 Seismicity

Seismotectonic Study for macroenvironment of Project site aims at elucidating the impact of tectonic movement induced seismicity on the microenvironment. Karachi is Pakistan's largest city with population exceeding 18 million and is amongst the top five most congested cities in

the world. Karachi has experienced no earthquake related damage in the recorded history of past ~ 175 years. Yet, Karachi is located in a seismically active tectonic setting often compared to Los Angeles with active plate boundary faults and triple junctions within a radius of ~ 150 km. This discrepancy in earthquake history and seismotectonic setting has led to diverse seismic hazard assessments for Karachi ranging from assignment of seismic hazard zones I (least severe) to IV (most severe). The Building Code of Pakistan (2007) assigns an intermediate seismic hazard value of 0.16–0.24 g (Zone IIB) to Karachi, which is broadly accepted but sometimes criticized to be an underestimation. A recent study entitled "*Seismic sources for southern Pakistan and seismic hazard assessment of Karachi*"[3], based on a new active faults compilation and seismic sources definition together with incorporation of maximum possible information on historical earthquakes (up to 893AD), has led to a re-assessment of seismic hazard for Karachi using probabilistic and deterministic seismic hazard assessment approaches. The main findings of this study are:

- Karachi is assessed to be prone to ground motions ~ 0.25 g with metropolitan areas having hazard values between 0.21 and 0.25 g for 10% probability of exceedance in 50 years (475-year return period).
- The deterministic seismic hazard analysis suggests maximum that peak ground acceleration (PGA) varies from 0.19 to 0.99 g in Karachi and its higher values are concentrated around the Nagar Parker fault that is controlling and hazardous for Karachi.

Despite a safe seismic history spanning past about 175 years, Karachi is located in a tectonic setting, which is considered amongst the most active in the world. The active Chaman transform fault marking plate boundary between the Indian and Eurasian plates is located only 120 NW of Karachi. Karachi itself is located at the southern tip of N–S trending Kirthar active foreland thrust-fold belt at the western deformed edge of the Indian plate. The triple junction between the Indian, Arabian and Eurasian Plates is located 110 km to the SW of Karachi.

[3] Waseem, M., Khan, M. A., & Khan, S. (2019). Seismic sources for southern Pakistan and seismic hazard assessment of Karachi. *Natural Hazards*, *99*(1), 511-536.

Seismic activity in the region is the result of the triple junction as well as the Karachi Arc, located in southeastern Pakistan, as a large fold and thrust belt that shows Neogene thin-skinned eastward movement. Seismic activity in and around the region shows that the Karachi Arc has been active since long in prompting the eastward movement of the delta. It is possible that the movement is related to the rebound that takes place after mass shift. Sarwar has suggested that the eastward creep of Karachi Arc is directly related to active subsidence of the Hyderabad graben that underlies it and also defines the northern and southern limits of the Karachi Arc.[4]

It may be added that subsidence such as that on Southern coast of Sindh, occurs naturally as a result of plate tectonic activity above active faults, and in places where fluid is expelled from underlying sediments and is common at river deltas that may have receded. Earthquakes arise and result from the release of the force along the growth fault plane. As a result, many different growth faults are created as sediment loads shift basin ward and landward.

4.2.4.1 Seismic Coefficient

According to uniform building code (1997) the soil profile type of the project falls in category "Sc" corresponding to "Soft Rock/Very Dense Soil". Details are annexed in Subsoil Geotechnical Investigation Report. Following parameters can be adopted:

Seismic Zone	= 2B
Zone Factor	= 0.2
Soil Profile Type	= Sc
Seismic Coeff. "Ca"	= 0.24
Seismic Coeff. "Cv"	= 0.32

4.2.4.2 Earthquakes

Historically the coastal region has suffered a number of earthquakes. Detailed review of the geological history including the modern time reveals the occurrence of deep-sea earthquakes at different times, throughout history in the North Arabian Sea, as presented below:

[4] Sarwar, G., 2004. Earthquakes and the Neo-Tectonic Framework of the Kutch-Hyderabad-Karachi Triple Junction Area, Indo-Pakistan. Pakistan Journal of Hydrocarbon Research, 14, 35-40.

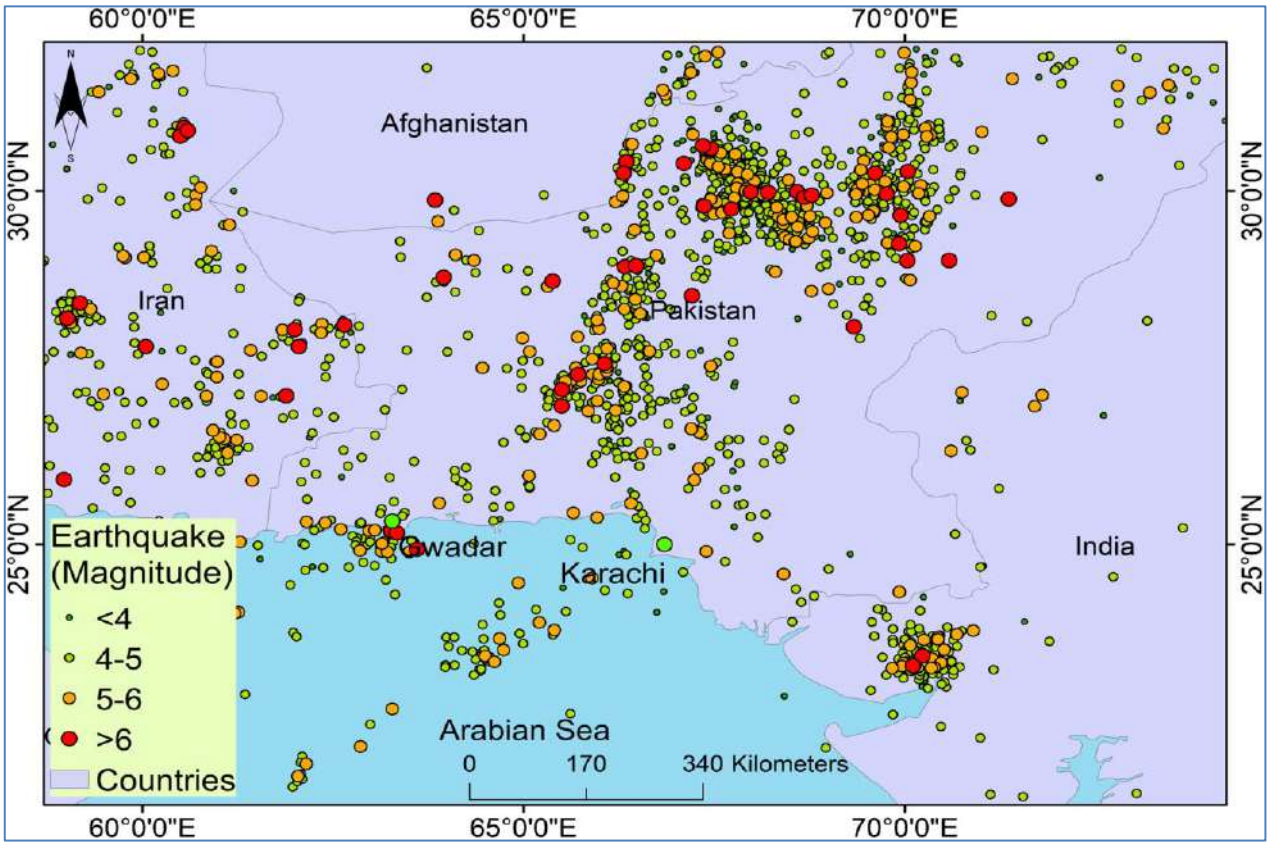


Figure 4.3: Earthquake recorded (1950–2019) in the Arabian Sea and its surroundings[5]

4.2.4.3 Seismicity of the Site

According to the Uniform Building Code (1997), Karachi and its adjoining areas fall in Seismic Zone-2B.

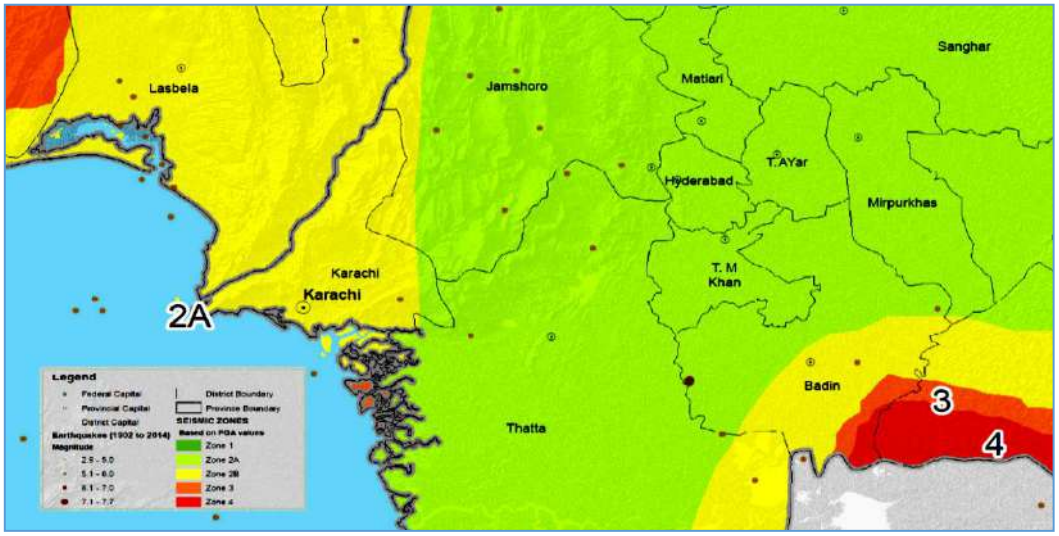


Figure 4.4: Seismic Zones in Karachi[6]

[5] Aslam, B., Ismail, S., & Maqsoom, A. (2020). Geospatial mapping of Tsunami susceptibility of Karachi to Gwadar coastal area of Pakistan. *Arabian Journal of Geosciences*, *13*(17), 1-12.
[6] Map data source(s): PMD, GSP, Pakistan Engineering Council – Prepared by Al Hasan Systems Private Ltd.

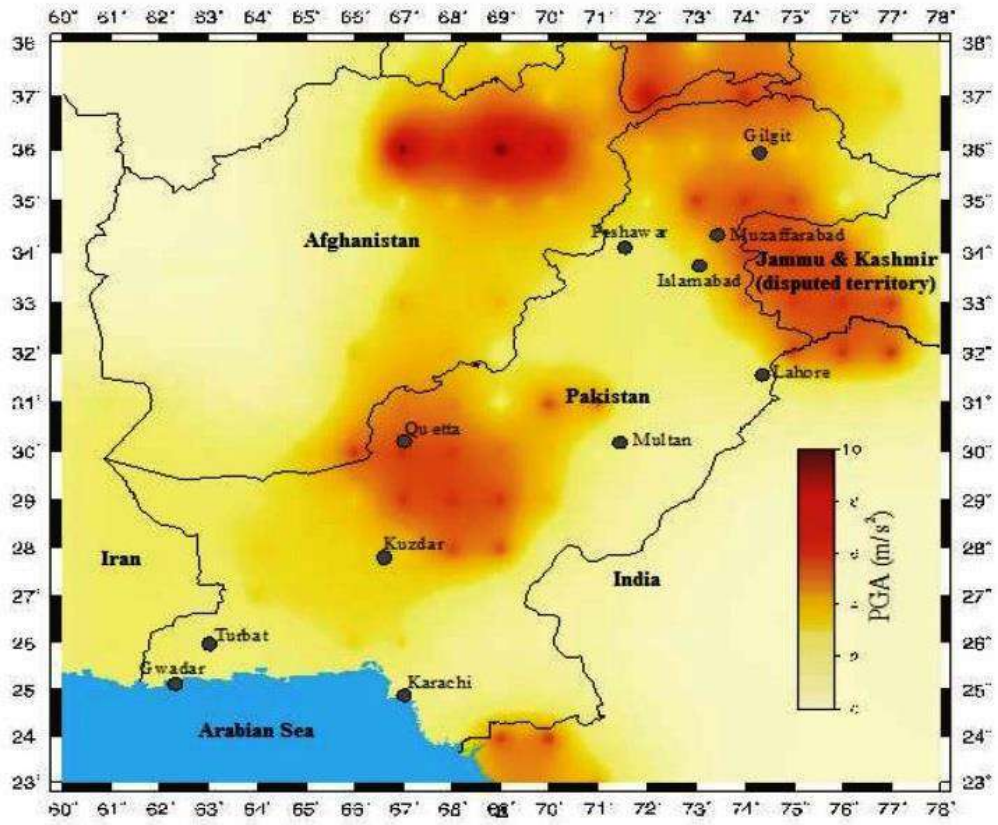


Figure 4.5: Seismic Hazard for Pakistan in terms of Peak Ground Acceleration (PGA)[7]

4.2.4.4 Liquefaction Features Caused by Earthquake

Liquefaction is a total loss of strength due to undrained restructuring. Disturbance, by shearing or vibration, destroys soil skeleton, with loss of grain contact and decrease of porosity, soil load is transferred to pore water, water pressure>normal stress=0, and soil acts as a liquid. Drainage reduces pore water pressure, allows grain contact and thixotropic recovery of strength[8]. Strong shaking produces liquefaction in the fine sands and silts during the earthquake. This causes the mineral grains to settle and expel their interstitial water to the surface. If the pore-water pressure rises to a level approaching the weight of overlying soil, the granular layer behaves as a viscous liquid rather than a solid and leads to collapse of even engineered structures. Liquefaction has been abundant in areas, where groundwater lies within 10 meters of the ground surface[9]. Investigators typically have designated sites as "Liquefied" on the basis of the presence of surficial liquefaction features, such as venting of sediment to the surface (i.e., sand boils), ground cracking associated with liquefaction (e.g., lateral spreading), or surface settlements. Other evidence of liquefaction includes tilting or settling of overlying structures and floating of underground structures[10]. A study investigated the "sinking" of a water tower in 2006 near Clifton

[7] PMD Seismic Monitoring and Early Tsunami Warning Centre - http://seismic.pmd.gov.pk/seismicnew/map2.html
[8] Waltham, T. (2009). *Foundations of engineering geology*. CRC Press.
[9] Hussain, V., Sheikh, S. A., Tabrez, A. R., & Anjum, S. (2004). Liquefaction effects of Bhuj earthquake on Thar, Indus delta region of Sindh, Pakistan. *Segmite International*, *1*(1), 39-42.
[10] Olson, S. M., & Stark, T. D. (2002). Liquefied strength ratio from liquefaction flow failure case histories. *Canadian Geotechnical Journal*, *39*(3), 629-647.

area and speculated about liquefaction due to mild earthquakes[11].

4.3 Meteorology and Climate

Karachi has an arid climate (Köppen Climate Classification: BWh) dominated by long summer season but moderated by marine influence from the Arabian Sea[12]. There is a minor seasonal intervention of a mild winter from mid-December to mid-February followed by a long hot and humid summer extending from April to September, with monsoon rains from July to mid-September. The characteristic climatic feature of the four seasons of Karachi is presented in **Table 4.1**.

Table 4.1: Seasonal Characteristics of the Climate of Karachi

Season	Temperature	Rainfall	Wind
Summer (Mid-March to Mid-June)	The summer is hot with temperature increasing from 26.2 °C in March, rising up to 40 °C in June.	There are less frequent rain showers in summer with no more than 1 or 2 rainy days. Approximately 10 mm average amount of rain in summer.	The wind speed in summer is variable. It is around 2.5 m/s in March and rises up to 18 m/s in April and drops to 4 m/s for the rest of the season. The direction mostly remains blowing from West
Monsoon (Mid-June to mid-September)	The temperature in monsoon remains high but relatively lower than summer and oscillates around 32°C.	Almost 80 % of the yearly rain occurs in the monsoon with July and August being the wettest month.	The wind direction in the monsoon is mostly blowing from East.
Post-Monsoon Summer (Mid-September to November)	The average temperature post monsoon drops and average min temperature may reach 12 °C in November.	The post-monsoon period remains mostly dry and rainfall in November is around 1.8 mm.	The wind speed in September is around 3.7 m/s and drops to 1.4 m/s in November.
Winter (December to mid-March)	The winter is mild with January being the coolest month where average minimum temperature falls to 6 °C.	Like the other seasons, except monsoon, there is little occasional rainfall. The rainfall in winter is less than 50 mm.	The wind speed in the winter season increases from 1.4 m/s in December to 2.6 m/s in March. The wind direction for most part winter season is blowing from NE and changes its course to blowing from West in early March

[11] Mahmud, S. A., & Sheikh, S. A. (2008). Earthquake Shocks and Liquefaction Threat to Dha and Clifton areas, Karachi Pakistan. A Case Study. In *Geotechnical Engineering for Disaster Mitigation and Rehabilitation* (pp. 398-405). Springer, Berlin, Heidelberg.

[12] https://en.climate-data.org/asia/pakistan/sindh/karachi-992367/

4.3.1 Temperature

The air temperature in Karachi Division and its coastal areas are generally moderate throughout the year due to presence of sea. Climate data generated by the meteorological station at Karachi Air Port represents climatic conditions for the region. The mean monthly maximum and minimum temperatures, recorded during 2001-2023 in Karachi to describe the weather conditions are shown in **Table 4.2** and **4.3** respectively.

Table 4.2:Mean Monthly Maximum Temperature °C

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
2001	27.2	29.6	33.1	34.6	35.1	34.9	32.2	32.3	33.1	36.0	33.5	30.4	32.7
2002	27.0	28.2	33.3	35.4	35.6	35.1	32.2	31.6	31.4	36.5	32.7	28.1	32.3
2003	27.6	28.5	32.4	36.6	35.7	34.9	34.1	32.6	32.5	37.0	32.2	28.3	32.7
2004	26.6	29.9	36.2	35.4	36.8	35.6	33.8	32.7	32.8	33.7	33.1	29.4	33.0
2005	24.9	26.3	31.5	35.3	35.4	36.0	33.2	32.2	34.2	35.2	33.1	28.4	32.1
2006	26.0	31.3	31.8	34.0	34.6	35.3	33.8	31.0	34.2	35.0	33.4	26.3	32.2
2007	26.9	29.4	31.4	37.7	36.0	36.4	N/A	N/A	N/A	N/A	N/A	N/A	33.0
2008	24.4	26.9	34.3	34.4	33.9	35.1	33.5	31.9	34.7	35.5	32.5	27.2	32.0
2009	26.2	29.8	33.0	36.0	36.8	35.7	34.5	33.0	32.8	35.9	33.0	28.6	32.9
2010	27.5	29.2	34	35.7	36.5	34.7	34.6	33.2	34.5	35.9	32.7	28	33.0
2011	26.9	28.5	33.2	35.8	35.3	35.3	34.2	32.8	32.9	N/A	N/A	N/A	N/A
2012	25.7	26.9	31.7	35.1	35.5	34.6	33.2	32.7	33.2	35.0	32.7	28.2	32.0
2013	26.7	28.0	33.3	34.0	35.1	36.5	33.8	32.1	33.0	35.7	32.3	28.3	32.4
2014	25.5	28.0	31.7	35.1	35.9	36.5	34.0	33.7	33.8	36.3	32.9	28.7	32.7
2015	26.3	28.9	31.5	35.9	36.0	37.7	34.1	32.3	34.6	35.8	33.0	28.6	32.9
2016	27.8	30.3	33.3	34.7	35.7	36.1	33.6	33.0	32.9	34.0	33.3	31.0	33.0
2017	25.4	30.2	32.8	35.5	36.2	36.3	33.1	33.8	33.4	36.6	32.3	28.2	32.8
2018	28.5	30.4	34.4	36.2	38.7	35.4	33.8	31.9	32.6	36.8	33.8	28.2	33.4
2019	26.3	26.8	31.3	35.4	36.0	37.2	34.7	32.5	35.7	35.8	31.5	27.1	32.5
2020	24.3	30.1	31.2	36.2	36.6	37.3	36.7	34.6	35.0	36.2	31.4	28.1	33.1
2021	26.6	31.3	34.6	37.3	37.5	36.1	34.5	32.6	36.3	34.8	34.0	27.6	33.6
2022	24.6	30.1	35.2	37.4	36.8	35.7	33.3	32.1	33.7	35.7	32.9	29.6	33.1
2023	25.6	30.9	33.3	34.5	35.5	35.9	35.0	31.4	34.4	35.1	33.0	29.4	32.8
2024	27.3	28.6	31.9	34.5	37.3	37.1	36.5	32.5	33.4	37.3	33.8	27.6	33.1
2025	27.2	30.4	34.7	37.2	36.5	35.6	34,3	33.0	32.4	35.3	31.8	29.2	33.1

Source: Pakistan Meteorological Department

Table 4.3: Mean Monthly Minimum Temperature °C

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
2001	11.5	14.9	19.6	23.8	28.1	29.0	27.1	26.5	25.9	24.4	18.6	15.8	22.1
2002	12.8	13.8	19.5	23.9	27.0	28.2	29.6	25.6	24.8	22.5	17.7	14.9	21.7
2003	12.7	16.9	19.8	24.2	26.5	28.2	23.6	27.0	25.3	20.9	15.2	12.0	21.0
2004	12.9	14.5	19.1	24.8	27.3	28.8	27.5	26.3	25.3	22.4	18.0	15.4	21.9
2005	12.3	11.3	20.3	23.0	26.4	28.3	27.2	26.6	26.6	22.9	18.9	13.0	21.4
2006	11.7	18.1	19.6	24.5	27.5	28.5	28.3	26.3	26.8	25.7	19.4	14.0	22.5
2007	13.0	17.3	19.7	24.7	27.6	28.6	N/A	N/A	N/A	N/A	N/A	N/A	21.8
2008	10.1	11.1	19.6	24.0	27.3	29.1	27.9	26.8	26.6	23.8	17.6	14.9	21.6
2009	14.7	16.5	20.8	23.8	27.6	28.7	28.1	27.5	26.5	22.6	17.0	13.9	22.3
2010	12.2	14.7	21.3	25.1	28	28.2	28.3	27.2	25.8	23.9	17.4	11.1	21.9
2011	11	14.5	19.7	23.1	27.1	28.8	27.8	28.6	26.5	N/A	N/A	N/A	N/A
2012	11.2	11.9	19.1	24.5	27.2	28.0	27.9	26.9	26.4	22.7	18.6	14.2	21.5
2013	11.6	15.1	19.2	24.2	27.1	29.3	28.0	26.6	25.5	25.4	18.1	13.0	21.9
2014	9.9	13.1	18.9	24.4	27.0	29.2	28.3	27.1	26.8	23.3	19.5	13.1	21.7
2015	12.6	16.4	19.2	25.7	27.7	29.8	28.4	26.9	26.3	24.9	18.6	12.6	22.4

Table 4.3: Mean Monthly Minimum Temperature °C													
Year	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Annual**
2016	14.8	14.9	21.7	24.6	27.9	27.9	28.1	27.1	26.4	24.0	17.1	15.5	22.5
2017	12.5	18.2	20.3	24.4	27.8	29.2	27.7	27.0	26.2	23.5	16.8	13.0	22.2
2018	12.9	15.8	20.9	25.3	27.7	28.8	28.1	26.3	25.5	23.0	19.3	13.1	22.2
2019	13.3	15.3	19.0	24.0	26.6	28.9	28.1	26.8	27.2	24.0	19.4	13.7	22.2
2020	10.8	15.3	19.1	24.7	27.7	29.7	29.4	28.1	27.3	22.7	16.0	12.5	21.9
2021	9.2	15.0	21.6	25.1	28.9	29.6	28.5	27.4	28.0	23.1	17.6	13.9	22.3
2022	12.8	15.9	21.6	25.5	28.1	28.6	27.4	27.1	26.8	22.7	19.3	13.2	22.4
2023	10.6	15.4	20.9	24.3	27.5	29.3	28.9	27.0	27.1	25.7	20.0	14.8	22.6
2024	13.6	16.8	19.7	24.8	28.1	30	30.3	27.5	27.0	26.3	21.9	12.6	23.2
2025	11.5	16.5	20.6	25.2	28.6	29.1	28.9	27.3	26.6	24.1	16.9	13.5	22.4
Source: Pakistan Meteorological Department													

4.3.2 Precipitation

The main source of precipitation is rainfall which is received mostly in the months of July to September during SW Monsoon winds. It is very erratic as some years are very dry and there is no rain. The average rainfall is 217 mm and most of it is received in the month of July.

Occasional winter rains are also received in the months of December – February as result of NE winds which count 15-25% of total rainfall.

Table 4.4: Monthly Amount of Precipitation (mm) at Karachi Airport													
Year	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Annual**
2001	0.0	0.0	0.0	0.0	0.0	10.6	73.6	16.2	N/A	0.0	0.0	0.0	33.46
2002	0.0	2.4	0.0	0.0	0.0	N/A	N/A	52.2	N/A	0.0	0.5	0.4	13.87
2003	6.4	21.8	0.0	0.0	0.0	16.3	270.4	9.8	N/A	0.0	0.2	0.0	54.15
2004	13.7	0.0	0.0	0.0	0.0	N/A	3.0	5.6	N/A	39.3	0.0	4.3	13.18
2005	6.6	12.8	N/A	0.0	0.0	N/A	N/A	0.3	54.9	0.0	0.0	17.1	18.34
2006	N/A	0.0	N/A	0.0	0.0	0.0	66.2	148.6	21.9	0.0	3.1	61.3	60.22
2007	0.0	13.2	33.4	0.0	0.0	110.2	N/A	N/A	N/A	N/A	N/A	N/A	52.26
2008	8.0	Trace	1.1	0.0	0.0	0.0	54.0	37.5	Trace	0.0	0.0	21.0	24.32
2009	3.0	Trace	0.0	Trace	0.0	2.6	159.9	44.0	68.9	0.0	0.0	1.5	55.68
2012	0.2	0.0	0.0	0.0	0.0	Trace	Trace	8.1	121.0	0.0	0.0	22.8	152.1
2013	Trace	20.0	2.8	30.0	0.0	Trace	5.5	105.4	4.0	1.2	0.0	0.0	168.9
2014	Trace	0.0	12.4	0.0	1.3	Trace	1.1	9.9	1.4	0.0	4.6	0.0	30.7
2015	0.3	2.1	2.8	0.0	0.0	Trace	46.6	1.4	Trace	0.0	0.0	0.0	53.2
2016	3.1	0.0	Trace	0.0	0.0	65.8	1.9	96.9	Trace	0.0	0.0	0.0	167.7
2017	41.5	Trace	0.0	0.0	0.0	58.8	33.3	65.6	26.4	0.0	0.0	6.6	232.2
2018	Trace	Trace	0.0	0.0	0.0	Trace	Trace	0.8	Trace	0.0	0.0	Trace	0.8
2019	39.4	Trace	2.2	0.0	0.0	1.6	66.3	204	51.7	1.2	Trace	Trace	367.3
2020	Trace	2.6	0.5	0	0	Trace	101.2	366.8	Trace	0	3.1	0	474.2
2021	0	0	0	0	0	Trace	45.4	Trace	88.3	17.2	0.0	16.9	167.8
2022	28.5	0.4	0	0	0	21.6	348.3	127.9	43.4	0	2.6	0	572.7
2023	0.0	0.0	5.7	2.2	14.9	4.0	40.4	Trace	4.6	0.0	5.5	0.0	77.3
2024	2.2	60.6	12.3	15.1	0.0	0.5	67.1	159.4	0.6	12.0	0.0	0.0	329.8
2025	0.0	Trace	0.0	0.0	0.0	29.7	2.0	205.1	72.3	33.7	0.0	1.2	344.0
Source: Pakistan Meteorological Department													

The record for rainfall of PMD at Karachi Airport (2001-2023) suggests that July and August are the wettest months and that the maximum rainfall recorded in Karachi during 2001-2023 period was 270.4 mm during the month of July 2003, while the maximum annual rainfall was 372.9 mm during the year 2010, followed by 474.2 mm in 2020 and 572.7 mm in 2022.

The probability that precipitation will occur has been found to vary from different days of July and August at Karachi throughout the 1992-2012 period. Precipitation most likely occurs around August 4, in 35% of all days. Precipitation is least likely around April 27, occurring in 2% of all days.

Thunderstorms are the most severe type of precipitation observed during days was 38% precipitation. They are most likely around August 12, when it is observed during 12% of all days. Drizzle is the most severe precipitation observed during 34% of those days with precipitation. It is most likely around July 30, when it is observed during 14% of all days. Moderate rain is the most severe precipitation observed during 22% of those days with precipitation. It is most likely around July 28, when it is observed during 8% of all days. When precipitation does occur, it is most often in the form of thunderstorms (40% of days with precipitation have at worst thunderstorms) and cloud burst, drizzle (36%), moderate rain (19%), and light rain (5%).[13]

Inundation due to Heavy Rainfall Events: Highest rainfall events have occurred in July 1994: 256.3mm, July 2003: 270.4mm and August 2006: 77mm in 3 hours. According to observations recorded for the year 2007, August 10 and 11 were witnesses to unusually high rainfall of 107 mm in 24 hours compared with the normal of about 60 mm for August. The wettest August ever experienced by the city was in 1979, when over 262mm of rainfall was recorded. The record for the maximum rainfall within 24 hours in the eighth month was 166mm of rain on August 7, 1979. The heavy rainfall was not unusual since it was caused by the general monsoon system that travels from across Rajasthan and lays over Sindh. The monsoon weather system did not move towards Baluchistan but the penetration of moist currents from Sindh brought scattered to heavy rain in southern Baluchistan, particularly along its coastal regions. Major inundation and land submergence were noticed in Karachi in July 2003 and August 2006. On both occasions, precipitation pattern and intensity were almost similar. The downpour on both occasions was a cloud burst. For estimating the impact of inundation on the six corridors, the maximum intensity of Rainfall of 18th August 2006 at 77mm in about 3 hours i.e., 25.7mm/hour will be considered critical and adopted for making estimates on land submergence.

4.3.3 Humidity

The relative humidity typically ranges from 25% (dry) to 70% (humid) over the course of a year, rarely dropping below 20% (very dry) and reaching as high as 90% (very humid).

Table 4.5: Mean Monthly Relative Humidity (Mean) at 1200 UTC (%)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
2014	25.0	27.0	35.0	47.0	57.0	61.0	64.0	61.0	60.0	36.0	36.0	31.0	45.0
2015	38.0	41.0	37.0	45.0	60.0	56.0	69.0	67.0	56.0	47.0	28.0	31.0	47.9
2016	46.0	25.0	41.0	47.0	60.0	60.0	68.0	70.0	63.0	57.0	34.0	38.0	50.8
2017	38.0	25.0	36.0	44.0	59.0	62.0	70.0	67.0	63.0	44.0	29.0	20.0	46.4

[13] *Average Weather for Karachi (https://weatherspark.com/averages/32864/Karachi-Sindh-Pakistan).*

Table 4.5: Mean Monthly Relative Humidity (Mean) at 1200 UTC (%)													
Year	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Annual**
2018	36.0	37.0	33.0	45.0	46.0	65.0	65.0	68.0	63.0	40.0	32.0	30.0	46.7
2019	40.4	33.9	36.6	48.0	55.6	58.8	64.8	72.6	67.6	41.1	34.6	29.7	48.6
2020	29.9	28.1	34.2	44.4	57.1	56.8	65.0	74.8	62.4	38.1	32.9	29.1	46.1
2021	31.3	34.1	41.2	43.3	54.3	60.3	67.5	64.5	63.0	46.5	27.6	38.7	47.7
2022	40.5	39.1	37.7	47.1	55.3	62.1	74.7	79.1	66.3	42.0	49.4	36.5	52.5
2023	25.5	42.2	39.3	46.7	57.7	62.4	67.8	71.0	59.5	54.9	32.5	28.7	49.0
2024	42.8	35.1	34.6	48.7	52.3	57.8	69.6	73.7	66.4	50.1	47.2	22.1	50.0
2025	26.8	33.6	27.9	44.2	58.6	63.3	64.2	68.0	68.2	3.5	31.2	30.2	45.8
Source: Pakistan Meteorological Department													

4.3.4 Wind Speed & Direction

The wind direction and speed between the summer and winter monsoon seasons are rather unsettled and large variations are noted both with respect to speed and direction.

Table 4.6: Wind Speed (m/s) at 12:00UTS													
Year	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Annual**
2001	2.6	3.4	4.3	5.6	7.5	8.1	6.8	7.3	5.5	3.7	2.0	2.4	4.9
2002	3.6	3.9	4.0	6.5	8.5	8.2	9.8	7.3	7.7	3.3	2.9	3.2	5.7
2003	4.0	5.0	5.4	5.2	7.7	8.8	6.7	7.1	6.0	3.2	3.1	3.0	5.4
2004	3.4	3.7	4.0	6.0	8.0	9.0	10.0	9.5	7.3	3.8	1.0	2.5	5.7
2005	3.6	4.2	4.8	5.1	7.1	7.5	9.0	6.9	6.4	3.9	2.0	1.5	5.2
2006	2.0	3.0	3.0	6.2	8.0	7.7	8.3	6.2	4.7	4.2	2.2	3.0	4.9
2007	2.0	3.7	4.0	4.0	6.0	6.3	N/A	N/A	N/A	N/A	N/A	N/A	4.3
2008	4.3	7.6	8.2	10.5	12.6	7.6	11.0	9.3	8.7	6.6	5.1	3.9	7.9
2009	7.0	7.2	7.9	9.3	9.8	9.7	9.5	9.3	9.1	6.1	5.0	3.9	7.8
2012	5.8	6.6	9.3	9.8	12.3	12.8	13.1	11.2	8.4	7.1	5.7	5.8	9.0
2013	5.2	6.9	9.0	10.3	11.5	10.8	12.0	11.2	10.3	7.7	5.1	4.5	8.7
2014	5.9	8.9	8.6	11.5	12.4	13.4	12.8	11.6	11.7	8.3	6.0	4.5	9.6
2015	6.9	10.3	10.1	11.5	12.8	12.3	13.7	12.3	10.5	8.7	5.6	5.8	10.0
2016	7.5	8.7	4.8	1.1	13.0	11.7	11.8	10.5	12.1	9.2	5.5	5.2	8.4
2017	7.0	8.0	10.8	12.1	12.8	11.5	12.1	10.3	8.7	8.5	5.4	7.4	6.9
2018	6.3	7.0	9.5	10.2	10.8	11.1	12.3	12.4	12.2	8.7	6.1	6.8	9.4
2019	6.7	8.9	10.2	11.7	12.1	11.7	13.7	9.1	8.5	8.0	6.9	7.4	9.6
2020	9.0	9.4	9.0	10.5	13.3	10.9	10.1	8.9	9.4	7.3	6.2	5.5	9.1
2021	6.1	7.6	9.7	8.5	11.7	12.7	12.6	11.1	8.8	8.1	6.7	6.6	9.2
2022	6.8	7.9	8.9	9.9	12.5	12.5	9.5	7.0	8.8	7.0	6.1	4.8	8.5
2023	7.0	7.7	9.2	10.1	11.7	11.5	11.3	12.3	9.1	7.9	6.9	6.6	9.3
2024	7.1	7.1	8.1	9.9	10.1	11.3	10.0	10.2	9.5	7.2	6.8	6.3	8.6
2025	6.7	7.7	9.4	10.5	10.6	11.6	10.6	9.7	8.9	8.5	6.2	5.5	8.8
Source: Pakistan Meteorological Department													

Table 4.7: Wind Direction at 12:00UTS												
Year	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
2001	S54W	S43W	S42W	S45W	S46W	S45W	N52W	S59W	S44W	N56W	S45W	S06W
2002	S67W	S52W	S51W	S55W	S51W	S42W	S54W	S45W	S48W	S56W	N54W	S41W
2003	S60W	N50W	S45W	S48W	S45W	S68W	S60W	S47W	S43W	S54W	S50W	S27W
2004	N27E	S46W	S53W	S49W	S52W	S54W	S54W	S62W	S56W	S47W	S45W	N86E
2005	N63E	S51W	S50W	S52W	S63W	S48W	S54W	S49W	S87W	S54W	S52W	N23W
2006	S48W	S62W	S50W	S57W	S64W	S60W	S67W	S78W	S51W	S53W	S49W	N79E
2007	S30W	S62W	S47W	S55W	S58W	S47W	S41W	S55W	S60W	S48W	S48W	N45E
2008	N45E	S47W	S54W	S51W	S52W	S39W	S50W	S52W	S46W	S39W	S38W	N

2009	N45E	S45W	S41W	S58W	S46W	S46W	S56W	S49W	S56W	S42W	S39W	S45E
2012	S3E	N56E	S62W	S46W	S61W	S51W	S66W	S51W	S53W	S41W	S41W	N9W
2013	N39W	S54W	S56W	S54W	S61W	S40W	S53W	S52W	S55W	S47W	S17W	N50W
2014	S72E	S54W	S43W	S46W	S46W	S45W	S54W	S48W	S85W	S45W	S49W	S45E
2015	S72E	S54W	S43W	S48W	S50W	S40W	S54W	S55W	S50W	S41W	S	S58W
2016	S43W	S36W	S48W	S54W	S54W	S45W	S48W	S36W	S51W	S45W	S43W	S36W
2017	S83E	S56W	S51W	S45W	S45W	S44W	S66W	S57W	S48W	S51W	S59W	N45E
2018	S39W	S39W	S46W	S51W	S50W	S45W	S45W	S48W	S46W	S46W	S42W	S18W
2019	S24W	S65W	S45W	S44W	S42W	S37W	S48W	S46W	S53W	S35W	N59E	N55E
2020	N31E	S12W	S52W	S55W	S49W	S44W	S47W	S55W	S47W	S38W	S4E	N35E
2021	S21W	S38W	S44W	S42W	S52W	S53W	S55W	S48W	S40W	S41W	S22E	S40E
2022	N45E	S54W	S57W	S59W	S57W	S56W	S62W	S59W	S60W	S48W	S32W	S32W
2023	S22E	S45W	S40W	S58W	S65W	S38W	S56W	S74W	S57W	S53W	S40E	S84E
2024	S3E	S8E	S50W	S51W	S41W	S45W	S54W	S72W	S57W	S27W	S40W	N41E
2025	S4E	S38W	S30W	S33W	S32W	S36W	S34W	S40W	S42W	S5E	S16W	S5W
Source: Pakistan Meteorological Department												

4.3.5 Urban Heat Island (UHI) Effect

The term "heat island" describes built environment that are hotter than nearby natural areas. An urban heat island refers to a city or metropolitan area that is significantly warmer than its surrounding natural areas due to human activities. The temperature difference usually is larger at night than during the day and is most apparent when winds are weak. UHI is most noticeable during the summer and winter seasons. It is estimated that the annual mean air temperature of a city with 1 million or above inhabitants can be 1–3°C warmer than its surroundings. In the evening, the difference can be as high as 12°C. The heat island can affect communities by increasing summertime peak energy demand, air conditioning costs, air pollution and greenhouse gas emissions, heat-related illness and mortality, and water quality.

The city of Karachi has been growing exponentially in terms of urbanization and population growth. The city hosts more than 20 million population with a growth rate of 4.10[14]. Rapid urbanization and global warming have initiated UHI effect over the city. A strong incidence of UHI is generally associated with a severe heat wave hazard in terms of sensible temperature. UHI effect is the unique feature of the June 2015 heat wave in Karachi. It is expected that with growing global warming incidence and poor coping strategies, UHI would become a major health risk for the vulnerable segment of population in mega-cities around the globe such as Karachi.

Causes of Urban Heat Island Effect: The principal reason for the night time warming is the retention of short-wave solar radiation absorbed during the day time by the building material consisting of concrete and asphalt. These materials are commonly used in urban areas for pavement and roofs that have significantly different thermal and radiative properties compared to the surrounding rural areas. This causes a change in the energy balance of the metropolitan area, often leading to higher temperatures than surrounding rural areas. This energy is then slowly released during the night as a long wave radiation, making cooling a slow process. Because of this phenomenon, the minimum temperatures of Karachi remained extremely high during the heat-wave event.

There are several causes of an urban heat island effect in Karachi.

[14] Pakistan bureau of statistics

- Reduced and slow process of evapotranspiration due to shrinking green areas and spaces in the city. With a decreased amount of vegetation, the city loses the shade, cooling effect of trees and the removal of carbon dioxide.
- Geometric effects in terms of rising number of tall buildings are a significant contributing factor to urban heat island effect. Over the years, the number of tall buildings within the city has increased that provide multiple surfaces for the reflection and absorption of sunlight, and thus increasing the efficiency with which the city is heated. This is called the "urban canyon effect". Another effect of increased number of buildings is the blockage of wind, which also inhibits cooling by convection and pollution from dissipating.
- Waste heat from automobiles, air conditioning, industry, and other sources also contributes to the UHI. High levels of pollution in urban areas can also increase the UHI, as many forms of pollution change the radioactive properties of the atmosphere.

Aside from the effect on temperature, UHI can produce secondary effects on local meteorology, including the altering of local wind patterns and humidity, which have been discussed in the previous section. The UHI effect described above has been one of the major causes of unprecedented large number of heats related deaths in Karachi. Future climate scenarios suggest that the frequency of this kind of disasters may increase with the rise of temperature in future.

4.4 Ambient Air Quality & Noise

4.4.1 Ambient Air and Noise at Project Site

Ambient Air and Noise monitoring were conducted by SEPA certified lab at the proposed project site. The location and results of Ambient Air quality and Noise monitoring are presented in table below. The results showed that ambient air quality and noise levels at the project site are well within the limits of SEQS. The detail lab report is attached in **Annex-II**.

Table 4.8: Ambient Air Quality

Date	Time	CO (mg/m^3)	NO ($\mu g/m^3$)	NO_2 ($\mu g/m^3$)	SO_2 ($\mu g/m^3$)	PM_{10} ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	SPM ($\mu g/m^3$)	Lead ($\mu g/m^3$)
SEQS		**5**	**40**	**80**	**120**	**150**	**75**	**500**	**1.5**
MIN		0.3	13.2	16.2	10.2	80	26	236	ND
MAX		1.1	18.2	21.3	18.6	111	52	271	ND
AVG		0.7	15.7	18.8	14.2	96.3	39	252.5	ND
LDL-Limits		0ppm	0ppm	0ppm	0ppm	10µg/m3	2.5µg/m3	1 µg/m3	-
ND*= Not detected									

Table 4.9: Noise Level Test Results				
#	Location/Source	SEQs Limits 65 dB (A) Leq		
		Min	Max	Average
1	Left Corner Front side of the Project Area	58.6	59.3	58.9
2	Right Corner Front side of the Project Area	60.1	60.8	60.4
3	Left Corner Back side of the Project Area	59.2	60.1	59.6
4	Right Corner Back side of the Project Area	62.4	62.7	62.5
SEQS = Sindh Environmental Quality Standards dB (A) Leq = Time weighted average of the level of sound in decibel on scale which is relatable to human hearing.				

Figure 4.6: Ambient Air and Noise Monitoring at Project Site













4.5 Water Resources, Water Quality and Drainage

4.5.1 Surface Storm Water

Hydrogeologically, the city of Karachi lies in the Hub River Basin and the Malir River Basin. The Malir River Basin is drained by the Malir River and the Lyari River. The aquifer of Karachi is, therefore, mainly recharged by seepage from Hub River, Hub Dam as well as the Malir and the Lyari Rivers.

The Malir River system is the 2nd largest river system of the region after the Hub River with eight tributaries which contribute to the flow of the Malir River. The Malir River flows from the northeast to the center of the city and finally drains into the Arabian Sea. Small tributaries named Mol Nadi, Khadeji Nadi, Jarnado Nadi, Bazar Nadi, Konkar, Sukkun Nadi, and Thaddo Nadi join the Malir River at a distance of 48 kilometers north of Karachi. There are few small dams located in the northern and northwestern parts of the Malir River Basin including Konkar, Thaddo, Khar weir, Lath Dam, and many others which are used to store rainwater for irrigation purpose. The total area of the Malir Basin is 2,252 Km^2 out of which 930.5 Km^2 is located in the Karachi City[15].

4.5.2 Water Supply, Demand and Sewerage System

The Karachi City Water Supply System supplies approximately 650 MGD of water to Karachi citizens by means of bulk supply from the Indus River (Kinjhar Lake) and the Hub Dam and wells as shown in **Figure 4.7**. However, currently the water supply capacity is far below the water demand and NRW rate is up to 35%, which results in the shortage of water supply in many areas of the city. In response to this, the KIV project (described later) is being implemented to substantially increase the bulk supply from the Kinjhar[16].

[15] Zaidi, A., & Zafar, S. (2018, May). Karachi: An Expanding City with Rising Disasters. In *World Environmental and Water Resources Congress 2018: Watershed Management, Irrigation and Drainage, and Water Resources Planning and Management* (pp. 337-342). Reston, VA: American Society of Civil Engineers.

[16] https://openjicareport.jica.go.jp/pdf/12367207_01.pdf

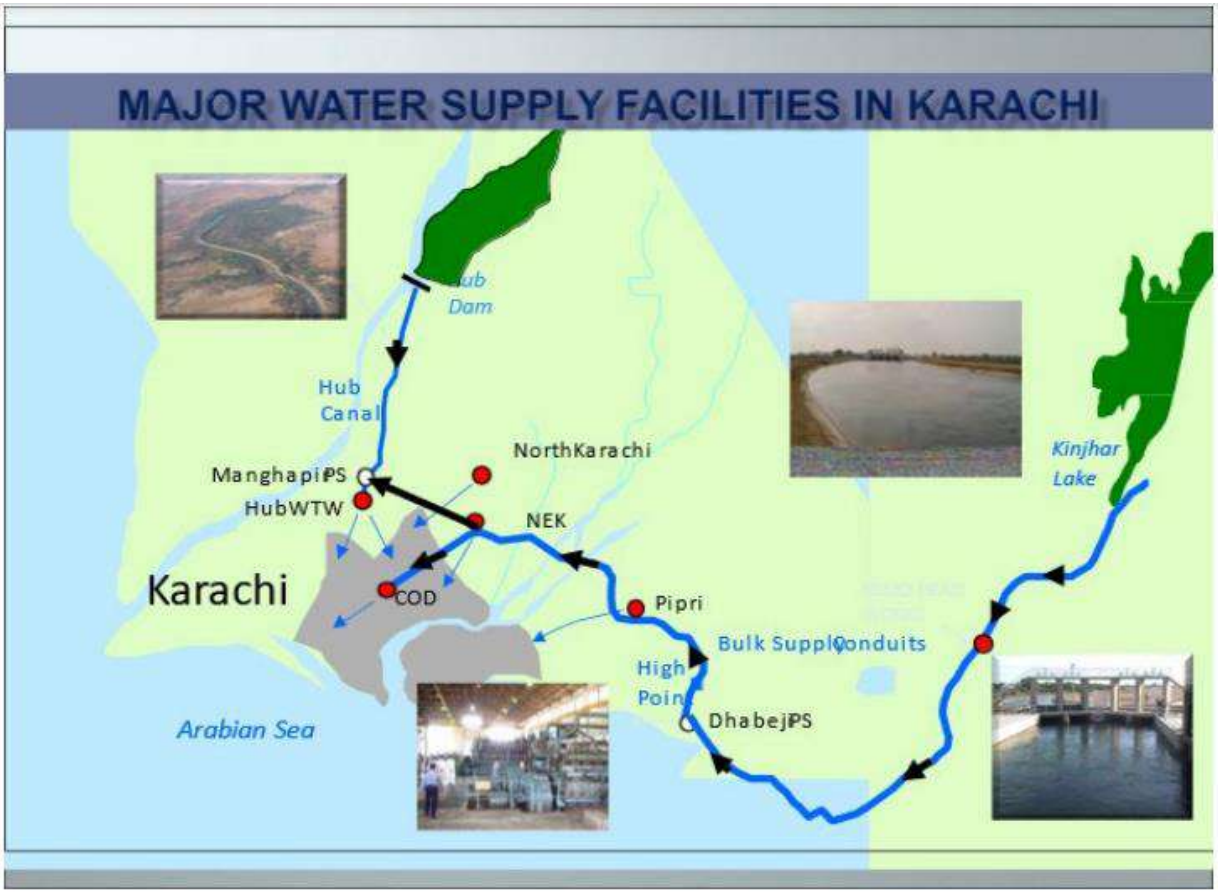


Figure 4.7: Major Water Facilities in Karachi City[17]

Sewerage Facilities: Karachi city consists of three treatment districts, TP-1, TP-2 and TP-3. However, the amount of sewage treated at these treatment plants are only about 1/3 of the total planned amount of 472 MGD, which is the amount of sewage expected from the water supply. Currently, most of the sewage generated in Karachi is discharged into rivers and seas without any treatment. KWSB is working on the S III project (see below) to strengthen/construct new interceptors and sewage treatment plants. Under this project, the current situation of untreated effluent will be greatly improved by guiding water to sewage treatment plant through interceptors constructed on the right bank of the Lyari River and the left bank of the Malir River. Of the three sewage treatment plants, TP-1 and TP-2 use the trickling filter process, and TP-3 uses the stabilization pond process. The outline of the sewage treatment districts in Karachi city are shown in **Figure 4.8**. In addition to the sewage treatment plant, Karachi city owns 6 nos. of disposal stations, 32 sewage lift pumping stations, 5,670 km of sewer pipes, and 250,000 manholes as sewage transmission facilities. Since the amount of sewage actually flowing in is smaller than the amount of sewage expected from the treatment district of each sewage treatment plant, it is presumed that the sewer pipes are damaged or clogged[18].

[17] https://openjicareport.jica.go.jp/pdf/12367207_01.pdf
[18] https://openjicareport.jica.go.jp/pdf/12367207_01.pdf

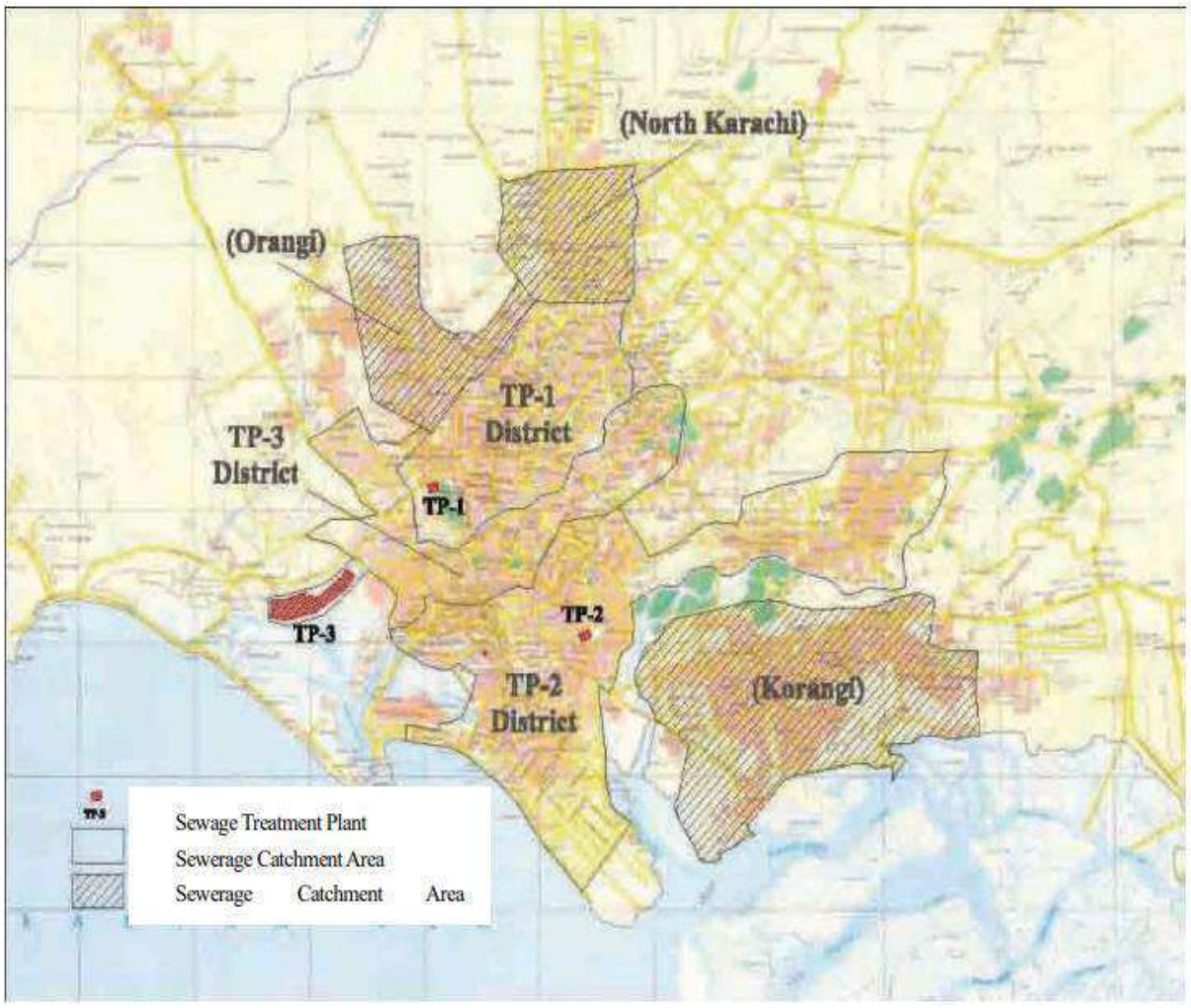


Figure 4.8: Karachi's Sewage Treatment Districts

4.5.3 Water Quality

Drinking water quality is one of the greatest factors affecting human health. However, drinking water quality in many countries, especially in developing countries is not desirable and poor drinking water quality has induced many waterborne diseases. The shortage of water in Karachi city due to rapid increase in population and industrial activities, has forced people to meet their water requirements from alternative supplies such as privately-owned ground water sources which extract, process and sell groundwater at a very high commercial cost[19]. However, the quality of groundwater is very poor in Karachi mainly due to the excessive pumping of groundwater by farmers, seepage of domestic wastewater in groundwater, huge amounts of chemical constituents in industrial wastewater and sea water encroachment, rendering it medically unfit for human consumption if consumed without prior treatment.

A study conducted by PCRWR in 2021 to assess of the water quality of cities of Pakistan revealed that Karachi, inhabits approximately 16.025 million (Population Census Report, 2017) people and houses about 60% of the industries of the country (UN Census, 2021). The water supply of Karachi is dependent on surface water and groundwater sources. Surface water sources include Haleji

[19] KWSB. (2010). Environmental Management Framework-Karachi Water Supply and Sewerage Improvement Project.

Lake, Keenjhar Lake and Hub Dam, while 44 groundwater source includes Dumlottee well-fields. Altogether, 28 fixed sources were monitored for drinking water quality. Out of these sources, 93% were found as unsafe for drinking. The groundwater of the city belongs to mainly Sodium-Chloride (92%) and a minor involvement from Sodium-Bicarbonate (8%). This indicates the presence of seawater belonging to the Sodium-Chloride facies and permanent type water hardness. The situation of water quality in Karachi continues to worsen since 2002 (23%) and no remarkable improvement could be seen up to the recent study of 2020 (7%)[20].

These findings suggest that the water as received by the residents is not safe for drinking. Although water quality has not been tested yet, groundwater pollution by nitrates, pesticides, heavy metals and hydrocarbons discharged into the environment is not negligible. The salinity of groundwater in Southern Sindh, particularly in the coastal areas has increased since over pumping has induced seawater to flow in, causing what is known as seawater intrusion. The fact, also acknowledged by KW&SB that 150 MGD (681,900 m^3/day) of water supplied to the consumers is chlorinated and bypasses the KW&SB filter plants is an important indicator of the need of addressing this issue on a priority basis.

4.5.3.1 Raw Water Quality at Project Site

The water quality assessment for the project site indicates that the available raw water meets the applicable standards for drinking water quality. Laboratory analysis shows that key physico-chemical parameters such as pH (7.55), turbidity (0.21 NTU), total dissolved solids (452 mg/L), and total hardness (180 mg/L) are all within the permissible limits defined by the Sindh Standards for Drinking Water Quality (SSDWQ). The water is reported to have acceptable taste, odor, and color, indicating no immediate aesthetic concerns. Major ions such as chloride (140 mg/L) and fluoride (0.071 mg/L) are also well within safe limits. Heavy metals including arsenic, lead, mercury, cadmium, and chromium were found to be below detection limits, suggesting no toxic contamination. Furthermore, microbiological analysis confirms the absence of total coliforms, fecal coliforms, and *E. coli*, indicating that the water is microbiologically safe. Overall, the results demonstrate that the water quality at the project site is suitable and does not pose any significant risk to human health or the environment under current conditions. The analytical test results of the raw water sample are presented in the **table 4.10.**

Table 4.10: Analytical Test of Raw water Quality

S.NO.	PARAMETERS TO BE ANALYZED	STANDARD	UNITS	RESULTS
		SSDWQ		
1	**Odor**	Non-Objectionable / Acceptable	Physical	Acceptable
2	**Taste**	Non-Objectionable / Acceptable	Physical	Acceptable
3	**pH**	6.5 – 8.5	SU	7.55

[20] https://pcrwr.gov.pk/wp-content/uploads/2021/10/Drinking-Water-Quality-in-Pakistan-2021.pdf

4	**Total Dissolved Solids (TDS)**	< 1000	mg/l	452
5	**Total Hardness as CaCO3**	< 500	mg/l	180
6	**Turbidity**	< 5	NTU	0.21
7	**Fluoride (as F-)**	≤ 1.5	mg/l	0.071
8	**Chloride (as Cl-)**	< 250	mg/l	140
9	**Nitrate (NO3)**	≤ 0.50	mg/l	0.15
10	**Nitrite (NO2)**	≤ 3	mg/l	0.051
11	**Zinc**	5.0	mg/l	0.081
MICROBIOLOGICAL ANALYSIS REPORT				
12	**Total Coliform**	0cfu/100ml	cfu	Nil
13	**Fecal Coliform**	0cfu/100ml	cfu	Nil
14	**Escherichia Coli(E-Coli)**	0cfu/100ml	cfu	Nil

The pictures of the raw water sampling at the project site are presented in **Figure 4.8.**

Figure 4.9: Raw Water Collection Point at the Project Site





4.6 Biological Environment

4.6.1 The Ecology of Macroenvironment

The ecology of microenvironment and macroenvironment of the project area has completely changed as a result of continuous emergence of urban conglomerates. In terms of macroenvironment, the vegetation of Greater Karachi can be divided into three edaphic types[21]:

- The coastal vegetation consists of three main associations. In the protected creeks facing the mouth of the rivers in shallow water is found mangrove vegetation consisting of mainly *Avicennia alba*. In the muddy coastal swamps *Arthroenemum indicum* is the main species. On the coastal sand dunes the main species consist of *Suaeda monoica*, *Aerua pseudo-tomentosa*, *Calotropis procera* and *Tamarix troupii*.

[21] Chaudhri, I. I. (1961). The vegetation of Karachi. *Vegetatio*, *10*(3-4), 229-246. https://link.springer.com/article/10.1007/BF00241786#Bib1

- The vegetation of the calcarious rocks consists of mainly *Commiphora mukul, Grewia villosa, Grewia tena, Euphorbia caudicifolia* and *Acacia senegal.*
- In the valleys between the hills where alluvium has been deposited over the basic rock by various rivers, the vegetation consists of *Capparis decidua*, *Prosopis spicigera* and *Salvadora oleoides*.

Ecological risk of high order has been induced by land clearance and removal of natural vegetation from the plains during the urban sprawl to make room for industrialization and urbanization. This has degraded the physical environment as quantified in the above section & the biological environment in the sense that the entire macroenvironment has lost its biodiversity. During the survey, less number of flora species was recorded in the project area such as *Conocarpus*, *Acacia nilotica* (Sindhi Babur), *Capparis decidua* (Kirar), *Ficrus religiosa* (Pepul), *Azadirachta indica* (Neem), *Prosopis juliflora* (Devi) and *Saveda fruticosa* (Lani). Horticulturists and tree activists have declared Conocarpus as harmful as the eucalyptus trees planted in the past. Eucalyptus was planted in huge numbers across the city only to be cut down for its negative impact on the environment. The same mistake was repeated with Conocarpus. In response to the growing concern against planting Conocarpus, district governments have put tremendous efforts in recent years towards plantation of neem trees and other native species in the city.

The impoverished as well as degraded environment resulting from non-availability of surface as well as groundwater and discharge of untreated wastewater into Lyari and Malir River has irreversibly reduced the biodiversity of the indigenous as well as introduced vegetation and hence it offers very little chance for the survival / growth of fauna in the macroenvironment of project area. There are even otherwise no habitats of large and small animals, birds or reptiles within the surveyed area.

4.7 Description of Socio-Economic Environment

The social baseline chapter provides a comprehensive review of the socio-economic conditions of the project area. This socio-economic profile is based on a literature review and several primary data gathering activities including site visits, sample socio-economic survey of stakeholders in the area, and consultations with primary and secondary stakeholders. This social baseline provides an overview of the socio-economic conditions of the people who reside and work in the project vicinity. It also includes an assessment of the public utilities and social services (education and health facilities) in the area concerning the proposed construction and operation of the Adress by Metro project.

International best practice for EIA studies demands an alignment of the proposed project components with the applicable Sustainable Development Goals (SDGs) adopted by all UN Member States in 2015. The SDGs provide broad universal targets for reducing poverty, environmental degradation, injustice and important pillars of social upheaval that must be achieved by 2030. In March 2017, the global indicator framework was developed and agreed upon by the Inter-Agency and Expert Group on SDG Indicators (IAEG-SDGs) to monitor progress towards the achievement of these indicators. Moreover, all member states, including Pakistan have developed national indicators linked to the global targets that provide the basis for a national effort of

monitoring progress towards fulfilment of the indicators. The proposed residential and commercial cum building project aligns with Sustainable Development Goal 11 by promoting planned urban development and efficient land use in a dense city environment. It also supports Sustainable Development Goal 9 through the development of modern infrastructure and improved urban services.

The socio-economic baseline data in this chapter identifies the existing socio-economic trends in the area and the potential impacts of the project providing the basis for the development of a Social Management Plan. The social baseline is divided into macro and microenvironment of the project area. The macro-environment encompasses District South. The discussion on macro environment covers the administrative setup, demography, education and health profile of the area. The immediate neighborhood of the project area is considered to be the micro-environment of the project and covers land use, education, health and utilities profile of the area.

4.7.1 Macro Environment of the Project Area

The macro-environment focuses on District South within Karachi, examining administrative structures, population demographics, education, health, and utilities. It provides insight into Karachi's role as a cultural and economic hub, as well as its socio-political governance framework:

4.7.1.1 Administrative Context

The proposed project Metro Address falls within the jurisdiction of sub-division Civil Line of District South. District South covers a total area of 85.0 sq. km while Civil Lines covers a total area of 18.6 sq. km, approximately one-fourth of the total district area. A total of 7 sub-divisions falls under District South Karachi which includes Aram Bagh sub-division, Civil Line sub-division, Clifton Cantonment sub-division, Garden sub-division, Karachi Cantonment sub-division, Lyari sub-division and Saddar.

4.7.1.2 Land Use

Civil Lines was an upmarket neighborhood where much of Karachi's British officials and local elite the project area has a mixed-use environment i.e.; it is used for both residential and commercial purposes. Most of the residential societies surrounding the project area belong to lower- and middle-class households. There are a few settlements located adjacent to the project area. Most of the residential developments comprise of one or two-story houses with a few high-rise buildings courtesy of new apartment complexes within the area. Most of the plots in the area are vacant, under development or still not developed. Few large-scale hospitals are operating in the area, which has been built over large stretches of land.

4.7.1.3 Demography

Civil Lines is an upscale neighborhood in Karachi, Pakistan, historically serving as a residential area for British officials and the local elite during the colonial period. The locality features numerous architecturally significant structures, including civic administration buildings, churches, mansions, and social clubs. It formed part of the "New Town" developed after the British took control of Karachi

from the Talpurs in 1839.[22] Situated to the east of the densely populated "Native Town" (comprising Mithadar and Jodia Bazaar), Civil Lines was intentionally planned as a spacious area in contrast to the crowded native quarters. It was primarily residential and housed much of the British administrative class and elite population.[23] To its north lies the European commercial district of Saddar, while the affluent seaside area of Clifton is located to the south.

Table 4.11: Demographic Characteristics of Karachi Division and Its Districts (2017–2023)

Name of Administrative Unit	Area S.Q Kilometers	Population Density Per S.Q Kilometers	Total Population of the Area	2017- 2023 Average Annual Growth rate
Karachi Division	3,527	5779.10	20,382,881	4.10
District Central	69	55,396.01	3,822,325	4.30
District East	139	28,213.97	3,921,742	5.32
District South	122	19,096.43	2,329,764	4.71
District West	370	7,241.57	2,679,380	4.35
District Keamari	559	3,700.27	2,068,451	2.07
District Korangi	108	28,971.95	3,128,971	3.29
District Malir	2,160	1,126.04	2,432,248	3.99
Gadap town (sub-division)	1,104	90.90	100,351	7.76
Source: Pakistan Bureau of Statistic 2023				

The data shows that Karachi Division, with an area of 3,527 sq. km, has a total population of 20,382,881 and an average annual growth rate of 4.10%, indicating rapid urban expansion. Among the districts, District Central has the highest population density at 55,396 persons per sq. km, followed by District East (28,213.97) and District Korangi (28,971.95), reflecting highly congested urban cores. District South, where the project is located, has a population of 2,329,764 over 122 sq. km, with a density of 19,096.43 persons per sq. km and a relatively high growth rate of 4.71%, indicating a dense yet comparatively planned urban environment.

In contrast, peripheral districts such as Malir (1,126.04 persons per sq. km) and Keamari (3,700.27) have significantly lower densities, highlighting more dispersed development patterns. Gadap Town, with a very low density of 90.90 persons per sq. km but the highest growth rate of 7.76%, reflects ongoing urban expansion into less developed areas. Overall, the trend suggests high population concentration in central districts alongside outward growth towards lower-density peripheral regions.

[22] Dutt, Ashok K.; Geib, M. Margaret (1998). Atlas of South Asia: A Geographic Analysis by Countries. Oxford & IBH Publishing Company. ISBN 978-81-204-1277-4

[23] Gayer, Laurent (2014). Karachi: Ordered Disorder and the Struggle for the City. Oxford University Press. ISBN 978-0-19-935444-3.

Table 4.12: Comparison of Karachi South District and Civil Lines Sub Division for 1998, 2017 & 2023

Administrative Unit	Population (2023)	Density (per sq.km)	Population (2017)	Population (1998)
Karachi South District	2,329,764	19,096.43	1,769,230	1,478,047
Aram Bagh Sub-Division	237,224	59,306.00	128,313	-
Civil Lines Sub-Division	480,480	6,581.92	473,119	142,721
Garden Sub-Division	502,819	125,704.75	363,967	-
Lyari Sub-Division	949,878	158,313.00	661,926	-
Saddar Sub-Division	159,363	4,553.23	141,905	-
Source: Pakistan Bureau of Statistic 2023				

The data indicates that District South has experienced steady population growth, increasing from 1,478,047 in 1998 to 1,769,230 in 2017 and reaching 2,329,764 in 2023, with a population density of 19,096.43 persons per sq. km, reflecting its status as a densely populated urban district. Within the district, Lyari Sub-Division has the highest population at 949,878 and the highest density of 158,313 persons per sq. km, followed by Garden with 502,819 and an even higher density of 125,704.75, indicating extreme congestion in these areas.

Civil Lines Sub-Division, where the project is located, has a population of 480,480 with a significantly lower density of 6,581.92 persons per sq. km compared to other subdivisions, highlighting its relatively more spacious and planned character despite notable growth from 142,721 in 1998 to 473,119 in 2017 and 480,480 in 2023. Saddar and Aram Bagh show comparatively smaller populations of 159,363 and 237,224 respectively, though Aram Bagh has a high density of 59,306. Overall, the trend suggests substantial population growth across District South, with particularly high congestion in Lyari and Garden, while Civil Lines remains comparatively less dense but steadily growing.

The project site in Civil Lines is surrounded by a mix of key administrative, commercial, and residential landmarks, highlighting the area's strategic importance. Prominent institutions such as the Commissioner Office, Sindh Secretariat, Chief Minister House, Governor House, and various courts of law reflect the strong administrative presence in the vicinity. The area is also close to notable landmarks and facilities including Bagh-e-Quaid-e-Azam, Frere Hall, and major hotels such as Pearl Continental, Marriott, and Hotel Metropole, indicating its commercial and urban significance. Additionally, nearby residential neighborhoods such as Hijrat Colony, Delhi Colony, Punjab Colony, and Kashmir Mujahid Colony contribute to the dense and diverse community profile of the area.

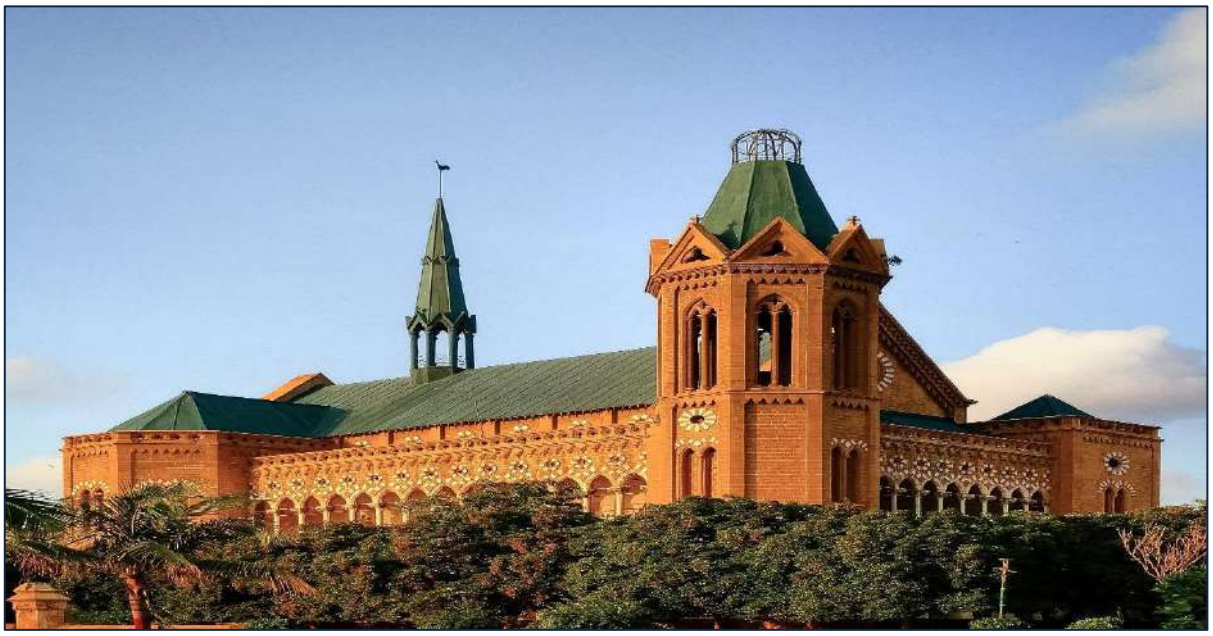


Figure 4.10: Frere Hall[24]

4.7.1.4 Religion

District South exhibits a diverse religious composition, with Islam being the dominant religion, alongside minority communities including Christians, Hindus, Parsis, Sikhs, and others. According to Pakistan Bureau of Statistics (2023), out of the total population of 2,329,764 in District South, approximately 2,186,415 individuals (over 93%) are Muslim, followed by Hindu communities numbering 96,486 and Christians at 38,342. Smaller populations of Ahmadis (349), Scheduled Castes (2,286), Sikhs (651), Parsis (952), and other minorities (4,283) are also present, reflecting the district's multicultural urban character.

At the sub-division level, Civil Lines—where the project is located—also reflects a similar pattern but with a relatively higher proportion of minority populations compared to some other areas. Out of a total population of 480,480, approximately 440,602 are Muslims, while Hindus (26,139) and Christians (11,681) form notable minority groups. Other smaller communities include Ahmadis (171), Scheduled Castes (85), Sikhs (91), Parsis (126), and others (1,585).

Overall, the data indicates that while the area is predominantly Muslim, there is a visible presence of religious minorities, particularly in Civil Lines, which is consistent with its historical background as a diverse and cosmopolitan urban locality

[24] Ahmad, S. (2026). *Frere Hall, Karachi* [Photograph]. Wikimedia Commons. Wikimedia Commons page.

Table: 4.13: Population Distribution by Religion in Karachi South District and Civil Lines Sub-Division

Area	Total Population	Muslim	Christian	Hindu Jati	Qadiani / Ahmadi	Scheduled Castes	Sikh	Parsi	Others
Karachi South	2,329,764	2,186,415	38,342	96,486	349	2,286	651	952	4,283
Civil Lines Sub-Division	480,480	440,602	11,681	26,139	171	85	91	126	1,585
Source: Pakistan Bureau of Statistic 2023									

4.7.1.5 Transportation

As cities expand, the demand for civic facilities increases, necessitating continuous development, technological advancement, and efficient management. Karachi, one of the fastest-growing mega port cities, is experiencing a high rate of urbanization, leading to a rapidly increasing need for improved transport infrastructure and services. Being one of the oldest cities, many of its older areas lack the capacity to accommodate rising traffic volumes, posing significant challenges for urban management. Traffic congestion has become a persistent issue, with severe jams now a common occurrence and conditions worsening over time. If not addressed on a priority basis, this situation could escalate into a complete gridlock, adversely affecting economic activities across the city. The rapid increase in the number of vehicles is also attributed to inadequate availability of affordable public transport.

According to the Research Report of KCCI, August 2017, the ratio of the registered motorcycles is highest (57%) while private vehicles are next (31%), indicating that new public transport vehicles are not inducted to facilitate the citizens of the city and they may resort to resolving their transport problem themselves. The following graph shows the share of vehicles which have been registered in Karachi in 2017.

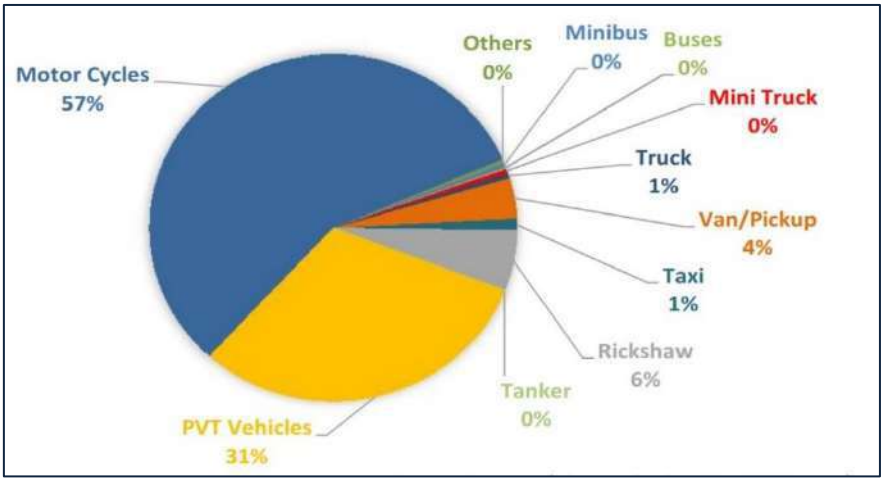


Figure 4.11: Registered Vehicles in Karachi by Vehicle Type (2017)[25]

[25] Source: Transport & Communication, KDA; KCCI Research Report (2017)

The district is served by a well-developed communication network comprising metaled roads; however, the increasing number of motorcycles and private vehicles has placed significant pressure on the road infrastructure of District South. Shahrah-e-Faisal, extending approximately 18 kilometers, is one of the busiest arterial roads in the city. Other major roads, including Club Road, M.T. Khan Road, Abdullah Haroon Road, and Dr. Ziauddin Road, also experience consistently high traffic volumes. Public transport in the form of local buses and wagons remains the most affordable mode of travel; however, operators often overcrowd vehicles to maximize earnings.

4.7.1.6 Education

District South is widely regarded as a major educational hub of Karachi, hosting a diverse range of schools, colleges, and higher education institutions. The district accommodates several prominent public and private sector institutions, including the Jinnah Postgraduate Medical Centre, National Institute of Cardiovascular Diseases, Institute of Chartered Accountants of Pakistan, Preston Institute of Management Science and Technology, and Shaheed Zulfiqar Ali Bhutto University of Law.

The area is also home to several well-known A Level and intermediate colleges such as St. Patrick's College Karachi, St. Mary's Academy Karachi, Mama Parsi Girls' Secondary School, and Karachi Grammar School, which are among the most prestigious institutions in the city. In addition, proximity to universities such as Iqra University and Indus Valley School of Art and Architecture further enhances the district's educational significance. This concentration of institutions makes District South a key center for education, attracting students from across Karachi and contributing significantly to its socio-economic dynamics.

The table below presents a district-wise summary of schools, student enrollment, and teachers based on data from the Sindh Education Management Information System (SEMIS) 2023–2024. It highlights variations across districts in terms of the number of schools, gender-wise enrollment, and teacher distribution. Among all districts, Central has the highest student enrollment, while Korangi also shows a large student population. Malir stands out for having the largest number of schools, particularly mixed schools, indicating widespread access to co-educational institutions.

Table 4.14: District Summary - School, Enrollment, Teacher Wise

District Name	No. of Schools				Enrollment			Teacher		
	Boys	Girls	Mixed	Total	Boys	Girls	Total	Male	Female	Total
Central	145	80	102	327	39,984	48,391	88,375	1,559	3,453	5,012
East	89	43	48	180	25,528	28,135	53,663	957	2,301	3,261
South	21	38	79	138	22,193	31,137	53,330	792	1,940	2,732
West	25	16	138	179	20,403	22,676	43,079	599	871	1,470
Malir	133	80	320	533	36,832	33,477	70,309	1,462	1,479	2,941

Korangi	91	44	82	217	40,156	47,042	87,198	1,162	2,885	4,047
Keamari	25	22	155	202	21,946	22,573	44,519	758	859	1,617
Source: Sindh Education Management Information System 2023-2024										

Table 4.15: Karachi District South and Civil Lines Sub Division Literacy Rates

Area	Indicators	Total	Male	Female	Transgender
Karachi South	Literate >=10	1,447,743	797,663	649,923	157
	Literate %	78.57	80.76	76.05	40.89
Civil Lines Sub-Division	Literate >=10	332,845	189,852	142,894	99
	Literate %	84.75	86.44	82.64	50.00

The literacy data indicates that District South has a relatively high literacy level compared to many other parts of Karachi. Out of the total population aged 10 years and above, 1,447,743 individuals are literate, including 797,663 males and 649,923 females. The overall literacy rate stands at 78.57%, with male literacy at 80.76% and female literacy at 76.05%, showing a moderate gender gap in educational attainment. The literacy rate among the transgender population is significantly lower at 40.89%, highlighting disparities in access to education for marginalized groups.

At the sub-division level, Civil Lines demonstrates an even stronger educational profile. A total of 332,845 individuals aged 10 years and above are literate, comprising 189,852 males, 142,894 females, and 99 transgender individuals. The overall literacy rate in Civil Lines is 84.75%, which is notably higher than the district average. Male literacy stands at 86.44%, while female literacy is 82.64%, indicating a relatively smaller gender gap compared to the overall district. The higher literacy levels in Civil Lines reflect its relatively well-developed, urban, and socio-economically advantaged character.

4.7.1.7 Health

District South serves as a major healthcare hub, providing medical facilities not only to its own residents but also to populations from adjoining districts. The presence of key hospitals such as PNS Shifa Hospital, National Medical Centre, and Dow Hospital adds to the significance of the district's healthcare infrastructure. In addition, several dispensaries operate across the district under the administrative control of Karachi Metropolitan Corporation and District Municipal Corporation (DMC) South, ensuring basic healthcare access at the community level.

Alongside public sector facilities, the district hosts numerous private healthcare institutions, further strengthening service availability. Notable hospitals include BHY Hospital, Kharadar General Hospital, Osmania General Hospital, Altamash General Hospital, and Dr. Ruth K. M. Pfau Civil Hospital Karachi. In addition, a wide network of private clinics is distributed throughout the district, contributing to comprehensive healthcare coverage in the area.

Table 4.16: Health Facilities in Karachi Division

Health Facilities	No	Beds
Government Hospitals + Autonomous Bodies + Other Health Centres	210	9,371
Dispensaries	57	10
M.C.H.C	21	23
T.B. Clinics	33	350
BHUs	33	66
RHCs	5	12
Unani Shifa Khana	3	
Leprosy Clinics	1	
Maternity Homes	5	
Trauma Center	3	
Urban Health Center	5	
Urban Health Unit	9	
Source: Development Department, Government of Sindh 2022		

Table 4.17: Health Facilities in Karachi Districts

District	Hospital	Hospital Beds	Dispensaries		R.H Centers		TB Clinics		BHU		MCHC	
	Civil, Specialized & Taluka & DHQ	Civil, Specialized & Taluka & DHQ	No	Beds	No	Beds	No	Beds	No	Beds	No	Beds
Central	5	313	2	0	-	-	13	0	2	0	2	5
East	2	400	2	0	-	-	10	108	4	-	2	-
Korangi	1	334	5	0	-	-	12	-	8	17	3	27
Malir	3	400	12	0	2	8	9	-	14	24	5	-
South	5	700	2	0	-	-	15	6	-	-	-	-
West	1	260	7	0	4	20	13	-	7	15	4	5
Source: SBOS, Government of Sindh (2020)												

The data indicates variation in the availability of healthcare facilities across different districts of Karachi. District South, where the project is located, has a relatively strong healthcare infrastructure compared to several other districts. It hosts 5 major hospitals with a total of 700

beds, which is the highest number of hospital beds among all listed districts, highlighting its importance as a key healthcare hub. In addition, the district has 2 dispensaries, although no Rural Health Centers (RHCs), Basic Health Units (BHUs), TB clinics, or Maternal and Child Health Centers (MCHCs) are reported, reflecting its fully urban character where large hospitals and private facilities play a more significant role.

4.7.2 Micro Environment of Project Area

4.7.2.1 Education Facilities

The project site is located in close proximity to a wide range of educational institutions, indicating strong access to schooling facilities within the immediate vicinity. Several schools are situated within a 3 km radius, including Karachi High School (1.8 km), Bay View High School (400 m), FG Public School (550 m), Government Minwalla Public Girls School (1 km), and Foundation Public School O Level Defence Campus (1.9 km). Other notable institutions include Trinity Methodist High School (1.5 km), Army Public School and College (2.8 km), St. Paul High School (2.2 km), Husamiyah School (2.3 km), Citizen Public School Montessori Campus (1.1 km), and the British School of Karachi (2.5 km), with Brooklyn Secondary School located slightly farther at 3.8 km.

The presence of multiple public, private, and international curriculum schools within close proximity reflects a well-developed educational network in the project area. This also indicates the presence of sensitive receptors, particularly school-going children, which is an important consideration during construction and operational phases of the project.

4.7.2.2 Healthcare

The project area is also well-served by several major healthcare facilities located within a short distance, ensuring strong access to medical services. Key hospitals include the Kidney Centre (1.5 km), Jinnah Postgraduate Medical Centre (JPMC) (1.6 km), and the National Institute of Cardiovascular Diseases (2 km), all of which are major tertiary care facilities. Other nearby hospitals include PNS Shifa (2 km), National Medical Centre (NMC) (2.5 km), Cantonment General Hospital (2.8 km), and Dr. Ruth K. M. Pfau Civil Hospital Karachi (4.2 km). RMA General Hospital is also located approximately 4.2 km from the site.

The concentration of both public and private healthcare institutions within a 5 km radius highlights the area's strong healthcare infrastructure. It also indicates that the project site is situated in a sensitive urban setting where uninterrupted access to healthcare services must be maintained, particularly during construction activities.

4.7.2.3 Waste Management

The water supply in the locality falls under the jurisdiction of Karachi Water and Sewerage Board Sindh Solid Waste Management Board (SSWMB) is responsible for the waste management in the nearby vicinity. The condition of solid waste in the project area is quite satisfactory. There is proper infrastructure for solid waste management, waste management of Civil Lines area falls under the jurisdiction of Karachi Cantonment. The developed projects and societies like Hoshang Pearl Tower, G&T Tower, Abeeda Towers and Royal Homes have their own private garbage collecting

system. Government buildings such as Chief Minister's House, Chief Secretary's House and State Guest House are situated in the neighborhood that results in up to the mark cleaning plan for the residents.

4.7.2.4 Water Supply and Drainage

The water supply in the area falls under the jurisdiction of the Karachi Water and Sewerage Board (KWSB). There is no shortage of water supply in the area, residents are satisfied with water condition and quality. Locals have water lines to meet household demands and the nearby residents do not use water tankers. It was also observed that the drainage system is satisfactory in the project area. The residents shared that they are safe during heavy rains, when the drain water overflows onto the streets of Karachi, no overflow of water in Civil Lines has been observed.

4.7.2.5 Electricity & Gas Supply

K-Electric supplies electricity for Civil Lines. Residents were mostly satisfied with the electricity supply in the area as load shedding is infrequent in the neighborhood but in summer season interval of electricity supply take hours to resume its continuation. The area suffers from gas load shedding during the winter season as it happens in other parts of the city too.

Chapter 5 Information Disclosure, Consultation & Participation

Public consultation and information disclosure are an essential component of the Environmental & Social assessment process, recognized by development agencies and national governments alike. Similarly, to incorporate the views, concerns, and suggestions of project stakeholders and to provide them with sufficient opportunity to become part and parcel of the development process, the importance of stakeholder engagement throughout the project life cycle cannot be dismissed.

Stakeholder consultation presents an opportunity for mutual information-sharing and dialogue between the project proponent and stakeholders. An effective public consultation provides concrete suggestions that can help improve project design, resolve conflicts at an early stage, identify management solutions to mitigate potentially adverse consequences and enhance perceived positive impacts.

5.1 Consultation Objectives

Effective stakeholder engagement enhances project beneficiaries' role from "participants" to "enabling agents" that proactively provide insights to project planning and implementation. The stakeholder consultation process for this project has been designed to enhance the role of stakeholders and thereby contribute towards project success and sustainability. Specific tasks and purposes of consultations with stakeholders have been given in the table below:

Table 5.1 - Tasks and Purposes of Consultation

Task	Purpose of Consultation with Stakeholders
Need for consultation with the stakeholders	• To build trust to ensure sustained support for the proposed project and build resilience during the times of crisis. • To learn about public concerns that need to be addressed and considered in designing of the project concept and preparing mitigation measures and programs. • To learn about the strengths, skills, and organizational support that the stakeholders can bring to support project planning and implementation. • To introduce the project and obtained their views and feedback on it, along with measures to incorporate to improve the project.
Modes and benefits of consultation	• Listening and creating dialogue with stakeholders to keep the project tuned to public concerns early, to pre-empt breakdowns, and avoid mistrust in public confidence. • Engaging the public as advocates for the project construction and to support the implementation of social, resettlement, and environment and health programs.

The specific objectives of the stakeholder engagement exercise carried out for the Metro Address Project include:

- Ensure all stakeholders are informed about the project's objectives, context, and scope, including the key design features, potential environmental and social implications.
- Promote active engagement with project-affected parties, beneficiaries, and other stakeholders to foster acceptance, ownership, and sustainability of the project. Ensure participation from diverse groups, irrespective of gender, ethnicity, income level, or ability, in an inclusive, transparent manner.
- Leverage local expertise and knowledge to refine project interventions, particularly regarding effective and safe construction processes.
- Gather community feedback on potential impacts, such as environmental changes or livelihood disruptions, and develop practical solutions to address these concerns while enhancing project outcomes.

5.2 Stakeholders Identification and Analysis

Stakeholders

Stakeholders are individuals, groups, or organizations who are directly impacted by the project. This includes local communities whose livelihoods, environment, and daily activities may be affected by the project's development. It also encompasses individuals and businesses that rely on the project's resources or infrastructure for their operations, such as those engaged in fishing, trade, or service provision. Industries or companies with a direct interest in the project's implementation and outcomes are also considered stakeholders.

Details regarding stakeholders and their roles and responsibilities are represented in **table 5.2** below.

Table 5.2 - Roles and Responsibilities of Stakeholders

Project Stakeholder	Roles and Responsibilities
Local Communities	• Participate in project consultations and provide feedback on potential social, environmental, and economic impacts. • Share local knowledge and traditional practices to inform the project's design and implementation. • Support the project through community engagement, ensuring the concerns and interests of community members are addressed.

5.3 Consultation and Participation Process

The project utilizes various methods of engagement that were employed as part of its continuous interaction with project stakeholders. For the engagement process to be effective and meaningful, a range of various techniques were applied that were specifically tailored to the identified stakeholder groups

5.3.1 Consultation with Stakeholders

The main purpose of the consultation exercise was to disseminate project information to relevant stakeholders and solicit their feedback at an early stage regarding potential issues and concerns based on the current project concept and design features.

Identification of stakeholders was a key step in designing an effective consultation process. To this end, several site visits were carried out by the Environmental and Social (E&S) team to identify individuals, groups, and organizations relevant to the project. Consultation meetings were held with these stakeholders, during which they were briefed on the background and scope of the Metro Address project. Concerns, suggestions, and queries raised by the participants were noted by the team, and photographs of the sessions were taken with the consent of those involved.

Additionally, Key Informant Interviews (KIIs) were conducted with a diverse range of stakeholders, including local communities, businesses, government departments, and non-governmental organizations. These interviews provided an opportunity for stakeholders to offer detailed feedback and share their perspectives on different aspects of the project. This comprehensive approach ensured that the views, expectations, and recommendations of all relevant stakeholders were taken into consideration during project planning and implementation.

5.4 Consultation Feedback and Analysis

5.4.1 Stakeholders

The comments, concerns, and suggestions received from the stakeholders during the survey have been collated in this section. The comments solicited from these stakeholders were helpful in the screening of the potential environmental and social aspects of the project.

Details regarding stakeholder's feedback and suggestions are represented in **table 5.3** below:

Table 5.3 - Stakeholder Feedback and Suggestions

S#	Name	Area Type	Stakeholder Role	Comments
1	Mr. Umer Jawaid (Union Member & Residents) Mr. Gul Khan (Chowkidar)	Residential	Elegant Homes	They stated that prior to the construction of this project, the old wall of the plot collapsed and fell onto the car of a union member from Hashim Villas Apartments, causing significant damage to the vehicle. During the construction of this project, the proponent must ensure proper safety measures are in place to prevent such incidents in the area. He expressed concern that the road is already congested, and the movement of construction vehicles during the construction phase may cause inconvenience to the residents of the nearby apartments. Therefore, it is recommended that the movement of construction vehicles be carefully managed, and that heavy vehicles utilize the front road to minimize disruption. The project area has a reliable electricity supply, with load-shedding occurring only in the event of a fault, and residents have expressed satisfaction with the service. During consultations, residents also noted that piped water is provided by KWSC, and they use a combination of both piped and boring water for their domestic needs.
2	Ms. Dunkin (Resident)	Residential	Sterling Homes Apartments	Miss Dunkin, a resident of Sterling Homes, stated that the utility infrastructure in the area particularly the sewerage and drainage systems is very old. She explained that the sewerage lines frequently become blocked, causing wastewater to accumulate on the road. According to her, residents and Mehmood from MJ Foods often cooperate to resolve these issues through mutual cooperation. She further expressed concern that the construction of the proposed high-rise building may place additional burden on the already deteriorating system, potentially worsening the situation. They further added that the proposed high-rise building may obstruct the flow of fresh air and block natural sunlight for the surrounding properties. Many high-rise buildings have been planned and developed in this area in the recent years and some high-rise buildings are under construction. The

				residents were concerned about blockage of air and lack of ventilation due to construction of these high-rise buildings. The residents of the neighbourhood highlighted several disturbances associated with the construction activities, including noise pollution, dust emissions, disruptions caused by the movement of construction material trucks, and vibrations generated by heavy drilling machinery. They expressed concern that these issues may affect the comfort and safety of the surrounding community during the construction period.
3	Mr. Deen Muhammad (Security Guard) Mr. Lal Chand (Worker)		The Grand Marquee	They stated that they have no concerns regarding the development of the high-rise building, noting that many such buildings have already been planned, completed, or are currently under construction in the surrounding area. They further emphasized that the work should be carried out with proper safety measures, all required protocols must be strictly followed, and the construction process should not cause any inconvenience or disturbance to them or to the neighbouring community. He emphasized that the construction site should be properly covered with a green safety net to minimize dust. He also pointed out that construction activities should be restricted during night time, as most events are held at night; any such work could disrupt business activities and create inconvenience for nearby residents.
4	Mr. Mehmood Jan (owner MJ Foods)	Commercial	MJ Foods	Mr. Mehmood stated that they have no concerns regarding the high-rise development, as many similar high-rise buildings have already been planned, developed, or are currently under construction in the surrounding area. He expressed optimism about the new development, noting that it is expected to support the growth of their business and enhance socio-economic activities in the neighbourhood. Mr. Mehmood stated that the project site is surrounded by numerous residential and commercial establishments. He recommended that construction activities be strictly limited to specific daytime hours, with no work conducted at night, in order to minimize disturbances to residents. He further emphasized that the

				construction site should be covered with a green net to reduce dust, as excessive dust could adversely affect the operations of his business MJ Foods. He expressed concern that the proposed high-rise residential-cum-commercial building must include sufficient parking facilities for residents, commercial occupants, and visitors. Inadequate parking provisions could lead to on-street parking, thereby increasing traffic congestion in the area. Mr. Mehmood expressed concern that the proponent should install a separate sewerage and drainage system for the building, as the existing lines are old and may not be capable of handling the additional load from the new development.
Secondary Stakeholder Consultation				
-	Mr. Saqib,	Director,	Culture, Tourism, Antiquities and Archaeology, GOS	Initially in 2022, we granted approval which later on revoked. We constitute a technical committee which is analysing this project. As per direction of Technical Committee EIA is recommended to conduct. After approval of Sindh EPA our technical committee will re-examine this project.

Table 5.4: Primary Stakeholder Consultations Pictures



Consultation with Worker & Security Guard, The Grand Marquee



Consultation with Security Guard & Given PID, Bank House (State Bank of Pakistan)





Consultation with Owner & Workers, MJ Foods



Consultation with Residents, Sterling Homes Apartments



Consultation with Chowkidar and Residents, Elegant Homes

Chapter 6 SCREENING OF POTENTIAL IMPACTS & PROPOSED MITIGATION MEASURES

This section presents the screening process that identifies the environmental aspects and makes assessment of impact of different activities on the physical, biological and social environment. The screening process has, through review of literature, primary as well as secondary baseline data, and expert judgment, made assessment of the potential impacts of said activities on the physical, biological, and socioeconomic environment of the Project. Mitigation measures have been proposed to reduce, minimize or compensate for the identified potential negative impacts and their adoption has been recommended. The report has taken cognizance of the deficiencies in infrastructure which has been overburdened as a result of increased demand of water supply, waste disposal and road congestion. The deficiencies having been created due to the non-sustainable development activities introduced in the megapolis for over two decades.

M/s L.K Builders & Developers has planned to construct a residential cum commercial building project comprises Basement-2 (Services) + Basement 1 (Parking + ARS + Services) + Ground Floor (Parking + Shops + Services) + 1ST Floor (Parking Services) + 2nd to 10th Floor (Parking & Services) + 13th to 46th Floor (Flats) + Roof (Solar Panel + Battery Room + Helipad + Services). The environmental aspects of the project as identified by situation analysis are related to the following:

- Physical environment,
- Biological environment, and
- Socio-economic environment.

Description of microenvironment and macroenvironment in the previous chapters have provided a classification of the micro-site based on assessment of impact using both primary and secondary data on climate, air quality & noise, hydrology, geology, geomorphology, soil characteristics and seismicity, ecology, built environment including road network and traffic movement, and the socioeconomic aspects pertinent to siting of the project and its adaptation in the emerging situation of intense construction activity in Karachi. Mitigation measures have been proposed wherever required.

Screening of potential environmental impacts on the physical environment is related to:

- Siting of the Project
- Topography, Geology and Seismicity of the microenvironment
- Vulnerability of soil to liquefaction
- Availability of utilities in the area
- Air, water and noise pollution and other forms of nuisance during construction at site, and in the microenvironment (neighborhood) and macroenvironment of site
- Burden on Infrastructure
- Capacity of adjoining roads, traffic movement, and congestion

The phases of project are:

- Siting
- Construction
- Operation

6.1 Impact Assessment Methodology

Potential environmental impacts of the proposed Project on different features of micro and macro-environment pertain to construction and operation of residential building project.

The screening process proceeds by identifying the potential environmental aspects of siting the project, identifying the potential environmental impacts at pre-construction, construction and operational stages of the project and identifying the residual impacts after adoption of mitigation measures that may be needed at the outset of activities. The impacts on environmental resources from the proposed project will be short-term and temporary in nature.

Environmental impact of a project is worked out using various factors, so that an environmental management plan can be evolved to take mitigation measures.

Impacts assessment strategy at different stages of the project is summarized as per **Fig. 6.1** below:

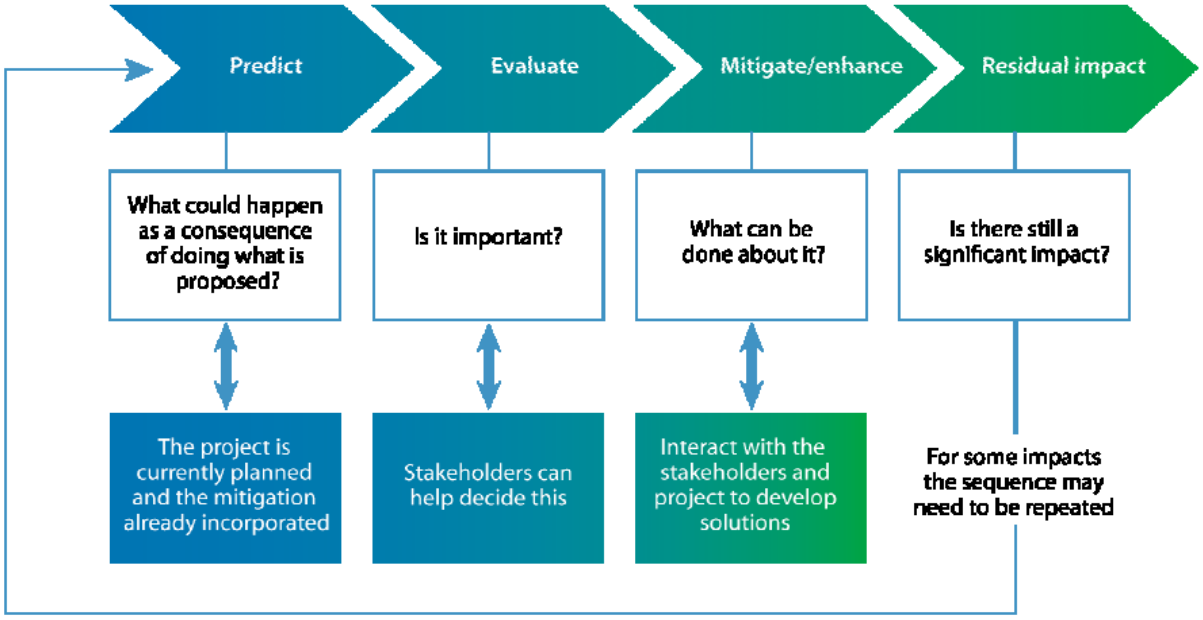


Figure 6.1: Impact Assessment Strategy

A systematic strategy was developed to provide an assessment of the likely impacts on the micro and macro-environment of the Project site. The strategy included:

6.2 Screening of Environmental Aspects related to Siting of Project

The Metro Address Residential cum Commercial Building will be sited at Plot No. 13, CL-07, Civil Lines Quarters, District South, Karachi; the site falls in the appropriate category that permits the designated land-use by the relevant authority. The site is thus the only and hence the preferred alternative for siting the Project.

The ownership of the plot lies with the M/s L.K Builders & Developers. Since the proponent is the rightful owner of the site/plot, there is no dispute with regard to siting of the project. To validate their claims on the site and on its being the only and hence the preferred alternative for establishment of the project, the proponent will take NOCs from utility agencies for the provision of electricity, gas, water and sewage arrangements.

The site is free from any encumbrances and therefore would least likely to cause displacement of population, loss of business and annoyance to the living environment, or disturb the peace and tranquility of its surroundings.

The proposed project is a self-contained building having its own back-up power generation, Solar system, water supply supplemented by hyper filtration system and sewage treatment, grey water recycling and disposal system in addition to provision of parking space. The relevant authorities have already received the due amount for provision of utility services and development of the area. They are expected to plan and implement augmentation of the facilities in advance; otherwise plan for densification would, instead of facilitating improvement in quality of life, be a burden on the environment.

The Project would thus achieve its objective of providing a secure and safe building at an attractive location with regards to upcoming development activities. This being a positive impact would be an indicator of achievement of the objectives of the Project.

6.3 Assessment of Impacts at the Construction stage of the Project

6.3.1 Demolition of Structure(s)

No demolition will take place.

6.3.2 Building Stability

The proposed building is an RCC framed structure. The different stages of construction including placement of foundation will have to be laid taking due consideration of the sub-soil structure, seismicity and liquefaction effects.

The sequence of construction should be as follows:

- Construction of earth retaining structure (secant pile wall, contiguous pile etc.)
- Drilling and installation of dewatering wells
- Excavation of plot up to groundwater level
- Dewatering
- Excavation up to Raft bottom level
- Construction of raft foundation followed by construction of substructure

The dewatering operations shall continue from start of excavation to completion of substructure. Tests on soil samples obtained from the borehole indicate ‘moderate’ sulphate and chloride exposure. Under these conditions Ordinary Portland Cement (OPC) is recommended to be used for all underground concrete works. As geotechnical investigation report, shallow groundwater is available at a depth of 2 feet below.

6.3.3 Erosion of Soil

Generally, the exposed soil after excavation for foundations is vulnerable to erosions and runoffs by rains. Such a situation is of temporary nature and short duration. It lasts only during the landscaping and concreting phase of construction at the site. Standards operating procedures have to be adopted to minimize the impact.

Mitigation Measure

- Covering the open soil during the construction phase till such time that the foundation will adequately concreted.
- Intensification in fugitive dust emission caused by erosion of soil will be mitigated by appropriate measures to reduce the level of impact to minor significance.
- Control of air emission during construction will be ensured by adopting sound operating procedures such as:
    - Exposed surface will be regularly wetted to effectively keep airborne dust levels to minimum
    - Stockpiles of fine material will be wetted or covered with tarpaulin especially during windy weather conditions.
    - Site workers will be mandated to wear dust masks especially during dry & windy weather conditions.

6.3.4 Excavation

The provision of foundation will require excavation below ground level. Once removed, the void space is likely to impact the integrity of the soil in the surrounding. To maintain the stability of excavation and to protect foundations of adjacent structures, retention measures such as bracing or shoring can be used to retain the soil during the construction of basement. It is essential to keep the excavation dry and excavation should be performed during dry season. It is imperative that system should have adequate water proofing to make sure moisture doesn't ingress into the retention system and basement.

Mitigation Measure

- Engineering study of sub-soil structure and impact analysis of surrounding structures was carried out.
- Fencing and obscuring the construction site to reduce the perception impact was undertaken.
- During the construction of basement, it would be advisable to monitor the excavation cuts and if found necessary, shoring/bracing may be employed. It must be ensured that the excavation is done in dry season.
- The neighborhood will be notified with adequate signage at the very start of the project. Site will be appropriately covered all around to contain the fugitive dust emission within the microenvironment. The impact of the activity will be continuously monitored by IMC since it is apprehended that the residents in the immediate neighborhood are likely to be exposed to dust fall hazards.

6.3.5 Construction Waste

Typical solid waste generated during construction includes wasted concrete, steel and wooden scaffolding, cement bags, excavated soil, wood remains etc. It is envisaged that the quantum of earth fill material will be enormous since excavation will be deeper down. The waste generated has the potential to cause adverse impact on the surroundings if not properly managed and disposed to approved dumpsites by approved waste contractors. The excavated waste has the potential to block nearby drainage channels that could ultimately cause localized flooding, particularly during the monsoon season. Irregular storage of this waste may pose health hazards to the workers at site and more so to the school going children and residents in the neighborhood.

The following measures have been recommended for management of the excavation procedure and disposal of construction wastes:

Mitigation Measure

- Site will be properly cordoned off by placing curtains all around.
- Unusable wastes will be transported to approve dumpsites.
- Excavated soil will be disposed of through the regular channel of the approved disposal contractor.
- Proper solid waste containers of adequate capacity will be provided to cater to daily waste generation.

6.3.6 Topography and Geology

The Project is not likely to impose additional stress on topographical parameters and hence no significant impacts are envisaged. The siting of the project demands careful planning and evaluation of load bearing capacity of the soil to ensure the stability of the proposed structure. In view of the project stability requirements, piling has been proposed. As such the stability of the project is ensured and is not likely to impose additional stress on the sub-soil structure and hence no significant impacts are envisaged.

6.3.7 Air Quality

The major source of air pollution during the construction phase will be dust emission due to earth works and gaseous emissions from construction equipment. Impacts from each source and proposed mitigation measures are likely to be as follows:

Dust Emission: Particulate matter emitted during construction activities results in deterioration of ambient air quality in the vicinity of the source and is usually a nuisance to the neighborhood and the communities in the neighborhood besides the construction workers. Dust emission from construction site is a concern particularly if the site is near residential areas. The main health hazards emanate from particles smaller than 10 microns (PM_{10}) in particular $PM_{2.5}$ as they are respirable. These particles are sufficiently charged to assume the properties of aerosols which on reaching the receptors have heavy impact on the respiratory system and on the surface of furnishings of the living environment. The impact on the environment would be considered significant if there is an increase in suspended particulate

matter within and beyond the boundaries of the project site due to activities at the site, or if the dust affects local property or results in complaints from the community.

- Potential sources of particulate matter emission during construction activities include earthworks (dirt or debris pushing and grading), exposed surfaces/storage piles, truck dumping, hauling, vehicle movement on unpaved roads, and concrete mixing and batching. The quantity of dust that is generated on a particular day depends on the magnitude and nature of activity and the atmospheric conditions prevailing on the day. Availability of Ready-mix on commercial scale has considerably reduced the level of emission of fugitive and construction sites are no longer required to have a batching plant.

Mitigation Measure

The following mitigation measures have been recommended:

- Water sprinkling and monitoring to ensure adequate suppression of dust will be a regular activity as long as the excavation activity lasts.
- Dust emission from soil piles and aggregate storage stockpiles will have to be reduced by appropriate measures like keeping the material moist by sprinkling of water at appropriate frequency and regularly monitored by IMC. Availability & use of ready-mix on commercial scale will considerably reduce the level of emission of fugitive at the project site.
- Construction materials that are fragile and vulnerable to raising visible dust will be transported only in securely covered trucks to prevent dust emission during transportation.
- The exposure of construction workers to dust needs to be minimized by provision of dust masks and mandating the workers to wear them.

Vehicle and Equipment Exhaust: Combustion exhaust from vehicles and construction equipment can affect the ambient air quality of the site surroundings. The impact would be potentially significant when the ambient air quality deteriorates due to emissions from construction equipment and machinery or the construction generators etc. beyond the guidelines especially at the environmental receptors in the neighborhood. The exhaust emissions will include particulate matter, hydrocarbons, oxides of nitrogen, Sulphur, and carbon.

Mitigation Measure

- All vehicles, generators and other equipment's used during the construction will be properly tuned and maintained in good working condition in order to minimize emission of pollutants.
- The stack height of the generators during operation phase will be vented through vertical stacks to minimize exposure at ground level.
- The noise and air emission from the Project as a whole will be contained within its microenvironment by measures engrained in the design of the building. The mechanical area will be provided with noise abatement devices. Generators emissions will be controlled to acceptable levels by segregating their locations and timely maintenance.

- In order to compensate for the increase and footprint of carbon and water vapor it would be desirable for proponent of project to undertake plantation of large number of trees with dense canopy at the nearest public park/green belt in consultation with the Independent Monitoring Consultant (IMC).

6.3.8 Construction Noise

Depending on the construction equipment used and its distance from the receptors, the commuters and residents in the neighborhood may be exposed to intermittent and variable noise levels. During the day such noise results in general annoyance and can interfere with sleep during the night.

In general, human sound perception is such that a change in sound level of 3 dB is clearly noticeable, and a change of 10 dB is perceived as a doubling or halving of sound level. The noise in the project area will increase during construction and completion of the proposed project and may result in disturbance to the nearby receptors unless it is contained within the appropriately fenced and covered site of the Project.

Baseline noise measurements were obtained through continuous monitoring for a 24-hour period at the project site. It was found from the noise monitoring that the typical average noise level in the project area was >70 dB (A). The Sindh Environmental Quality Standards for noise require that the sound level in residential and commercial areas should not exceed 55 dB (A) and 65 dB (A) respectively during day time and 45 dB (A) and 55 dB (A) respectively during the night time.

Mitigation Measures

- Restraining the use of noisy equipment to suit to the conditions of the living environment namely 65 dB (A) during the day and 55 dB (A) during the night.
- Reducing equipment noise at source by proper design, regular maintenance & repair of construction machinery and equipment.
- Minimizing noise from vehicles and back-up power generators by use of proper silencers and mufflers.
- Use noise-abating devices wherever needed and practicable.

6.3.9 Water Sourcing

Water will be required during the construction activity for human consumption at the construction stage as well as for the construction activities including sprinkling of water for dust suppression.

Mitigation Measures

Adherence to the following measures will ensure efficient use of water during the subsequent stage of construction:

- A complete record of water consumption during the construction phase will be maintained.
- Water conservation practices will be adopted to prevent wastage of water.

- The water supply lines will be checked and repaired for leaks, if any, in order to reduce wastage of water.
- Use of water efficient sanitary fittings such as low flush toilets, water efficient shower heads, and aerators on faucets will be ensured throughout the Project cycle.

6.3.10 Soil Contamination

The contractor shall be mandated to follow the SOPs with regard to handling, storage, transfer, use and final disposal of contaminants, if any by the proponent. The following measures will be adopted during the construction stage to reduce the chances of soil contamination:

Mitigation Measure

- Fuel oils, lubricants, and chemicals will be stored in covered dyked areas, underlain with impervious lining. The construction site(s) will be provided with hard cover or tarpaulin lining to prevent contamination of soil.
- Washing and maintenance of vehicles and equipment will only be carried out at designated areas.
- Regular inspections will be carried out to detect leakages in construction vehicles and equipment.
- Appropriate implements such as shovels, plastic bags and absorbent materials will be made available near fuel and oil storage areas for removal of oil and contaminated soil.
- Contaminated soil will be removed and properly disposed after treatment such as by incineration by SEPA certified contractor.
- Hazardous Substances Rules 2014 will be adhered to for storage, transfer, subsequent handling and final disposal of any chemicals/substances during the construction stage.

6.3.11 Wastewater Generation & Disposal

Disposal of domestic effluent from the construction site has to be adequately managed so that the wastewater flows into the regular channel and does not contaminate the soil and groundwater of the site or its surrounding.

Mitigation Measures

The following mitigation measures will be adopted during stages of construction:

- Wastewater generated will be routed to the nearest drain / sewerage system.
- Sewage will not be mixed with any other waste.

6.3.12 Solid Waste Generation and Management

- The construction phase of the project is expected to generate wastes including; packing waste; scrap, excess construction materials and debris, domestic wastes from construction camp, empty containers and drums, used lubricating oils and chemicals etc.
- The impact of solid waste disposal would be significant if the waste management is not carried out appropriately. This may adversely affect the health of workers, cause soil pollution, and deteriorate the quality of surface water and groundwater. Also, if excessive wastes are generated, recyclable wastes are not recycled, wastes are scattered, handling

of wastes will result in contamination, and wastes are improperly disposed of, the result would be serious degradation of the environment.

- Waste generated as a result of construction activity will be inherently less reactive and chemically inert under normal conditions however, its handling and storage may pose adverse impacts of minor nature which could be controlled by employing the recommended mitigation measures in the EMP.

Mitigation Measures

- A waste management plan will be developed for the construction stage of the project. The following will be the key elements of the waste management system:
    - Separate bins will be placed for different type of wastes - plastic, paper, metal, glass, wood, and cotton.
    - Recyclable material will be separated at source. The recyclable waste will be sold to EPA certified waste contractors for recycling.
    - Non-hazardous non-recyclable wastes such as kitchen wastes will be disposed of in landfill site managed by municipal administration or approved waste manager/contractor.
    - No wastes will be dumped at any location outside the site boundary.
    - All hazardous waste will be separated from other wastes. Hazardous wastes will be stored in designated areas with restricted access and proper marking. Hazardous wastes will be disposed of through SEPA approved waste contractor.
    - Surplus construction materials including partially filled chemical and paint containers will be returned to suppliers. Inert construction wastes will be disposed of onsite as fill material or sold as scrap to contractors.
    - Records of all waste generated during the construction period will be maintained. Quantities of waste disposed, recycled, or reused will be logged on a Waste Tracking Register.
    - Training will be provided to personnel for identification, segregation, and management of waste.

6.3.13 Materials Selection

General specification/details have been worked out in respect of type of structures, concrete, and all other materials required for the Construction of Building Project. The following measures will be adopted to ensure sustainable development of the Project:

Mitigation Measures

- The structures and materials will, in the construction stage, conform to recommended standards and follow standard practice of civil works.
- Materials including paving stones, crush, gravel and sand will be brought from commercial quarries located in Sindh province. Environmentally sound materials and goods will be selected, with priority being accorded to products meeting national and international standards.

- Traditionally well-tried materials and components will be selected and selection of construction materials would be based on sustainable source.
- The production, use and disposal of building materials during the construction stage of the project will utilize considerable amount of energy and resources; all attempts will be made towards efficient consumption and minimization of wastage of water, energy and materials.
- Best practice of energy efficiency will be adopted in the building design. The Project building would be constructed with high level of thermal insulation.
- The environmental impacts arising from selection of building materials and components would take account of the environmental issues during the materials selection process, and introduce Recycling strategies such as Reuse and Reduction of Wastewater.

6.3.14 Seismic Hazards

The area presents a moderate to high hazard potential for earthquake activity. The seismic zone map of Pakistan, developed after the October 2005 earthquake, divides the country into four seismic zones based on ground acceleration values, categorizing them as major, moderate, minor, and negligible zones. Under this zoning the project site lies in the moderate to high hazard zone with minor to moderate damaging impact.

The developed guidelines for earthquake design of buildings in Karachi have assigned an expected Peak Ground Acceleration'(PGA) value of 0.20g for larger buildings such as the project building. This would place the project site within Uniform Building Code (UBC) Zone 2B. The expected intensity according to the Modified Mercallis Scale (MM) would be VIII and higher.

Mitigation Measures: No specific mitigation measures other than construction of the building facility in accordance with the UBC Zone 2B are recommended.

6.3.15 Operation of Vehicular Traffic

Vehicular traffic management will have to be undertaken seriously to restrain unnecessary traffic jams that may cause annoyance to the commuters travelling on the roads surrounding the project. This is relevant especially in the case due to the road condition and the availability of a smaller road.

Mitigation Measures

- Heavy traffic during construction phase will come to the project site during late night hours.
- Project vehicles shall not be fitted with pressure horns
- During construction, regulate speed of vehicles
- Designated parking areas will be provided for different type of project vehicles within and around the project site.
- Manage vehicle movement to avoid traffic jam and long queues.
- Prepare, implement and monitor the traffic management plan.
- Vehicles to use designated parking areas during construction phase.
- Parking of vehicles alongside the road should be prohibited at all time.

6.3.16 Occupational & Community Health and Safety Impacts

The health, safety and welfare of personnel working on the Project and the general public, and the avoidance of damage to property, are important issues in themselves and for the project client. The construction of high-rise building poses significant risk for workers especially if they are not well-trained and are not equipped with appropriate personal Protective Equipment's (PPEs).

It is not unusual to observe that construction workers are left on their own to protect themselves from imminent hazards. Accidents usually occur at unprotected sites and are incident on unprotected workers. HSE considerations require that precautions must be taken against even the most insignificant impacts. The contractor is expected to consider Occupational & Community Health and Safety (OCH&S) aspects of construction, so that operations are conducted in a manner that eliminates risk to persons and property. The Contractor is expected to treat safety as a high priority in his activities while executing the work. Contractors will not permit or cause unsafe conditions that pose a hazard during construction. Perceived risks will be addressed at the outset by way of adequate and concrete mitigation measures.

However, Major social concerns during the construction stage arise when: i) the stakeholders are not informed about the project or its schedule of operations; ii) the site is not appropriately cordoned off to restrain outsiders from entering the site; iii) construction crew invariably ignores or sidetracks the mandatory requirement of wearing PPEs; iv) construction crew is not pre-trained to be aware of the likely hazards during various stages of the project; v) even if they are trained on awareness and provided the PPEs the lukewarm attitude of the supervisors does not oversee the follow-up of HSE procedures/SOPs.

Mitigation Measures

The proponent will direct Contractor to prepare an Occupational & Community Health and Safety Plan (OCH&S) that conforms to requirements set out in the Sindh Occupational Safety and Health Bill (2017), Sindh Occupational Health and Safety Rules (2019) and that aims to eliminate or minimize unwanted hazards and risks to personnel and the public during construction, and to achieve 'Best Practice' within the project context, establishing a work environment that conforms to provincial requirement with respect to health, safety and emergency response. The proponent will make sure that OCH&S Plan will address the following key elements:

- The Contractor will provide as a minimum of safety training addressing 1) general safety awareness; 2) first aid procedures; 3) emergency procedures; and 4) use of personal protective equipment.
- The Contractor will conduct site safety inspections and make sure construction work in undertaken in safe and sound manner.

- The Contractor will provide a system for recording all accidents and dangerous occurrences, regardless of whether or not personnel injury occurs, including any incident involving a member of the public.
- The Contractor will investigate accidents in order to ascertain the facts with a view to prevent future and possibly more serious occurrences.
- The Contractor plan will include a Safety and Emergency Preparedness Plan to address foreseeable emergencies that may arise during the construction activity.
- The Contractor will propose safety signage for display around the sites in local language to address use of PPE, dangerous conditions, smoking prohibition, first aid station, and prohibited entry.
- The Contractor will provide means for maintaining healthy working conditions for workers related to the effects of noise, dust, use of chemicals, by removal of the cause and use of suitable Personal Protective Equipment (PPE), to be provided to workers. The Contractor will ensure that workers are properly trained in the use of PPE and that adequate supervision is provided to ensure its proper use.
- The Contractor will employ an Environmental, Health and Safety (EHS) expert on site.
- Provide alternative traffic arrangement/detours, if necessary, so that traffic can be distributed and move on different roads; and ensure that public/residents association is informed about such traffic diversions.
- Maintain transparency of the project, public information/caution boards must be provided at the work site – information shall inter-alia include project name, cost and schedule; executing agency and contractor details; nature and schedule of work; traffic diversion details, if any; entry restriction information; competent official's name and contact information for public complaints.
- Restraining access to the public from the site by enclosing/barricading the construction area; providing warning boards and sign boards and positioning security guards throughout the day and night, 24/07.
- Temporary inconveniences due to construction works will be minimized through planning and coordination with community members and organizations e.g. Traffic Management Authorities (if needed).
- Fulfilment of Occupational Safety Health Administration (OSHA) guideline for scaffoldings will be highly prioritized in order to make sure no accidents occur.
- Requirements of Scaffoldings should be considered; scaffolding should be able to bear its' own weight plus four times the maximum intended load.
- Scaffolds must be secured to a structure or building to prevent tipping.
- Scaffolding material should be properly inspected prior to its use.
- Base plates and mud sills must be used to provide stable footing for scaffold legs on a foundation.
- For scaffolding planks, solid sawn wood, fabricated planks, and fabricated platforms may be used as scaffold planks following the recommendations by the manufacturer or a lumber grading association or inspection agency.

- Fall protection, such as guardrails, must be provided on all open sides and ends of platforms more than 10 feet above the ground.
- All employees must be trained by a qualified person to recognize the hazards associated with the type of scaffold being used and how to control or minimize those hazards. The training must include fall hazards, falling object hazards, electrical hazards, proper use of the scaffold, and handling of materials.
- Platforms must be fully planked or decked, and they must extend over their end supports by at least 6 inches but not more than 12 inches.
- Maintain the service roads in good condition to allow smooth traffic movement; provide necessary personnel to guide and control the traffic.

6.4 Assessment of Impacts at the Operation Stage of the Project

During operational phase of the project, various activities may have significant impact on some environmental parameters. Various environmental attributes are to be studied during this phase for their overall impact on the surrounding environment.

6.4.1 Solid Waste Generation and Disposal

There will be a considerably large quantity of solid waste generated from the residential units/apartments. The solid waste will mainly include food waste, paper, packaging material, plastic bottles and glass. If not properly managed and disposed of, these wastes can pose serious environmental hazard to the occupants and visitors of the proposed building project and also to the surrounding environment.

People will throw the waste until proper waste collection system is provided. It can pollute the marine waters and pose a threat to marine life and fishes.

The quantity of solid waste to be managed can be segregated at source into organic and recyclable components. Nearly half of the waste generated is expected to be of organic nature i.e. biodegradable and the remaining mostly recyclable. Therefore, waste segregation can solve much of the solid waste management problem. The viable options after storing, collecting and transportation of segregated waste components for its ultimate safe disposal are composting and recycling, respectively which need to be carefully designed and managed appropriately.

Mitigation Measures

The following mitigation measures would be adopted to combat from the impacts imposed upon the project site and immediate environment due to the solid waste generation activities in the operational phase:

- All solid waste shall be segregated into organic and recyclable waste at source and then collected, stored, and transported for recycling/sold to vendors for ultimate safe disposal.
- Handling and disposal of such waste shall be managed by a dedicated waste management contractor.
- The solid waste management plan will be developed and facilities for collection, storage and transportation will be established and organized.

- Appropriate waste signage will be used to increase awareness among users.
- Covered waste bins (different colors) will be provided to every building that will be ultimately collected in a storage area. This storage area will be covered so that pollutants and smell from the waste would not affect the surrounding.
- Residential units of the project will be provided different colored bins for different categories of waste.
- Storage facility for collecting waste bins will be created and established by taking into account quantities of waste generation.
- Handling and disposal of such waste will be managed by a dedicated waste managing contractor.
- Waste managing contractor should have binding to dispose the waste to official dumpsites of Karachi.

6.4.2 Wastewater Generation and Disposal

The project on becoming functional will generate wastewater which will be mainly sewage. Small quantities of hazardous waste may be produced during the maintenance activities in the building (such as oily waste etc.). The cleaning waste generated by the use of surfactant and cleaning agents used during the operational phase. The wastewater generated can be a potential source of pollution to the surface and ground water resources of the area.

All type of wastewater generated (i.e. drainage of sewage, showers and kitchen effluent etc.) will be directed to the wastewater treatment consisting of Septic Tank prior to disposal into an allocated out fall sewer. This will ensure the specifications stipulated in SEQS will comply.

Following additional mitigation measures will be adopted for effective management of wastewater during the operational phase of the project:

- Grease interceptor and/ or oil skimmer to be installed on kitchen effluent to maintain oil levels within SEQS limits.
- Waste segregation measures would be employed to minimize entry of solid waste into the wastewater stream.
- Water conservation strategies will be employed to avoid wastage of water.
- Periodic preventive maintenance of pumps, diffusers and other ancillary equipment's.
- Monitoring of wastewater to ensure compliance with SEQS.
- Provision of holding tank, so that the effluent is settled and then disposed of to the main sewer line.
- The cleaning agents used will be non-hazardous.
- If groundwater is used and desalinated water is required, RO reject water will be disposed in environmentally friendly manner.

6.4.3 Water Consumption and Quality Assurance

The water requirement for the project will mainly be catered through city water supply and through water tankers and/or borehole when required. Potable water may directly be supplied to apartments in bottles or after filtration. Water conversation measures will be applied in order

to reduce the amount of wastewater generation in this phase. Additionally, relevant quality standards will be maintained to ensure that the water is fit for drinking purpose using guidelines of established SEQS water metrics.

Adherence to the following mitigation measures will ensure efficient use of water during the subsequent stage of operation:

- A complete record of water consumption during the operation phase will be maintained.
- The water supply lines will be checked and repaired for leaks, if any, in order to reduce wastage of water.
- Water filtration systems will be installed to keep water purity levels within acceptable SEQS parameters, especially coliform levels which indicate presence of harmful pathogens.
- All the main water inlets will be provided with water flow meters to record consumption of water.
- Drinking water and service water sources should be clearly labeled.
- Water conservation practices will be adopted to prevent wastage of water.
- Reuse and recycle water as much as possible for example by using grey water for flushing toilet. Grey water is the term used for the used water that goes down our sinks and shower drains. Black water is another term for the water 'and stuff' that goes down from our toilets. The grey water from bathrooms sink can be reused to flush the toilets.
- Use of water efficient sanitary fittings such as low flush toilets will be ensured throughout the Project cycle.
- It will ensure that all activities executed must comply with all the environmental regulations as well as cooperation will be bridged with concerned regulatory authorities.

6.4.4 Energy Consumption

During operation phase, for electricity supply, the primary sources will be Karachi Electric (KE) and solar panels will also be considered. Additionally, generators are available to ensure uninterrupted power in case of outages. Energy saving techniques such as Energy efficient mechanical systems and Passive ventilation/cooling by provision of natural lighting and ventilation will be employed to conserve energy.

Mitigation Measures

Following energy conservation measures are being adopted.

- The energy-efficient lighting system installed for the project will contribute immensely to energy saving during the operational phase of the project.
- Natural lighting and ventilation shall be preferred in the buildings.
- The energy-efficient lighting system installed for the project will contribute immensely to energy saving during the operational phase of the project.
- The energy usage during the operational phase will be monitored and targets would be set for efficient use of energy.

6.4.5 Air Emissions

During the operational phase, air emissions may come from backup generators. If vented at

lower heights, the exhaust gases are likely to disperse locally and cause localized pollution to the working staff. Other emissions coming from this project will be from the exhausts of additional traffic movement related to proposed project activity.

Mitigation Measures

Impacts of Emissions may be reduced to prescribed level by attempting the following mitigation measures:

- Monitor all exhausts at regular frequency to meet SEQS exhaust emissions.
- Stack height of generators will be increased to ensure better dispersion and distance covered by the pollutants in air before reaching the ground.
- Carry out regular maintenance of generators.
- An awareness program will be organized for generator operators to regularly tune-up engines and ensure proper maintenance.

6.4.6 Fire Hazards and Life Safety

Fire is one of the major safety hazards. Fires can cause loss of life and property. However, at the same time fires have the potential to severely harm the people in the vicinity and affect the environment.

Mitigation Measures

Risks involved with fire hazard can be reduced by adopting following measures:

- For all engineering designs, IBC (International Building Control), EN 54 & NFPA codes will be followed.
- Standard fire and smoke detection and protection devices such as alarms, fire hoses and hydrants to be provided in all areas of the project.
- The facility will possess a detailed emergency and evacuation plan that will be regularly drilled to make sure that the responsible staff remains trained at all times.
- Firefighting equipment such as fire extinguishers and hydrant systems will be maintained at strategic locations within the proposed building.
- Regular inspection and servicing of the extinguishers will be undertaken by a reputable service provider and record of such inspections should be maintained.
- Fire safety signs will be prominently displayed within the floors.

6.4.7 Positive Socioeconomic Impacts

Employment Opportunities

Job opportunities will be developed for both construction and operation phase of project. During construction phase, 50 -100 workers will be required during peak construction period for skilled, semi-skilled and unskilled jobs. Further, during operation phase, jobs opportunities will also be developed for project as management agents, caretakers, cleaners, security personnel and technicians.

Provision of Market for the Supply of Building Materials

The project will require the supply of large quantities of building materials which will be sourced locally. This provides ready market for building material suppliers such as quarrying companies, hardware shops and individuals with such materials.

Increased Business Opportunities

The large number of project staff required will provide ready market for various goods and services, leading to several business opportunities for small scale traders such as food vendors around the construction site.

Revenue to National and Provincial Government

Through payment of relevant taxes, rates and fees of the government and the local authorities, the proposed project will contribute towards the national and local revenue earning.

6.4.8 Cultural Resources

A heritage building "Jenning Private School" in the middle of plot that will manage by proponent to preserve and maintain with same facade of School building during construction and usage of building for resident and will convert that school into club.

6.4.9 Land-use and Aesthetics

The Project falls in the category that permits the designated land-use; the Project will add the skillfully and sustainably designed mixed-use housing scheme as a landmark to the skyline of Karachi and produce positive impact on the aesthetics of the urban environment. The Project is designed as a self-contained building; with 24-hour security system all over the building the designers have ensured that the concerns on invasion of privacy are alleviated and eased. The Project would thus achieve its objective of providing a secure and safe building at an attractive location. This being a positive impact would be an indicator of achievement of the objectives of the Project.

- No mitigation measures will be required.

Chapter 7 Environmental Management Plan

7.1 Introduction

7.1.1 General

The EIA for the proposed development activities of project has identified potential impacts that are likely to arise during the construction and operation phases. The EIA has examined in detail both negative and positive impacts of each stage of the operation. Where adverse impacts have been identified, the EIA has recommended mitigation measures; include management and monitoring practices, physical controls, or compensation in monetary terms. The mitigation measures proposed are based on a good understanding of the sensitivity and behavior of environmental receptors, past experience, case studies, legislative controls, guidelines, & expert advice. For the effective implementation and management of the mitigation measures and monitoring requirements an Environmental Managements Plan (EMP)has been prepared and presented in this section. For any residual impacts (impacts remaining after applying the recommended mitigation measures) or for impacts in which there has been alevel of uncertainly in prediction, monitoring measures have been recommended. Advice on monitoring measures required was sought from experts involved in the EIA and case studies ofsimilar development activates at international level.

7.1.2 Objectives

The EMP provides a delivery mechanism to address adverse impacts, to enhance project benefits and to introduce standards of good practice to be adopted for all project works.

The primary objectives of the EMP are to:

- Outline mitigation measures recommended in the EIA and define the responsibility and timing for the implementation of these measures;
- Develop monitoring mechanism & identify parameters that can confirm the implementation of the mitigation of these measures;
- Define roles and responsibilities of the project proponent for the implementation of EMP and identify areas where these roles & responsibilities can be shared with other stakeholders and
- Define the requirements necessary for documenting compliance with the EMP and communicating it to all concerned regulatory agencies.

For each impact, or activity, which could give rise to an impact, the following information is presented:

- Mitigation measure that will be implemented;
- The person(s) responsible for ensuring full implementation of the mitigation measure;
- The parameters that will be monitored to ensure effective implementation of the mitigation measure;
- The implementation timing to ensure that the objectives of the mitigation are fully met.

7.2 Structure of the EMP

The EMP consists of the following section.

- Legislation and guidelines.
- Organizational structure and roles and responsibilities;
- Mitigation management's matrix
- Environmental monitoring program
- Change management plan
- Training Program

7.3 Legislation and Guidelines

The EIA has discussed in detail all the legislation and guidelines (chapter 2) which has relevance to the project. The proponent shall ensure that the construction and operation of project is conducted in conformance to relevant legislations and guidelines and guidance is sought as and when required. The proponent shall also ensure that the key project management staff is awareof these legislations and guidelines. SEQS for municipal and industrial effluents, selected gaseous pollutants from industrial sources and motor vehicle exhaust and noise have been provided in Chapter 2.

7.4 Organizational Structure and Roles and Responsibilities

7.4.1 Organizational Structure

The proposed project includes the following main organization:

- The project proponent and owners of the EMP.
- The construction contractor as well as contractor required during the operational phase (e.g. waste contractor) as the executors of the EMP.

These organizations will have the following roles and responsibilities during the project activities.

7.4.2 Roles and Responsibilities

(i) ***General***

Project Proponent: Project proponent will be responsible for ensuring the implementation of the EMP. A person holding a senior position will be responsible for the overall environmental performances during the proposed project. The person will be responsible for ensuring the implementation of the EMP by the proponent and all project contractors. The proponent's Site Representative (SR) will be responsible of implementation of the EMP and liaison with project contractor and stakeholders at site regarding environmental issues during the construction phase. Further the person holding a senior position in the proponent team will also be responsible for monitoring EMP's compliance and provided technical support in environmental issues.

Project Contractors: For the proposed project, the proponent will appoint construction contractor for different field operations. Various contractor will also be hired during the operation phase of the

facilities in town (e.g. waste contractors). The contractors will be responsible for implementation of, or adherence to, all provisions of the EIA and the EMP and with any environmental and other codes of conduct required by the proponent. Overall responsibility of the contractor's environmental performances will rest with the person holding the highest management position within the contractor's organization reporting to their management. The contractor's site managers will be responsible for the effective implementation of the EIA and the EMP. The contractor's HSE officers will have functional responsibilities to ensure implementation of or adherence to the EMP.

(ii) ***Planning and Design of the Operations***

Details of project Activities: Details of the project activities are provided in section 2 of the EIA report. Following approval of the EIA, any changes to the proposed activities will be handled through the change Management Plan provided in this EMP.

Approvals: No-objection Certificate (NOC)/Approval from SEPA will not relieve the proponent of other legal obligation and hence the proponent and project contractors will obtain all other relevant clearance and necessary approvals required by the Government of Sindh and Relevant departments prior to commencing the respective operations.

Contractual Provision: Adherence to the requirements of the EIA and EMP in terms of environmental mitigation will be required from all project contractors and thus EMP will form partof their contractor with the proponent.

(iii) ***Implementation of the Operation***

Co-ordination with Stakeholders: The proponent will ensure that co-ordination with the regulators and other stakeholders on environmental & social matters is maintained throughout construction & operation phase of the project.

Monitoring: The proponent and the contractors will ensure that monitoring of the project activities is carried out throughout the project. The site representative will monitor all project activities duringthe construction and operation phase. He will keep a record of all non-conformances observedand report these along with actions to the proponent management in Karachi for further action.The site representative will also report any impacts anticipated along with his recommendation forfurther action.

Emergency Procedures: The proponent and the contractors will prepare contingency plans to deal with any emergency situation that may arise during the construction and operation e.g. majoroil spills, medical evacuation & communicate these to the regulatory agencies if required by these agencies.

Approvals: The project contractor will be responsible for obtaining all relevant approvals such as approvals for waste contractors, water source & others as specified in Mitigation Management Matrix.

Trainings: The project contractors will be responsible for the selection and training of their staff capable of completing the project activities properly and efficiently. The contractors will be responsible for providing training to their staff members according to the training programme.

(iv) *Communication and Documentation*

The proponent and the contractor will ensure that the communication and documentation requirements specified in the EMP are fulfilled during the construction and operation phase.

Change Management: The EIA for the proposed project recognizes that changes in the operationor the EMP may be required during the project activities and therefore provides a Change Management Plan to manage such changes. Overall responsibility for the preparation of change management statements will be with Proponent's site representative.

Restoration: The proponent along with the construction contractor will be responsible for the final restoration of work areas.

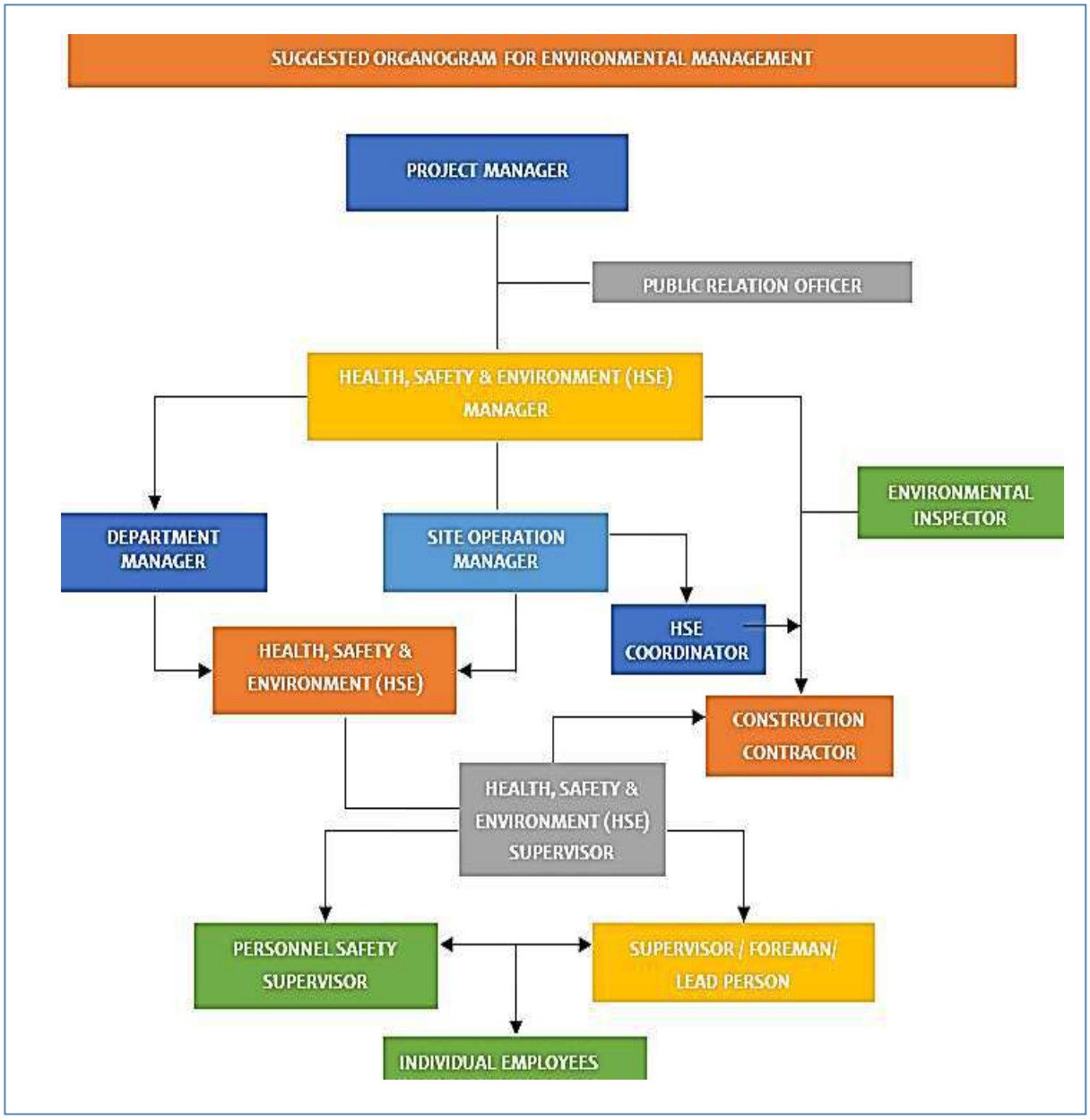


Figure: 7.1: Suggested organogram for Environmental Management

7.5 Maintenance of the EMP

EMP needs to be revised on timely basis to keep up-to-date as per the requirements comes up regularly. Therefore, outlining the responsibilities and activities associated with the maintenance of the EMP is essential. The responsibilities of the Construction Contractor should be detailed and procedures for requesting EMP revisions should also be outlined. EMP revision procedures must include requirements for notification of the appropriate government and municipal agencies so that their role is also played in the overall management process.

7.6 Environmental Health and Safety Management System

Environmental, Health and Safety Management System is essential for the care of EHS issues which should outline mitigation measures and best management practices. This management system recommends carrying out a complete assessment, evaluating, monitoring, identifying and control all potential hazards and risks arise during the construction and operation phases of the proposed project. It needs to ensure that the Health and Safety Plan (HSP) along with the Health and Safety Rules is established and enforced. The Plan should outline roles, responsibilities and expected outcomes with respect to the environmental health and safety management of the construction & operation phase of the Project. These measures should be implemented to ensure that no significant adverse environmental, health and safety impacts are created by activities associated with the construction of the project.

Protection of the public and workforce health and safety during both construction and operationsis the prime responsibility of proponent. Utilizing expert personnel and the Environment, Healthand Safety Management System (EHSMS), the potential health and safety hazards and risks willbe identified and assessed, then the subject of substantial planning, organization, procedures for various facility are developed.

7.6.1 Health and Safety during Construction Phase

Worker Health & Safety Management Plan will also be outlined to implement mitigation measures and best management practices. The plan should be implemented to ensure that no significant adverse worker's health and safety issues arise from activities associated with the construction of the project.

Potential hazards for workers in construction include:

- Falls (from heights);
- Trench collapse;
- Scaffold collapse;
- Electric shock and arc flash/arc blast;
- Failure to use proper personal protective equipment; and
- Repetitive motion injuries.

7.6.2 Health and Safety during Operation Phase

Since the project is high-rise development, occupational health & safety issues need to be addressed and managed effectively to ensure safety of its occupants in particular and the neighborhood in general.

7.7 Emergency Response Plan

Emergency may be defined as a sudden event causing or has the potential to cause serious human injury and/or environmental degradation of large magnitude. The best "cure'' for an emergency is, of course, "prevention". The probable emergency situation can be:

- Serious fire or explosion
- Major gas leakage.
- Major Spillage
- Natural calamity such as heavy rain, flooding, dust storm or earthquake, cyclone, etc.
- Bomb threat or any sabotage/terrorist activity
- Any other incident involving all or large part of the premises and its workers.

Emergency Response Management is provided by a small team of senior managers (the "Control Committee") who in turn will direct all response activities through the Emergency Response Unit.

7.7.1 Objectives

The main objective of this plan is to establish the general guidelines for the actions to be taken in the event of fires, explosion, emergencies, accidents, disasters and sabotage, aimed at minimizingtheir effects and consequences, in order to protect:

- The lives of own or third-party personnel present in the project facilities.
- The lives of the occupants of the Project
- The lives of the nearby residents & communities coming into the direct influence of theproject area.
- The lives of the ecological systems located in the surroundings of the Project.

7.7.2 Emergency Response Manuals

Based on the Risk Assessment the proponent should prepare written emergency preparedness and response plans/procedures for the project facilities to cover emergency situations that could occur. It may be required that Emergency Response Manuals will be developed for various situations arising.

7.8 Environmental Compliance Reporting, Documentation and Trainings

The management will be responsible for the regular audit and review of the environmental management and monitoring plan. This will include both on-site auditing and review of performance reports. Additional onsite inspections and investigations will be undertaken in

the event of significant environmental incidents. These will be undertaken in conjunction with the IMC.The management will participate in the audits and inspections and investigations. The management will also be responsible for regular review of the environmental performance of the site and site personnel, and for the reporting on the implementation of commitments made in the EMP.

In particular, there will be:

- Periodic audit reports.
- A review and improvement of the EMP.

Management recognizes that periodic external compliance audits and inspections will be made through a third-party consultant (IMC) to monitor, assess and validate the level of performance and compliance pursuant to the commitments made in the accepted Environmental Management Plan. The monitoring reports shall also be submitted to SEPA on regular intervals.

Training: It an important step for the implementation of the EMP. All the employees will require to be trained to work appropriately on EMP. EHS Manager will organize trainings in consultation with HSE Officer. It will make sure that employees understand the Environment, Health and Safety Issues. Trainings should be arranged on regular basis with notification that it should be attended all respective employees.

HSE Officer will determine the training requirements during both phases. Induction will be the basis of all training courses for contractor & subcontractor during construction phase.

Trainings identified in EMP are given below:

- Site induction course
- Training for emergency response and preparedness
- Training for familiarization with site environmental controls

7.9 Mitigation Management Matrix

The Mitigation Management Matrix will be used as a management & monitoring tool for implementation of the mitigation measures required by the EIA. Mitigation management matrix for construction and operation is provided in the **table 7.1**. The matrix lists down the following:

- The mitigation measure recommended in the EIA.
- The person/organization directly responsible for adhering to or executing the required mitigation measures.
- The parameters which will be monitored to ensure compliance with the mitigation measures;
- The timing at which the mitigation or monitoring has to be carried out.

It is highlighted that although responsibilities for executing and monitoring mitigation measures have been delegated to different persons, the proponent will hold the primary and overall responsibility for ensuring full implementation of the EMP.

7.10 Environmental Monitoring Program

The objective of the environmental monitoring during the construction & operation phase will beas follows:

- ✧ To check compliance of the contractors with the EMP by monitoring activities of the projecton a daily basis. This will be called compliance monitoring.
- ✧ To monitor impacts of the operation in which there has been a level of uncertainty in prediction such as impacts of noise, water abstraction etc. and to recommend mitigation measures if the impacts are assessed to be in excess of or different from those assessed in the EIA. The aim will be attained through effects monitoring.
- ✧ To achieve these objectives, the following monitoring program will be implemented.

7.10.1 Compliance Monitoring

Compliance monitoring will be carried out to ensure compliance with the requirements of the EIA and to document and report all non-compliances. The mitigation management matrix provided in the EMP will be used as a management and monitoring tool. The contractor's HSE Officer will be responsible for monitoring the compliance of their organization with the relevant EMP requirements. Proponent's site representative will monitor the contractor's compliance and will also ensure that during construction each activity system and plan is in place for effective compliance monitoring.

The site representative will make regular checks on the contractor's works; keep records of all non-compliances observed during the execution of the project activities; & the details of all remedial actions taken to mitigate the project impacts.

7.10.2 Effects Monitoring

An independent monitoring consultant (IMC) will be responsible to carry out the required effects monitoring during the construction and operation phase.

7.10.3 Environmental compliance Reporting and Documentation

The management will be responsible for the regular audit and review of the environmental management and monitoring plan. This will include both on-site auditing and review of performance reports. Additional onsite inspections and investigations will be undertaken in the event of significant environmental incidents. These will be undertaken in conjunction with the IMC. The management will participate in the audits and inspections and investigations. The management will also be responsible for regular review of the environmental performance of the site and site personnel, and for the reporting on the implementation of commitments made in the EMP.

In particular, there will be:

- Periodic audit reports.
- A review and improvement of the EMP.

Management recognizes that periodic external compliance audits and inspections will be made through a third-party consultant (IMC) to monitor, assess and validate the level of

performance and compliance pursuant to the commitments made in the accepted Environmental Management Plan. The monitoring reports shall also be submitted to Sindh Environmental Protection Agency (SEPA) on regular intervals.

7.11 Change Management Plan

The EIA for the proposed project recognizes that changes in the operation or the EMP may be required during the construction and operation and therefore provides a Change Management Plan to manage such changes. The management of changes is discussed under two separate headings, Additions to the EMP and Changes to the Operation and the EMP.

7.11.1 Changes to the EMP

The EIA and the EMP have been developed based on the best possible information available atthe time of the EIA study. However, it is possible that during the conduct of the proposed operation additional mitigation measures based on the findings of environmental monitoring during the operation may have to be included in the EMP. In such cases following actions will be taken:

- A meeting will be held between the proponent and the concerned project contractors. During the meeting, the proposed addition to the EMP will be discussed and agreed upon by all parties.
- Based on the discussion during the meeting, a change report will be produced collectively, which will include the additional EMP clause and the reasons for the addition.
- The report will be signed by all parties and will be filled at the site office: A copy of the report will be sent to the proponent and contractor head offices.
- All relevant project personnel will be informed of the addition.

7.11.2 Changes to the Operation

The change management system recognizes three orders of changes:

A. First Order

A first order change is one that leads to a significant departure from the project described or the impacts assessed in the EIA and consequently require a reassessment of the environmental impacts associated with the change. Example of first order change includes change in location ofproposed project. Action required in this case will be that the environmental impacts of the proposed change will be reassessed by the proponent and sent to the SEPA for approval.

B. Second Order

A second order change is one that does not result in the change in project description or impacts that are significantly different from those detailed in the EIA. Example of second order changes includes extension in the site area. Action required for such changes will be that the proponent will re-assess the impact of the activity on the environment & specify additional mitigation measures if required and report the changes to SEPA.

C. Third Order

A third order change is one that does not result in impacts above those already assessed in the EIA, rather these may be made site to minimize the impact of an activity such as:

- ✧ Increase in project workforce;
- ✧ Change in layout plan.

The only action required for such changes will be to record the change in the Change Record Register.

7.12 Training Program

Environmental training will form part of the environmental management system. The training will be directed towards all personnel for general environmental awareness.

7.12.1 Objectives

The key objective of training program is to ensure that the requirements of the EMP are clearly understood and followed throughout the project. The trainings to the staff will help in communicating environmental related restrictions specified in the EIA and EMP.

7.12.2 Roles and Responsibilities

The contractors will be primarily responsible for providing environmental training to all project personnel on potential environmental issues of the project. The contractors will be responsible to arrange trainings and ensure the presence of targeted staff.

7.12.3 Training Program

The environmental awareness, EIA and EMP training will be carried out during the project activities.

A. Training log

A training log will be maintained by tine contractors. The training log will include:

- ✧ Topic
- ✧ Date, time and location
- ✧ Trainer
- ✧ Participants

B. Training Needs Assessment

In addition to the training specified in the training log special/additional trainings will be provided during the project activity. The criteria to assess the need of training will be based on the following:

- ✧ When a specified percentage of staff is newly inducted in the project
- ✧ When any non-compliance is repeatedly reported refresher training will be providedregarding that issue.
- ✧ When any incident/accident of minor or major nature occurs. Arrival of new

contractor/sub-contractor.

- ✧ Start of any new process/activity.

C. Training Material

The contractors will develop & prepare training material regarding environmental awareness, sensitivity of the area, EIA, EMP and restrictions to be followed during the project. Separate training material will be prepared for each targeted staff.

Table 7.1: Environmental Management Plan (EMP)				
Construction Phase				
S.#	**Impact and Mitigation Measures**	**Responsibilities**	**Monitoring**	**Timing**
1.	**Erosion of Soil**			
1.1	Covering the open soil during the construction phase till such time that the foundation will adequately concreted.	Construction Contractor (CC)	Monitoring compliance	During construction phase
1.2	Exposed surface will be regularly wetted to effectively keep airborne dust levels to minimum.			
1.3	Stockpiles of fine material will be wetted or covered with tarpaulin especially during windy weather conditions.			
1.4	Site workers will be mandated to wear dust masks especially during dry & windy weather conditions.			
2.	**Construction of Waste**			
2.1	Unusable wastes will be transported to approve dumpsites.	Construction Contractor (CC)	Monitoring compliance	During construction phase
2.2	Excavated soil will be disposed of through the regular channel of the approved disposal contractor.			
2.3	Proper solid waste containers of adequate capacity will be provided to cater to daily waste generation			
3.	**Air Quality**			
3.1	**Dust Emissions**			
3.1.1	Water will be sprinkled daily or when there is an obvious dust problem on all exposed surfaces to suppress emission of dust. Frequency of Sprinklings will be kept such that the dust remains under control, particularly when wind is blowing towards the receptors	Construction Contractor (CC)	Monitoring compliance	During construction phase
3.1.2	Dust emissions from soil piles and aggregate storage stockpiles will be reduced by appropriate measures. These may include:			

Table 7.1: Environmental Management Plan (EMP)				
Construction Phase				
S.#	**Impact and Mitigation Measures**	**Responsibilities**	**Monitoring**	**Timing**
	→ Keeping the material moist by sprinkling of water at appropriate frequency → Covering the pile, for example with tarpaulin or thick plastic sheets, to prevent emissions. → Locating stock piles out of the wind direction			
3.1.3	To suppress dust, sprinkled regularly to prevent dust emission on unpaved roads. Other temporary tracks within the site boundary will be compacted and sprinkled with water during the construction works.	Proponent & CC	Monitoring compliance	During construction phase
3.1.4	Project traffic will maintain a maximum speed limit of 20km/hr on all unpaved roads within the proposed site area.		Check speed of vehicles	
3.1.5	Construction materials that are susceptible to dust formation will be transported only in securely covered trucks to prevent dust emission during transportation.	CC	Monitoring compliance	
3.1.6	The exposure of construction workers to dust will be minimized by provision of dust masks.	CC	Check for dust masks	
3.2	**Vehicle Equipment and Exhaust.**			
3.2.1	All vehicles, generators and other equipment used during the construction will be properly tuned and maintained in good working condition in order to minimize emission of pollutants.	Proponent & CC	Maintenance records of vehicles and equipment	During construction phase
3.2.2	The stack height of the generators during operation phase will be vented through vertical stacks to minimize exposure at ground level	CC	Monitor compliance	During construction phase

Table 7.1: Environmental Management Plan (EMP)				
Construction Phase				
S.#	**Impact and Mitigation Measures**	**Responsibilities**	**Monitoring**	**Timing**
3.3	**Generator Emissions**			
3.3.1	The generator will be properly tuned and maintained in good working condition in order to minimize exhaust emissions.	Proponent & CC	Check maintenance records	During construction phase
3.3.2	The diesel generator should be used for a very short duration with the power switched back to the main power supply as quickly as possible.		Monitoring compliance	
3.3.3	NOx emission reduction techniques should be employed on a regular basis		Monitor NOx emissions	
4.	**Construction Noise**			
4.1	Reduce equipment noise at source by proper design, maintenance and repair of construction machinery and equipment.	Proponent & CC	Check maintenance records	During construction phase
4.2	Minimize noise from vehicles and power generators by use of proper silencers and mufflers.		Monitor compliance	
4.3	Use noise-abating devices wherever needed and practicable.		Monitor compliance	
5.	**Water Sourcing**			
5.1	A complete record of water consumption during construction and operation phase will be maintained.	Proponent & CC	Check water consumption records	During construction phase
5.2	If a new water well is to be drill, it will be designed to abstract water preferably from deep aquifer not being used by local communities		Monitor compliance	
5.3	Water conservation program will be initiated to prevent wastage.			

Table 7.1: Environmental Management Plan (EMP)				
Construction Phase				
S.#	**Impact and Mitigation Measures**	**Responsibilities**	**Monitoring**	**Timing**
5.4	The water supply lines will be checked and repaired for leaks in order to reduce wastage of water.	Proponent, Maintenance Contractor	Check maintenance records	During construction phase
5.5	Recycle grey water for use for toilet flushing.	Proponent	Monitor compliance	During construction phase
5.6	Ensure that water efficient sanitary fittings are used throughout the development e.g. low flush toilets, water efficient shower heads, and aerators on faucets	Proponent & CC	Monitor compliance	During construction phase
6.	**Soil Contamination**			
6.1	Fuels, lubricants, and chemical will be stored in covered bounded areas, underlain with impervious lining.	Proponent & CC	Monitor compliance	During construction phase
6.2	Maintenance of vehicles and equipment will only be carried out designated areas. The area will be provided with hard surface or tarpaulin will be spread on the ground to prevent contamination of soil.	Proponent & CC	Monitor compliance	
6.3	Vehicles will only be washed at designated areas.	CC	Vehicle Inspection record	
6.4	Regular inspections will be carried out to detect leakage in construction vehicles and equipment.	Proponent &CC	Check inspection / maintenance records	
6.5	Appropriate arrangements, including shovels, plastic bags and absorbent materials, will be available near fuel and oil storage areas	CC	Monitor compliance	

Table 7.1: Environmental Management Plan (EMP)				
Construction Phase				
S.#	**Impact and Mitigation Measures**	**Responsibilities**	**Monitoring**	**Timing**
6.6	Contaminated soil will be removed and properly disposed after treatment such as incineration etc.	Proponent & CC	Monitor compliance	During construction phase
7.	**Wastewater Generation**			
7.1	Wastewater generated at the campsites will be stored temporarily in septic systems comprising of septic tanks from where it will be routed to a nearest drain/sewerage system.	Proponent & CC	Monitor compliance	During construction phase
7.2	At the time of restoration, septic tanks will be dismantled in place and backfilled with at least 1m of soil cover above the surrounding natural surface level.	CC	Monitor compliance	After the completion of construction phase
8.	**Occupational and Community Health & Safety Impact**			
8.1	The Contractor will provide as a minimum of safety training to its workers addressing 1) general safety awareness; 2) first aid procedures; 3) emergency procedures; and 4) use of personal protective equipment.	Proponent & CC	Monitor compliance	During construction phase
8.2	The Contractor will conduct site safety inspections and make sure construction work in undertaken in safe and sound manner.			
8.3	The Contractor will provide a system for recording all accidents and dangerous occurrences, regardless of whether or not personnel injury occurs, including any incident involving a member of the public.			
8.4	The Contractor plan will include a Safety and Emergency Preparedness Plan to address foreseeable emergencies that may arise during the construction activity.			
8.5	The Contractor will provide means for maintaining healthy working conditions for workers related to the effects of noise, dust, use of			

Table 7.1: Environmental Management Plan (EMP)				
Construction Phase				
S.#	**Impact and Mitigation Measures**	**Responsibilities**	**Monitoring**	**Timing**
	chemicals, by removal of the cause and use of suitable Personal Protective Equipment (PPE), to be provided to workers. The Contractor will ensure that workers are properly trained in the use of PPE and that adequate supervision is provided to ensure its proper use.			
8.6	Temporary inconveniences due to construction works will be minimized through planning and coordination with community members and organizations e.g. Traffic Management Authorities (if needed	Proponent & CC	Monitor compliance	During construction phase
8.7	Fulfillment of Occupational Safety Health Administration (OSHA) guideline for scaffoldings will be highly prioritized in order to make sure no accidents occur.			
9.	**Solid Waste Generation**			
9.1	Separate bins will be placed for different type of wastes - plastic, paper, metal, glass, wood, and cotton.	Proponent & CC	Monitor compliance	During construction phase
9.2	Non-hazardous non-recyclable wastes such as kitchen wastes will be disposed of in landfill site managed by municipal administration or approved waste manager/contractor.			
9.3	All hazardous waste will be separated from other wastes. Hazardous wastes will be stored in designated areas with restricted access and proper marking. Hazardous wastes will be disposed of through SEPA approved waste contractor.			
9.4	Records of all waste generated during the construction period will be maintained. Quantities of waste disposed, recycled, or reused will be logged on a Waste Tracking Register.			

Table 7.1: Environmental Management Plan (EMP)				
Construction Phase				
S.#	**Impact and Mitigation Measures**	**Responsibilities**	**Monitoring**	**Timing**
9.5	Training will be provided to personnel for identification, segregation, and management of waste.	Proponent & CC	Monitor compliance	During construction phase
10. Material Selection				
10.1	The structures and materials will, in the construction stage, conform to recommended standards and follow standard practice of civil works.	Proponent & CC	Monitor compliance	During construction phase
10.2	Materials including paving stones, crush, gravel and sand will be brought from commercial quarries located in Sindh province. Environmentally sound materials and goods will be selected, with priority being accorded to products meeting national and international standards.			
11. Traffic				
11.1	Heavy traffic during construction phase will come to the project site during late night hours.	Proponent & CC	Traffic record	During construction phase
11.3	During construction, regulate speed of vehicles.		Monitor compliance	
11.4	Designated parking areas will be provided for different type of project vehicles within and around the project site.			
11.5	Manage vehicle movement to avoid traffic jam and long queues.			
11.6	Prepare, implement and monitor the traffic management plan.	Proponent		
11.7	Parking of vehicles alongside the road should be prohibited at all time.			
	Project vehicles shall not be fitted with pressure horns.	CC		

Table 7.1: Environmental Management Plan (EMP)				
Construction Phase				
S.#	**Impact and Mitigation Measures**	**Responsibilities**	**Monitoring**	**Timing**
12. Cultural Resources				
12.1	Where feasible, alternative routes will be designated to divert construction traffic away.	Proponent & CC	Monitor compliance	During construction stage
12.2	Protocols will be established for the safe transportation and delivery of materials, with a focus on avoiding routes that pass near sensitive areas.			
12.3	The appointed contractor and construction personnel will receive training and information regarding the significance of nearby cultural resource.			

Operation Phase				
13. Solid Waste Generation				
13.1	Waste generation will be minimized by adopting waste management strategy of reduce, reuse and recycle.	Proponent	Monitor compliance	During operation phase
13.2	A waste management plan will be prepared, implemented and monitored for the safe collection, storage and treatment/disposal.		Monitor compliance	
13.3	Records of all waste generated will be maintained. Quantities of waste disposed, recycled, or reused will be logged on a Waste Tracking Register.		Check waste tracking register	
13.4	Training will be provided to personnel for identification, segregation, and management of waste.		Check training records	
13.5	All inert and non-hazardous construction wastes will be disposed to the existing tipping sites within or outside of the city limits.	Proponent, Waste Contractor	Monitor compliance	

13.6	Hazardous wastes will be disposed of through waste management contractors who will identify suitable disposal options for these wastes such as recycling, metal recovery, incineration or bioremediation etc.	Proponent, Waste Contractor	Monitor compliance	During operation phase
13.7	Various waste containers for waste collection should be placed at appropriate locations in the building	Proponent		
14. Wastewater Generation				
14.1	Grease interceptor and/ or oil skimmer to be installed on kitchen effluent to maintain oil levels within SEQS limits.	Proponent	Monitor compliance	During operation phase
14.2	Waste segregation measures would be employed to minimize entry of solid waste into the wastewater stream			
14.3	Monitoring of wastewater to ensure compliance with SEQS.			
14.4	If groundwater is used and desalinated water is required, RO reject water will be disposed in environmentally friendly manner			
15. Water Consumption				
15.1	A complete record of water consumption during the operation phase will be maintained.	Proponent	Monitor compliance	During operation phase
15.2	Water conservation practices will be adopted to prevent wastage of water.			
15.3	Drinking water and service water sources should be clearly labeled.			

16. Energy Consumption				
16.1	The energy-efficient lighting system installed for the project will contribute immensely to energy saving during the operational phase of the project.	Proponent	Monitor compliance	During operation phase
16.2	Natural lighting and ventilation shall be preferred in the buildings.			
16.3	The energy-efficient lighting system installed for the project will contribute immensely to energy saving during the operational phase of the project.			
16.4	The energy usage during the operational phase will be monitored and targets would be set for efficient use of energy.			
17. Air Emissions				
17.1	Monitor all exhausts at regular frequency to meet SEQS exhaust emissions.	Proponent	Monitor compliance	During operation phase
17.2	Stack height of generators will be increased to ensure better dispersion and distance covered by the pollutants in air before reaching the ground.			
17.3	An awareness program will be organized for generator operators to regularly tune-up engines and ensure proper maintenance			
17.4	Carry out regular maintenance of generators			
18. Traffic				
18.1	Manage vehicle movement to avoid traffic jam and long queues.	Proponent & CC	Monitor compliance	During operation phase
18.2	Prepare, implement and monitor the traffic management plan.			
18.3	Vehicles to use designated parking areas during operational phase.			
18.4	Parking of vehicles alongside the road should be prohibited at all time.			

Table 7.2: Environmental Monitoring Plan					
Construction and Operation Phases					
Ambient Air Quality Sampling Plan					
Phase	**Parameters**	**Locations**	**Frequency**	**Duration**	**Standards**
Construction	SOx, NOx, CO, O3, PM2.5, PM10 Lead, SPM	At the interface of project site and residential community	Monthly	Continuous for 8 hours* in a full working day	SEQS
Drinking Water Quality Sampling Plan					
Stages	**Parameters**	**Locations**	**Frequency**	**Duration**	**Standards**
Construction	Heavy metals, TDS, TSS, pH, Total Coliform, Faecal Coliform	Ground water source and other sources	Monthly	Grab sampling	SEQS for drinking water
Wastewater Quality Sampling Plan					
Stages	**Parameters**	**Locations**	**Frequency**	**Duration**	**Standards**
Construction	BOD, COD, DO, TSS, TDS, pH, NO_3, SO_4, Oil & Grease)	Camp site discharge points into drains	Monthly	Grab sampling	SEQS
Operation	BOD, COD, DO, TSS, TDS, pH, NO_3, SO_4, Oil & Grease)	Effluent from compact type treatment plant	Quarterly	Composite sampling / Grab sampling	SEQS
Noise Level Sampling Plan					
Stages	**Parameters**	**Locations**	**Frequency**	**Duration**	**Standards**
Construction	Decibels [dB(A)Scale]	At the interface of project site & residential community	Monthly	Continuous for 8 hours in a full working day	SEQS

		7 m from the equipment at construction site			
Solid Waste					
Stages	**Parameters**	**Locations**	**Frequency**	**Duration**	**Standards**
Construction	Waste generation rate, waste composition; recyclables and non-recyclables, hazardous waste	At main solid waste collection point from where the waste is transported from site	Monthly	24-hour sample collected during week days	Best Practices
Operation	Segregated bins to be provided to store different types of waste provided	At main solid waste collection point from where the waste is transported from site	Daily	---	Best Practices
Occupational Health and Safety					
Construction	Assessment of scaffolding, its proper installation as per OSHA standards Provision of fall protection system Regular inspection and maintenance of electrical system Provision of PPEs	Scaffolding, construction site and equipment yard	Daily	During working hours	Best Practices
Fire Safety					
Operation	Regular testing and maintenance of fire alarm, fire extinguishers, smoke detectors and fire hydrant system. Regularly inspection of exit stairwells for obstructions, proper signage, and functionality of emergency exist.	In areas where fire safety equipment's are installed and areas for emergency exist	Monthly	As per requirement	Best Practices

Table 7.3: EMP Implementation Cost		
Activity	**Cost (Rupees PKR)**	**Remarks**
Training Program	500, 000	**Refer section 7.12**
Environmental Monitoring		
Ambient Air (Construction)	(40,000 * 12) = 480,000	**Cost for 1-year monitoring at 01 location @Rs.40,000/per location.**
Drinking Water Quality (Construction)	(20,000 * 12) = 240,000	**Cost for 1-year monitoring at 1 sample @Rs.20,000 for all primary parameters**
Wastewater (Construction)	(50,000 * 12) = 600,000	**Cost for 1-year monitoring at 1 sample**
Wastewater (Operation)	(50,000 * 4) = 200,000	**Cost for 1-year monitoring at 1 sample**
Noise Levels (Construction)	(1,000 * 4 * 12) = 48,000	**Cost for 1-year monitoring at 04 locations @Rs.1,000/location**
Solid Waste (Construction/Operation)	10,000	**Estimated cost for 1 year**
Mitigation Measures (Construction)	500,000	**Initial estimates**
Mitigation Measures (Operation)	500,000	**Initial estimates**
Reporting	1,000,000	**Initial estimates**
Total	4,078,000	**-**
Contingencies (5% of EMP cost)	203900	**-**
Grand Total	4,281,900	**-**
Grand Total (in words)	**Four Million Two Hundred Eighty-one Thousand**	**-**

Chapter 8 Conclusion

Realizing that the city has overgrown its sustainability limits, it is imperative that the Builders and Developers take cognizance of the cumulative effect of the current pace of rapid development. Consequently, each project is required to keep the sustainability principles in view and go an extra mile beyond the present approach which is confined to bare survival.

Based on the findings of the environmental impact assessment it is concluded that the environmental impacts of the construction and operation of project are manageable and can be mitigated by implementing the Environmental Management and Monitoring Plan which forms an integral part of EIA document. The screening process has through review of literature, primary as well as secondary baseline data, and expert judgment, made assessment of the potential impacts of said activities on the physical, biological, and socioeconomic environment of the Project. Mitigation measures have been proposed to reduce, minimize or compensate for the identified potential negative impacts and their adoption has been recommended. The proposed project is a self-contained building having its own back-up power generation, and sewage treatment, recycling and disposal system in addition to commitment for the provision of required parking space. This being a positive impact would be an indicator of achievement of the objectives of the Project.

Construction and operation of project is not expected to have unacceptable/significant impact on the aesthetics of the microenvironment and macro environment. Nevertheless, the impact will be mitigated through careful planning, suitable landscaping, waste management, traffic management and adopting appropriate mitigation measures.

Mitigation measures will be assured by a program of environmental monitoring conducted to ensure that all measures are provided as intended, and to determine whether the environment is protected as envisaged.

The recommendations that need to be followed to ensure that the environmental impacts of the project are successfully mitigated. The proponent shall ensure that:

- All mitigation, compensation and enhancement measures proposed in this EIA report are implemented in full, as described in the document;
- The Environmental Management and Monitoring Plan are implemented in letter and spirit.

Screening of potential impact suggests that the Construction & operation of project will, on adoption of the suggested mitigation measures, be an environmentally acceptable proposition.

Annexures

Annex – I: Architectural Approval, Construction Permit of SBCA & Culture Department Approvals

SINDH BUILDING CONTROL AUTHORITY
ONE WINDOW CELL

File No: CL/PC-1/82/OWC/Arch:&Planning/2022/2023/52 Dated: 26/04/2023

(ARCHITECTURAL CONCEPT PLAN)
(NOT VALID FOR CONSTRUCTION)

M/S. JS Properties (BL-3571)
Through Muhammad Jawaid Iqbal & Other (Owner/Attorney)
CNIC : 42301-2617835-5,
Office address: 10-A, Muhammad Ali Bogra Road, Bath Island, Karachi.
Professional Team:-
1. Lic. Arch: Syed Junaid Iqbal (AL-01-791)
2. Lic. Engr. Rameez Bilwani (SE-06-316)
3. Membership of ABAD: (F.M. 2054)

Area of plot: 4152.00 Sq.yds
Gross covered area:616259.64 Sq.fts
Net area after exemptions:298918.64 Sq.fts
Category: Residential-cum-Commercial

Subject: - **PROPOSED ARCHITECTURAL CONCEPT PLAN (NOT VALID FOR CONSTRUCTION) IN RESPECT OF PLOT NO. 13, CL-07, CIVIL LINE QUARTERS, DISTRICT SOUTH, KARACHI.**

Reference:- **PROP-20220803-7, dated:05-08-2022**

The proposal has been examined and scrutinized with the requirements of Karachi Building & Town Planning Regulations,2002 and amended upto date.

This Architectural Concept Plan (Not Valid For Construction) has been issued as per notification issued by Director General, SBCA vide letters No. SBCA/PS-CE/2020/05, Dated: 7-7-2020, No.SBCA/PS-CE/2020/07, Dated:29-7-2020,No.SBCA/PS-CE/2020/5/574, Dated:31-08-2020, No. SBCA/PS-CE/2021/831, Dated: 08-01-2021 & No.SBCA/Secy. to DG/ 2021/18, Dated:28-01-2021 & No.SBCA/PS-CE/2022/26, Dated:29-3-2022 in respect of cancellation / withdrawal of Presentation committee.

The Competent Authority has been pleased to accept the Architectural Concept Plan (Not Valid for Construction) of subject plot admeasuring 4152.00 sq.yds for Basement-2 (Services) + Basement-1 (Parking + ARS + Services) + Ground Floor (Parking + Shop + Services) + 1st Floor (Parking Services) + 2nd to 10th Floor (Parking + Services) + 11th to 12th Floors (Recreation Area + Services) + 13th to 46th Floors (Flats) + Roof (Solar Panel + Battery Room + Helipad + Services) only with following terms and conditions: -

1. **This approval is granted on the basis of title verification in response to the letter No. SBCA/Title verification Cell/AD/Arch.& Planning/2023/09, dated: 10-2-2023, by the Assistant Director, One Window Cell/Architectural & Planning, SBCA. Reply has been received through portal (SWF, SBCA Diary No.86/L, dated: 17-02-2023) vide letter No.South/Rev.Br/2023/16,Dated:16-2-2023, Addl.Deputy Commissioner-I For Deputy Commissioner, South Karachi, Karachi, alongwith vide letter No.A.C/ CL/South/70/2023, Dated:16-02-2023, by the Assistant Commissioner, Civil Lines Sub-Division South Karachi and vide letter No.Mukh/C.L/S.DIV/South/154/2023, Dated:14-2-2023 issued by the Mukhtiarkar, Civil Lines, Sub-Division South Karachi.**
2. **This Architectural Concept Plan (Not Valid for Construction) is for Basement-2 (Services) + Basement-1 (Parking + ARS + Services) + Ground Floor (Parking + Shop + Services) + 1st Floor (Parking Services) + 2nd to 10th Floor (Parking + Services) + 11th to 12th Floors (Recreation Area + Services) + 13th to 46th Floors (Flats) + Roof (Solar Panel + Battery Room + Helipad + Services) only.**

9-) SBCA Proposed Architectural Concept Plan

r, 1st Floor, 2nd Floor, 3rd Floor, 4th Floor, 5th th Floor & 10th Floor and Recreation Area at under any circumstances.

lition that Air Raid Shelter provided as per se of allottees of Flats only in emergency /builder under any circumstance.

dition that owner/builder shall design / g which is MANDATORY as per Clause 25-

Continued on Page/2

6. This approval is granted with the condition that owner/Builder shall mandatory design/provide the provision for utilization of at-least 5% for Solar Energy.
7. In case of any complaint / dispute or any court matter the SBCA shall not be the party and shall not be the responsible.
8. Land escaping shall be provided as per KB&TPR-2002 (amended upto date).
9. Subject to condition that all constructional activities, supervision etc. shall jointly be the responsibility of professionals and owner / builder.
10. In order to achieve better quality concrete of required strength for Safe, Sound and Stable Structure, Builder shall use Ready Mix Concrete from the batching plant as defined in these regulations.
11. NOC for Sale /Advertisement shall be obtained from Design Section, SBCA as per Notification No.SBCA/PS-CE/2020/06, Dated: 23-07-2020 after issuance of construction permit.
12. NOC / Clearance from Structure Section of SBCA to obtained before Final Construction permits.
13. In case of any compliant / evidence regarding Sale / Booking of units without Sale NOC, this Architectural Concept Plan (Not Valid for Construction) will be withdrawn and Builder License shall be cancelled by the Authority.
14. The owner is required to produce NOC for Height Clearance, Valid Builder's License, NTN Certificate, & SITE Engineer Registered in PEC is required before issuance of construction permit or within 90 days from date of issuance of this letter.
15. The owner/builder shall conduct Environmental Impact Assessment (EIA) Study through Consultants and accordingly report shall be submitted to SBCA well before the commencement of construction.
16. In case of any misrepresentation / concealment of facts or construction started without getting construction permit under Section 6 (1) of SBCA 1979, this approval will be withdrawn / cancelled without any notice.
17. Owner/builder/Lic. Professionals will produce all required NOCs and documents before final construction permit or within 90 days from issuance of this Architect Concept Plan (Not Valid for Construction) otherwise said plan will be cancelled / withdrawal automatically without any notice.
18. The owner paid the betterment charges in this office for covered area 298918.64 Sq.fts @ Rs.50/- per Sq.ft vide challan No.8024/402 amounting to Rs.5,97,83,728/- dated: 17.02.2023.
19. SBCA reserve the right to obtain all fees / charges / taxes / dues remaining to owner / builder subsequently.(if applicable)

You are therefore, advised to comply above and submit the Structure requirements for further process in accordance with these rule regulations.

26/04/2023

Assistant Director
One window Cell / Architectural & Planning
Head Quarters, SBCA

26/04/23

Copy for information to: -

1. Director, (District South), SBCA.
2. Director, Structure Section, SBCA.
3. Director, IT, SBCA.
4. Chairman, ABAD.
5. Secretary to DG, SBCA.

SINDH BUILDING CONTROL AUTHORITY
ONE WINDOW CELL

No. CL/PC-1/82/OWC/Arch:&Planning/Construction Permit/2023/93 Dated:04/05/2023

M/S. JS Properties (BL-3571)
Through Muhammad Jawaid Iqbal & Other
(Owner/Attorney)
CNIC : 42301-2617835-5,
Office address: 10-A, Muhammad Ali Bogra Road, Bath Island, Karachi.

Area of plot: 4152.00 Sq.yds
Gross covered area:616259.64 Sq.fts
Net area after exemptions:298918.64 Sq.fts
Category: Residential-cum-Commercial

Professional Team:-
1. Lic. Arch: Syed Junaid Iqbal (AL-01-791)
2. Lic. Engr. Rameez Bilwani (SE-06-316)
3. Membership of ABAD: (F.M. 2054)

Above professionals will be fully responsible for safe & sound construction in accordance with approved plan and standard specifications and ensuring all safety measures during construction for the safety of workers, neighbors and pedestrians at site as defined in KB & TPR-2002 (As amended).

SUBJECT: CONSTRUCTION PERMIT ON PLOT NO. 13, CL-07, CIVIL LINE QUARTERS, DISTRICT SOUTH, KARACHI.

Reference:- PROP-20220803-7, dated:05-08-2022

No. of Stories: Basement-2 (Services) + Basement-1 (Parking + ARS + Services) + Ground Floor (Parking + Shop + Services) + 1st Floor (Parking Services) + 2nd to 10th Floor (Parking + Services) + 11th to 12th Floors (Recreation Area + Services) + 13th to 46th Floors (Flats) + Roof (Solar Panel + Battery Room + Helipad + Services) only.

- Architectural Concept Plan (Not valid for construction) vide No. CL/PC-1/82/OWC/Arch:&Planning/2022/2023/52, Dated: 26-04-2023.
- Structure NOC No. SBCA/DD/(STR)/2023/71, Dated: 09-05-2023.
- Verification of title documents and status of land issued vide No. SBCA/Title verification Cell/AD/Arch.& Planning/2023/09, dated: 10-2-2023, by the Assistant Director, One Window Cell/Architectural & Planning, SBCA. Reply has been received through portal (SWF, SBCA Diary No.86/L, dated: 17-02-2023) vide letter No. South/Rev.Br/2023/16,Dated:16-2-2023, Addl.Deputy Commissioner-I For Deputy Commissioner, South Karachi, alongwith vide letter No.A.C/CL/South/70/2023, Dated:16-02-2023, by the Assistant Commissioner, Civil Lines Sub-Division South Karachi and vide letter No.Mukh/C.L/S.DIV/South/154/2023, Dated:14-2-2023 issued by the Mukhtiarkar, Civil Lines, Sub-Division South Karachi.

1. The building plan for the above mentioned plot attached herewith is hereby approved and you are Permitted to carry out construction on the said plot accordingly.
2. Provided that it does not entitle you to build on land not lawfully conveyed to you and land or road of City District Government, Karachi or any other local Authority.
3. Provided that right of easement is a matter between the concerned parties with which this Authority has not concern.
4. Provided that it holds good only if the work is started within **ONE YEAR** from the date where after it shall be deemed to have lapsed.
5. A full time site engineer registered with PEC shall be deputed by the owner/builder during the execution of work.
6. Provided that rain water spouts from balconies, shops, windows doors of the building shall not Project or over hanged on public streets or the land belonging to the CDGK or local Authority.
7. Provided that the construction shall be carried out under the supervision of Lic. Engineering and Lic. Architect started above.
8. The Lic. Architect, Lic. Engineer/Owner shall be jointly and severally responsible for all the structural design and standard specification to be provided for the execution of the work.
9. Provided that plinth cornice shall not project more than 2" on any public street for ornamental purpose.

AND

10. Provided that premises shall not be used for the purpose other than the use approved by the Authority and according to the terms and condition of allotment / lease.
11. Subject to the condition that if any violation is found during / after construction, the same shall be demolished.
12. Provided that the quality control and stability of the structure slab be the responsibility of the owner /attorney and Lic. Architect / Lic. Engineer.
13. No building materials or any kind of machine shall be stores/placed for execution on road of Govt. land / footpaths during construction.
14. Subject to condition that all the constructional activities supervision etc shall jointly be the responsibility of professionals & owner.

Contd...../2

OFFICIAL COPY OF CONSTRUCTION PERMIT

15. Fire-fighting and safety arrangements shall be provided as per existing regulations and also in accordance with international standard.
16. This approval is granted with the condition that owner / builder shall mandatory design / provide the provision for utilization of at-least 5% for solar energy.
17. This approval is granted with the condition that owner / builder shall design / provide the provision of Broadband wiring which is MANDATORY as per Clause 25-1.9.3 of KB&TPR-2002.
18. Owner shall obtain the plinth verification through licensed professionals on prescribed form (ZP-4) upon completion of foundation as per KB&TPR from concerned Town.
19. The owner and professionals shall submit to the authority floor certificate (form ZP-5) at the time of casting of slab of each floor as per KB&TPR in concerned Town.
20. In case of any complaint / dispute or any court matter, the SBCA shall not be a party and shall not be responsible.
21. If at any later stage, it is found that the approval of Proposed plan was obtained with mis-representation of facts, the same will be withdraw / cancelled.
22. Owner / Attorney is bound to get the completion / occupancy plan approved from this Authority before occupation as per KB&TPR.
23. Air Raid Shelter (ARS) provided in **Basement-1** shall not be misused under any circumstances.
24. Parking as provided at **Basement-1, Ground Floor, 1st Floor, 2nd Floor, 3rd Floor, 4th Floor, 5th Floor, 6th Floor, 7th Floor, 8th Floor, 9th Floor & 10th Floor** shall not be misused under any circumstances.
25. Recreation area as provided at **11th & 12th Floors** shall not be misused under any circumstances.
26. All the construction work to be carried out strictly as per Administrative Instruction and as per KB & TPR-2002 (Amended to date) with maintaining the shear wall / columns etc. as per structure drawings.
27. Owner & License professionals will take all the precautionary measures as per KB & TPR-2002 (Amended to date) and also follow the specifications / notes mentioned by Dy. Director Structure Section, SBCA in the approval letter / structural drawings during excavation and further construction to avoid any mishap to the adjoining / surrounding buildings.
28. In case of any complaint / evidence regarding Sale / Booking of Units without Sale NOC, approval of building plan should be withdrawn and builder license shall be cancelled by the Authority.
29. As per Notification No. SBCA/Secy. to DG/2016/503 Dated: 18-05-2016, owner / builder shall obtain NOC from Environment & Building Services Section, SBCA as and when made functional.
30. NOC for Sale & Advertisement shall be obtained from Design Section, SBCA as per Notification No. SBCA/PS CE/2020/06, dated 23.07.2020.
31. To achieve quality concrete of required strength for sale, sound and stable structure, the owner / builder shall use ready mix concrete from batching plant which is mandatory under clause 11-1 of KB&TPR-2002 and amended up to date.
32. This approval is granted by One Window Cell/Town Planning Section only planning point of view, all other aspects like ownership/court case/complaint/dispute implementation of construction activities according to KB & TPR shall be the responsibility of concerned Town.
33. At any stage, any ambiguity / error found in the approval of building plan, the same shall be conveyed accordingly by the Town concerned.
34. This approval is granted as per NOC for withdrawal of Sub-Division of Plot Nos. 13/1 & 13/2, measuring 2010 sq.yds & 2142.00 Sq.yds Sheet No. 07 Civil lines Quarter, Karachi from SMPA vide letter dated 27-01-2023.
35. The owner is required to produce **NOC for Height Clearance, Valid Builder's License, NTN Certificate, & SITE Engineer Registered in PEC** before issuance of NOC for sale & advertisement.
36. The owner/builder shall conduct Environmental Impact Assessment (EIA) Study from SEPA through consultants and accordingly report shall be submitted to SBCA well before commencement of construction.
37. Before commencement of construction, the owner/builder shall obtain the requisite approval/NOC from the SEPA.
38. Owner/builder/Lic.Architect will produce all required NOCs and documents before final construction permit or within 90 days from issuance of this final construction permit said plan will be cancelled/Expired automatically without any notice.
39. SBCA reserve the right to obtain all fees / charges / taxes / dues remaining to owner / builder subsequently. (if applicable)

Encl:

- Approved Proposed Building Plans.

09/05/2023

Assistant Director
One window Cell / Architectural & Planning
Head Quarters, SBCA

09/05/23

Copy for information to:-

1. Director, (District South), SBCA.
2. Director, Design, SBCA.
3. Director, Vigilance Section, SBCA.
4. Director, I.T, SBCA.
5. Chairman, ABAD, Karachi.
6. Secretary to DG, SBCA.

NO. D.D(H)/D.G (A&A)/CTA&AD/CLQ/1-21/2022/0752
Government of Sindh
Directorate General of Antiquities & Archaeology
Culture, Tourism, Antiquities & Archives Department
House No. C-82, Block-02, Clifton, Karachi.
Karachi, dated the 28th October, 2022

To,

Mr. Shunaid Qureshi & Mr. Muhammad Jawed Iqbal,
Plot No. 13, CL-07,
Fatima Jinnah (Bonus) Road,
Civil Lines Quarters,
Karachi.

Subject: **REQUEST FOR CONFIRMATION STATUS OF LAND BEARING SURVEY NO. 13, CL-07, FATIMA JINNAH (BONUS) ROAD, CIVIL LINES QUARTERS, KARACHI.**

Please refer to your application on the subject matter and to state that this office has checked and verified the subject plot, and it does not exist in the list of Protected Heritage under the Sindh Cultural Heritage (Preservation) Act, 1994.

You are hereby, allowed to carry out the new construction on the rear side of the plot, as this Department has no objection to any new construction on rear side of the subject plot. However, the **Undertaking** in this regard shall be furnished to this office mentioning that no any damage/ vandalism may be caused to the protected heritage structure of the Jennings Private School.

Deputy Director
(Heritage)
28/10/2022

Copy forwarded for information and taking necessary action to:

1. The Director General, Sindh Building Control Authority, Karachi.
2. The Deputy Commissioner, District South, Karachi.
3. The Director (A&M), CTA&AD, Govt. of Sindh, Karachi.
4. The Assistant Director (Heritage), CTA&AD, Govt. of Sindh, Karachi.
5. P.S to the Secretary to Govt. of Sindh, CTA&AD, Karachi.
6. P.A. to the Director General (Antiquities & Archaeology) CTA&AD, Govt. of Sindh, Karachi.
7. Office/Master File.

Annex – II: Directions of Technical Committee under Culture Department

NO.A.D(H)/D.G(A&A)/CTA&AD/CLQ/1-21/2022/2098
Government of Sindh
Directorate General of Antiquities & Archaeology
Culture, Tourism, Antiquities & Archives Department
House No. C-82, Block-02, Clifton, Karachi.
Karachi, dated 12th of March, 2026

To,

Muhammad Ahmed Masood (Through the owner),
Managing Partner,
Advocate Supreme Court,
House No. 98A, Main Saba Avenue, Phase-VI (DHA),
Karachi.

SUBJECT: **COMPLIANCE OF ORDER DATED 13-02-2026 AND SUBSEQUENTLY ORDER DATED 19-02-2026 BY THE HONOURABLE HIGH COURT OF SINDH, KARACHI IN C.P NO. D4039 OF 2025 FILED BY MUHAMMAD JAVED IQBAL & ANOTHER V/S PROVINCE OF SINDH & OTHERS.**

I am directed to refer to your application dated 27-02-2026, received in this department on 05-03-2026, regarding the subject cited above and to state that the matter was placed before the Technical Committee on Sindh Cultural Heritage, under the Chairmanship of Mr. Hameed Haroon, wherein the subject case was thoroughly examined and reviewed by the Technical Committee in several meetings held on 25-09-2025, 30-09-2025, and 04-10-2025. **(The Minutes of the meetings are herewith attached for ready reference)**

02. You are therefore requested to take further necessary action in accordance with the observations and recommendations made by the Technical Committee and furnish the requisite details as reflected in the minutes of the meetings. The same may be provided at the earliest so that the matter may be placed before the forthcoming meeting of the Technical Committee for further consideration and for timely compliance of the orders passed by the Honourable High Court of Sindh, Karachi without further delay.

Deputy Director
(Heritage)
12/03/26

Copy forwarded for information and taking necessary action to:

1. The Chairman, Technical Committee on Sindh Cultural Heritage, Karachi.
2. The Director (Heritage), CTA&AD, Govt. of Sindh, Karachi.
3. The Assistant Director (Heritage), CTA&AD, Govt. of Sindh, Karachi.
4. Architect Syed Akbar Jamil, Arch Vision Plus, SB-29, Main University Road, Block-13-C, Gulshan-e-Iqbal, Karachi.
5. P.S to the Secretary, CTA&AD, Govt. of Sindh, Karachi.
6. P.A to Director General (A&A), CTA&AD, Govt. of Sindh, Karachi.
7. Office/Master File.

Check Para/2 (Page # 8 & 9), the 3rd Meeting's Conclusion highlighted for perusal

GOVERNMENT OF SINDH
CULTURE, TOURISM, ANTIQUITIES & ARCHIVES DEPARTMENT

MINUTES OF THE MEETING OF TECHNICAL COMMITTEE ON SINDH CULTURAL HERITAGE HELD ON 25-09-2025 AT 04:00 P.M.

An emergency meeting of the Technical Committee (T.C.) on Sindh Cultural Heritage was held on 25-09-2025 at 04:00 pm, under the Chairmanship of Mr. Hameed Haroon, except item No. 03, where Mr. Hameed Haroon did not attend and the Agenda No. 03 was considered by the forum, which was chaired by Dr. Kaleemullah Lashari.

The Committee considered following agenda item and decided as follows:

S.NO	AGENDA ITEMS	DECISIONS
1.	CONFIRMATION MINUTES OF THE MEETING OF TECHNICAL COMMITTEE HELD ON 19-08-2025.	The members of the Technical Committee confirmed the minutes of the last meeting of Technical Committee held on 19-08-2025.
2.	Consideration of the Development Plan regarding plot # CL7/13 by Mr. Muhammad Javed Iqbal, co-owner of the property.	The Background: The matter was first brought to the attention of the TC, in its meeting held on the 19.08.2025, wherein the attention of the Committee was sought over the anomaly in the reference of property's plot numbers, variously quoted, in different communications among the departments (Heritage Cell CTA&A Department, SBCA, Revenue Department, Masterplan Department). Further that the illegal development activity was noticed in the premises of Jennings Private School on 08.08.2025, Field Officer issued a Show-cause Notice to the owners for the violation of the law, by undertaking dismantling / damaging the structure. On this the owners have gone to the High Court, and the Honorable Court granted the Status quo and asked for the report from the Field Officer, Heritage Cell, SBCA and Revenue Department. The matter was considered, where the TC required the submission of all the documents, pertaining to the issue, and observed that the owners may be asked to be present if they consider making any submission, and if they have any development plans they may submit the same. On 17.09.2025 the High Court issued a show-cause notice to the Director General, regarding the slow process of the application of the owners. The Director General requested the TC for its advice in the matter, on which the Chairman convened a meeting of the Sub Committee, of the TC on 18.09.2025. Wherein the Sub-committee observed that the Owners to be asked to present the plans and assist

the Committee, or submit it through the attorney authorized to take decision on his behalf.
The representative of SBCA pointed out that no site inspection was conducted by SBCA prior to issuance of the construction permit. Given the heritage sensitivity and the transition from sub-divided plots to an amalgamated property, a current file, with inspection note, photographs, and inspection report should have existed on file. The absence suggests a procedural lapse in due diligence.
Furthermore, he pointed out that the Director General SBCA observed in his note to Chief Secretary Sindh, that the construction permit dated 04-05-2023, be held in abeyance (suspended operation), pending till the time findings and approval of development plan by the Technical Committee, through Culture, Tourism, Antiquities & Archives Department, and its impact assessment report, is made available.

TECHNICAL COMMITTEE HELD ITS MEETING, ON 25.09.2025

Introduction by Counsel:
Ad. Moiz Baig introduced himself as the learned counsel for the petitioners, namely Mr. Muhammad Javed Iqbal and Mr. Shunaid Qureshi. Upon query from the Chairman regarding his authority, Moiz Baig confirmed that he had the requisite authorization as counsel to represent the matter before the Courts. The Committee observed that it shall be appropriate, if Ad. Moiz Baig is also authorized to present the owners in the TC, he may bring such and authorization. Ad. Moiz Baig submitted the letter subsequently, from the Owners to represent their application, in connection with Plot No. CL-7/ 13.
The proposal received in the Department of CTA&A, had the approval of SBCA. After the clarity with regard to the plot numbers quoted earlier, it is beyond doubt that any development plan for an enlisted property has to be processed under the Heritage law. Advisory Committee, and the Technical Committee formed under the Sindh Cultural Heritage (Preservation) Act 1994 & the Rules made thereunder are mandated to consider any such plan for the enlisted property.

Reference to Court Orders:
Moiz Baig apprised the Committee that the Hon'ble High Court, vide order dated 26-08-2025 in C.P. No. D-4039 of 2025, quoted the submission of the Director General, Antiquities & Archaeology, CTA&A Department that:
"If the petitioner gives a proper and valid undertaking in writing along with the development plan of construction over the subject plot, it will be placed before the Technical Committee and decided within three (03) weeks."

		Pursuant to the said observation, the owners, through their Attorney Mr. Muhammad Ahmed Maqsood, submitted the development plans on 27-08-2025 to the Director General (A&A) for placing before the Technical Committee. **Clarification on Subdivision of Plot:** The Development plan submitted by the applicants was granted approval by SBCA on 26.04.2023, on the amalgamated plot CL7/13, having the status of enlisted property. Thus, the permission on the property was not in the purview of SBCA. The applicants were asked whether they desire the development plan, having been approved by the SBCA, to be considered, or you desire to submit a fresh plan. **Clarification by Consultant:** The consultant/architect confirmed that the site plan was provided to them in 2023, i.e., after the amalgamation, meaning the planning exercise was carried out with reference to a single amalgamated plot rather than the earlier subdivided layout. Having obtained the clarity that the process of the permission is to be undertaken under the heritage law, the consultant / architect expressed the desire to submit a fresh development plan. **Decision of the Committee:** After hearing the submissions and deliberations, the Chairman concluded: The petitioner shall re-submit the development proposal, along with the application for the development / rehabilitation of the enlisted property. The Committee shall review the re-submitted proposal in its forthcoming meeting. Counsel for the petitioner was directed to submit the re-designed proposal before Tuesday 30-09-2025 at 04:00pm, so that the matter may be placed for urgent review and the matter was adjourned for Tuesday on 30-09-2025 at 04:00 p.m. **SECOND PART OF THE MEETING HELD ON 30-09-2025 AT 04:00PM** In continuation of the previous meeting held on 25-09-2025, the matter was taken up by the Technical Committee on 30-05-2025 at 04:00 pm under the Chairmanship of Hameed Haroon, whereby it was observed as under: 1. **Impact on Heritage Structure (Legal & Technical Concerns):**

- The Committee observed that construction of a Highrise within 10 feet of Jennings School raises serious concerns regarding structural stability, vibration impact, and aesthetic integrity of the heritage site.

- The proposed project contravenes the spirit of the Sindh Cultural Heritage (Preservation) Act, 1994, which mandates safeguarding the cultural contest environmental setting, architectural aesthetics and visual corridor of heritage properties.

2. The Historical setting of the quarter, where stalwarts of our history and culture have dwelled
3. Protected Heritage like the Frere Hall, Quaide Azam House Museum, Metropole Hotel, Sindh Club, PACC, Bank House, Junagadh House, US Consul General's House and majority of the enlisted buildings are situated with in the few yards distance of each other.
4. Traffic Congestion and Access Concerns:

- The proposed high-rise will exponentially increase vehicular load, parking demand, and congestion in an already narrow and saturated zone surrounding Jennings School.

5. Lack of a Traffic Impact Assessment (TIA) report was noted.
6. High-Density Urban Impact:

- The Committee noted that such a high-density vertical development may create shadowing, air circulation, and light obstruction issues for Jennings School.
- Concerns were raised about public utility load (water, sewerage, electricity, solid waste management), which were not addressed in the submission.

7. Undertaking Requirement:

The proponent must submit a legal undertaking ensuring:

- No vibration, piling, or excavation activity will damage the structural fabric of Jennings School.
- They will bear full financial liability for any structural damage to the heritage building.

- The documents drafted in the meeting shall also be the part of the undertaking as desired by the Committee.

8. **Restoration Plan for Jennings School:**

- Before any permission is granted for development project is accorded, a comprehensive restoration and conservation plan of Jennings Private School must be prepared, approved, and funded by the developer.
- Committee emphasized that drawings must include:

➢ façade preservation,
➢ Landscape buffer between school and the new construction,
➢ controlled setback from heritage boundary,
➢ restricted signage/lighting to avoid visual pollution.

9. **Required Modifications in Submitted Drawings:**

- Increase in setback distance from heritage boundary.
- Reduction in height/mass of the structure in direct visual alignment with Jennings Private School.
- Incorporation of buffer walls and green barriers.
- Revised architectural drawings showing heritage-sensitive treatment of the rear elevation.

Observation by the Technical Committee as under:

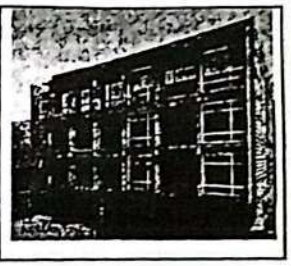
- Submission of a Heritage Impact Assessment (HIA) report.
- Submission of Traffic Impact Assessment report.
- Detailed Geotechnical and Structural Stability Report addressing excavation risks near heritage foundations.
- Comprehensive Fire & Emergency Access Plan verified by Fire Department.
- Revised Environmental Impact Assessment (EIA) covering noise, dust, vibration, and air quality impacts.
- Restoration & Maintenance Fund Commitment for Jennings School to be established before any NOC.

- Inclusion of consultations with old Jennings School Alumni, Old Civil Lines residents, and relevant Heritage NGOs and experts in the field regarding preservation of the past.

The Committee advised the owner to submit these requirements/ drawings etc through covering letter to the Heritage Section. It was further observed that Dr. Asma Ibrahim and Mr. Nadeem Ahmed Khan shall extend advise the consultant, if seeks it, to re-design the proposal for further consideration.

The Committee proposed while considering the presentation provided by the architectural consultant and the owners of the Jennings Private School property, they may be provided with the images of the heritage school property and its new annex namely the Narain Jagannath Vaidya (NJV) School in Karachi, and a new 1+3 annex could more suitably be added on (Refer to the photographs from the Presentation given by NJV School, these are reproduced below)





The matter was adjourned to be undertaken on Saturday 04-10-2025 at 03:30 p.m.

THIRD MEETING HELD ON 04-10-2025 AT 03:30 P.M

In continuation of the Committee's previous decision dated 30-09-2025, the services of Architect Mr. Kamran Ansari were engaged by the owners to prepare the restoration plan for the heritage structure known as Jennings Private School.

Ansari briefed the Committee that over time, various unbecoming alterations and additions had been made to the main structure of Jennings School building, including application of cement plaster over the original masonry at several locations. He further informed that the terrace above the main gate had been converted into a room, which was not part of the original architectural design.

He added that while the overall structural condition remains stable, several original features have been concealed and unnecessary rooftop rooms were erected. The side walls have been entirely plastered, which need to be removed carefully to expose and restore the original stone facing. He also proposed to restore the windows to their original shape and design and to retain the building "as it is" while restoring its original architectural integrity.

The Committee appreciated the presentation and approach and collectively advised that:

- The box-type room constructed over the terrace be removed, and it may be restored in line with the original façade and streetscape;
- Upon removal of plaster, the stone facing be rehabilitated, with appropriate pointing, corresponding to the original façade;
- The interior conditions of the structure be documented and shared with the Committee;
- The intended use of the building be clearly defined.

Ar. Kamran Ansari stated that the restored structure will function as a Museum and Library. The Committee recommended that the Jennings School Alumni be engaged to contribute memorabilia and historical artifacts to be displayed in the proposed museum.

The Committee further directed the Architect to submit a detailed and updated restoration plan, including the scope of work, interior layout, and usage plan, within three (03) weeks for further review and examination.

Architect Mr. Akbar presented the details of the proposed building, earlier approved by SBCA, located to the rear of the Jennings School premises. He assured the Committee that the nature and setting of the area shall get the due consideration, and heritage sensitivity shall be duly taken care of. No damage or vandalism would occur on the site, and that the Museum and Library would be developed and maintained for public access, as per agreed arrangements.

The Committee observed that the subject site lies within the Civil Lines Quarters, an area of high historical significance, containing heritage

landmarks such as CM House, CS House, Flagstaff House, The First Prime Minister's House (State Guest House), Frere Hall, US Consul General's House, Junagadh House, Old Indian Embassy, Bank House, PACC, and multiple enlisted heritage properties. Being part of a historically sensitive precinct, its sanctity and heritage character must be preserved.

The Committee further discussed that while several limited-height residential projects (up to G+4) have been permitted by the Committee, the proposed high-rise may compromise further architectural setting of the area, it may alter the streetscape considerably, thus the proposal be developed sensibly, taking care of the multiple considerations, and creating environmental balance. It was suggested that the proposal be developed having considerations for appropriate scale, expected to enhance the aesthetic value of the area.

The Committee also raised the following technical and legal observations:

1. The road serving the site is narrow and already congested, and the traffic circulation plan for such a high-rise may finds its place in the proposal.
2. Green Architecture requirements, a Green Environmental Plan (EIA Report) be included, given the high-density urban setting and environmental implications.
3. A Traffic Impact Assessment (TIA) may be necessary to evaluate vehicular movement and parking load.
4. A Geotechnical and Structural Stability Report, addressing the excavation risks near the heritage foundation,
5. Accordingly, the Committee expects to receive a comprehensive development and rehabilitation plan, for its consideration ASAP.

The Committee concluded that the previous SBCA permission was out of context, the applicants desired that the considerations may be given to the fresh detailed submissions of the restoration and development plan.

Conclusion:

		The Committee concluded that: • **The Architect Kamran Ansari shall submit the detailed restoration plan within three (03) weeks;** • **The developer/owner shall submit the revised architectural design, considerations for Green Architecture and Environmental Plan (EIA), having considerations for the historic nature of the area, and its heritage component and the technical studies regarding Traffic Impact Assessment, Geotechnical/Structural Stability Reports, fire evacuation plans and its viability etc.** • **The proposal shall be re-examined upon receipt of the above documents.**
3.	COMPLIANCE OF THE ORDER OF THE HONOURABLE HIGH COURT OF SINDH (C.P NO. D-7543/ 2022, C.P NO. D-1138/2022, C.P NO. D-2225/2023) REGARDING CONSTRUCTION OF BUILDING AT PLOT NO. 6/ 1, CL-6, CIVIL LINES QUART ERS, KARACHI.	The learned counsel for the Respondent Mr. Sarfaraz Khamisani, submitted his written objection before the Committee. He contended that the Nazir of the Honorable High Court of Sindh was specifically appointed in C.P. No. D-7543 of 2022 to conduct an inspection and measure the exact distance of the subject property from Frere Hall. The Nazir, after carrying out an inspection on 27-03-2023, categorically confirmed that the subject property lies beyond the 200 feet radius of Frere Hall and its garden. It was further noted that a residential bungalow as well as a forty-five feet wide road separates the subject property from Frere Hall. The Committee considered the written objection placed by the learned counsel, and enquired about the basis of decision about the extent of the property Frere Hall. The learned Council for the respondent was unable to provide any authentic document, map or layout plan to the effect. He requested for the time, in this matter. Committee observed that following clarifications and documents are required: • The exact location and boundaries of Frere Hall be ascertained through legal and authentic records. • The concerned stakeholder/authority be directed to provide the legal documents establishing the limits and boundaries of Frere Hall. • The Sindh Building Control Authority (SBCA) be requested to provide the original status/record of the subject property. • The concerned Assistant Commissioner be approached to furnish the site plan of the subject property along with its demarcation. In view of the above, the Committee recommended that the Department may formally address letters to the concerned Departments/Authorities to obtain the

		requisite legal documents, records, and site plan, for further consideration.
4.	REQUEST FOR REPAIR AND DISMANTLING OF INTERNAL DANGEROUS PORTION OF BUILDING KATRAK MANSION, SITUATED AT PLOT NO. GK-7/ 41-42-43, GHULAM HUSSAIN KASIM QUARTERS, KARACHI.	Architect Mr. Kamran Ansari briefed the Committee regarding the proposed restoration and redevelopment of Katrak Mansion, a notified heritage property. He explained that the main heritage structure, including the dome-side portion, would be comprehensively renovated and restored in accordance with heritage conservation principles. He further elaborated that the rear portion comprising two adjoining plots would be utilized for new construction, while ensuring that the dome structure and front elevation of the heritage building remain fully protected and visually dominant. Upon review of the submitted proposal and architectural renderings, the Chairman observed that the design proposed for the rear properties to be developed in accordance with the observations made by the Committee. The Committee, therefore, directed the Architect to: 1. Re-design the rear façade and architectural treatment in such a manner that the features of heritage structure be saved, and its presence may be complimented in the rear structures. 2. Submit revised / modified architectural drawings at the earliest, incorporating the above observations. 3. Clearly define the scope of works, specifying in detail which portions of the rear properties are proposed to be dismantled, along with appropriate justification and technical notes. The Committee shall consider the revised proposal, when these are received.
5.	REQUEST FOR PERMISSION TO UNDERTAKE, RENOVATION, REPAIR AND MAINTENANCE WORK ON THE HERITAGE FAÇADE OF YOUSUF MANSION, AT PLOT NO. AM-08 (B-BLOCK), MUHAMMAD BIN QASIM (BURNS) ROAD, STRACHAN ROAD, ARTILLERY MAIDAN QUARTERS, KARACHI.	The matter under consideration was placed before the Technical Committee. However, the Committee observed that the concerned Architect/Consultant, who was required to brief the proposal, was not present in the meeting. Therefore, the matter may be deferred to the next meeting for consideration, subject to the presence of the Architect/Consultant for proper briefing.
6.	REQUEST FOR PERMISSION TO CARRY OUT RENOVATION AND REPAIRING WORK ON DANGEROUS DECLARED HERITAGE BUILDING AT PLOT NO. RS-4/8/2, RAMSUWAMI QUARTERS, KARACHI.	The matter under consideration was placed before the Technical Committee. However, the Committee observed that the concerned Architect/Consultant, who was required to brief the proposal, was not present in the meeting. Therefore, the matter may be deferred to the next meeting for consideration, subject to the presence of the Architect/Consultant for proper briefing.

7.	REQUEST FOR UN-DECLARED HERITAGE OF TOWER MANSION LOCATED AT PLOT NO. GK-7/ 99, GHULAM HUSSAIN KASIM QUARTERS, SADDAR TOWN-I, KARACHI.	An application submitted by the owner of the property known as *Tower Mansion*, requesting for de-listing from the heritage list on the grounds that it is in a highly dangerous condition and has been declared unsafe by the Sindh Building Control Authority (SBCA). The applicant contended that the structure is in such a precarious state that it may collapse at any time, which is self-explanatory. The Committee noted with concern that despite filing the application, the applicant/owner was not present before the Committee to substantiate the request. Upon detailed consideration, the Committee observed that the present hazardous state of the building is not a result of inherent structural defects but is solely attributable to prolonged non-maintenance by the owner. The Committee emphasized that had timely repairs and upkeep been undertaken, the building would not have deteriorated to its current condition. Accordingly, the Committee concluded that the request for de-listing could not be entertained. Instead, the owner is directed to submit a comprehensive development proposal, duly prepared and endorsed by a licensed architect as soon as possible, for the Committee's review. Upon submission, the Technical Committee shall examine the proposal and make appropriate recommendations in accordance with heritage preservation guidelines.
8.	DEMOLITION OF MUHAMMAD ALI KHOSO LIBRARY AT TANDO ADAM, DISTRICT SANGHAR.	The matter regarding the application submitted by the owner for *de-listing* of the heritage building came under consideration of the Technical Committee. After due deliberation, the Committee regretted the application for de-listing on the grounds that the building possesses significant heritage value and, therefore, does not warrant removal from the protected list. The Committee further observed that any attempt at illegal demolition or tampering with the structure shall be subject to appropriate legal action under the Sindh Cultural Heritage (Preservation) Act, 1994. It was decided to direct the concerned Deputy Commissioner to ensure that no demolition or construction activity is permitted at the site until the matter is duly decided by the Advisory Committee. The Committee also resolved that the owner shall appear before the Technical Committee to express his grievances, if any, so that the Committee may duly consider and place appropriate recommendations before the Advisory Committee for its decision.

9.	RESTORATION OF FAÇADE OF OLD ILACO HOUSE, STATE LIFE BUILDING NO. 5-A, AT PLOT NO. SB-6/ 5, ZAIB-UN-NISA STREET, KARACHI.	The Committee, after due deliberations, observed that a site visit of the subject building is required in order to ascertain whether the works carried out are in conformity with the approval previously granted, for the renovation of the façade. The Committee further resolved that reference should also be made to the observations recorded in the earlier meeting of the Technical Committee, so as to verify whether those observations have been duly complied with or not. Accordingly, it was decided that Dr. Asma Ibrahim, Dr. Anila Naeem, Mr. Altaf Aseem, and Mr. Sohail Ahmed Kalhoro shall undertake a visit to the site and prepare a report. The said report shall be submitted to Dr. Kaleemullah Lashari, for further consideration and recommendation in the matter.
10.	INTIMATION OF COMMENCEMENT OF WORK UNDER GRANTED PERMISSION BY YOUR DEPARTMENT AT PLOT NO. SB-1/ 82 (CAPTAIN HOUSE), SADDAR BAZAR QUARTERS, KARACHI.	The Committee considered the application submitted by the owner regarding initiation of works at *Captain House*. The owner informed that Architect Ar. Kamran Ansari has been appointed as consultant for the project. It was further apprised that the building was in a highly dangerous condition, and certain collapsed stone portions have already been carefully removed, numbered, and securely stored at a designated location. The owner assured the Committee that the works shall strictly be carried out in accordance with the approved development plans. After due deliberation, the Committee directed that a fresh undertaking shall be submitted through the Consultant, in conformity with the guideline policy approved by the Technical Committee. The Committee further recommends that: 1. Any deviation from the approved proposal shall entail the action against the owner/consultant. 2. All removed and numbered stones shall mandatorily be refixed at their original positions. The Committee emphasized that adherence to the approved guidelines and conservation principles is mandatory and non-compliance shall not be tolerated.
11.	SEALING ORDER-UNAUTHORIZED COMMERCIAL ACTIVITY ON SHOP NO. 3-G, MULES MANSION, PLOT NO. 8, WILLINGTON PLACE, DISTRICT KEAMARI, KARACHI.	The tenant of the shop 3-G submitted an application at *Mules Mansion*, where a small filter plant had been installed in small shop. The said shop had earlier been sealed by the Department. The owner requested that the shop be de-sealed and that he may be allocated an appropriate location to conduct boring activities in order to sustain his livelihood. The Committee, after due discussion, observed as follows: 1. **Installation Within Premises:** If the Filter Plant is installed within the premises of the heritage building of Mules Mansion, it carries dangerous implications

		which may cause structural damage to the property. Such activities inside the building are strictly prohibited, considering the heritage status and fragile condition of the structure. 2. **Installation Outside Premises:** If the Filter Plant is proposed to be installed in a shop or location outside the premises, the legal requirements and regulatory compliances must be fully observed. In such cases, the business operations may only be carried out subject to necessary precautionary measures, ensuring no direct adverse impact on the protected heritage property. **Decision:** The Committee unanimously decided that no such activity, including installation of Filter Plants or boring, shall be permitted within the premises of *Mules Mansion* due to the risks posed to the historical structure. However, if the owner intends to carry out such business outside the premises, the matter may be considered in accordance with the law, subject to fulfillment of all precautionary and regulatory requirements. The shop may be de-sealed and owner to seek regulatory permission outside the building, if permissible.
12.	REQUEST FOR CONFIRMATION STATUS OF PLOT NO. JM-475, JAMSHED QUARTERS, KARACHI.	The Department conducted a site visit of the subject plot, where it was observed that no built structure exists on the said plot that could be recommended for inclusion in the heritage list. At present, the plot is vacant, and according to the official record, it has not been declared as a protected heritage structure. Furthermore, this area was not included in the declared list prior to 2018. The Committee decided that the above information may be conveyed to the applicant.
13.	CONFIRMATION STATUS OF THE PLOT NO. RS-4/ 53, RAMSUWAMI QUARTERS, KARACHI.	The Department informed the Committee that a site visit was conducted on the subject plot. During the inspection, it was observed that only an ordinary structure exists on the said plot, which is not of sufficient architectural or historical value to be recommended for inclusion in the heritage list. Furthermore, as per available records, the plot is not declared in the list of protected heritage structures. The Committee decided that the above information may be conveyed to the applicant.
14.	VERIFICATION OF HERITAGE STATUS OF PROPERTY BEARING CS NO. 2056, WARD-C, NAI KA PIR KHAIE ROAD, HYDERABAD.	The Department informed the Committee that a site visit was conducted on the subject plot. During the inspection, it was observed that only an ordinary structure exists on the said plot, which is highly dilapidated and ruinous condition which is not of sufficient architectural or historical value to be recommended for inclusion in the heritage list. Furthermore, as per available records, the plot is not declared in the list of protected heritage structures.

		The Committee decided that the above information may be conveyed to the applicant.
15.	REQUEST FOR ISSUANCE OF NO OBJECTION CERTIFICATE (NOC) FOR SALE OF PROPERTY.	The Committee was apprised that the owner of the subject property has submitted an application requesting issuance of a Sale Certificate, as the property is intended to be sold. Upon deliberation, the Committee observed that issuance of a Sale Certificate does not fall within the domain of the Technical Committee. However, the Committee advised that the applicant may be permitted for the sale of the property, with the clear stipulation that the said property is a declared heritage structure. Accordingly, the owner must be informed that any activity relating to construction, repair, or maintenance shall require the submission of a detailed proposal before the Technical Committee for prior scrutiny and approval, in order to ensure compliance with the provisions of the Sindh Cultural Heritage (Preservation) Act, 1994.
16.	LIFT INSTALLATION PROPOSAL ENSURING PRESERVATION OF BUILDING'S HERITAGE AT KPT HEAD OFFICE BUILDING.	The Committee reviewed the application submitted by the Chief Mechanical & Electrical Engineer-II, M&EE-II Department, Karachi Port Trust, West Wharf Karachi, wherein a request was made for the installation of two new lifts within the premises of the KPT Head Office. The applicant stated that the lifts are intended to facilitate the movement of employees and senior management, further emphasizing that the proposed enhancement will not affect the architectural character or elevation of the heritage building. It was also mentioned that the lifts would be installed entirely within the premises, with two new pits constructed without disturbing the original foundation, and that a dedicated MS structural shaft will be developed to bear the load in accordance with the submitted structural drawings and engineer's report. Upon careful deliberation, the Committee approved the proposal to install the two lift only subject to condition that no damage/ vandalism shall be caused to the main heritage structure. The committee further appreciated the KPT as a responsible institution, which takes good care of its property, and is committed to saving its inherent value. Committee enquired about the non-current records kept with in the organization, as KPT has played very vital role in the socio-economic development, thus the records are of national importance. The representative invited the Committee to visit and advise the KPT regarding the best practices in Old Records Management.

The meeting came to an end with the vote of thanks to and from the Chair.

Dr. KALEEMULLAH LASHARI
Member, Technical Committee

Dr. ASMA IBRAHIM
Member, Technical Committee.

ALTAF ASEEM
Member, Technical Committee

NADEEM AHMED KHAN
Member, Technical Committee

DR. ANILA NAEEM
Member, Technical Committee

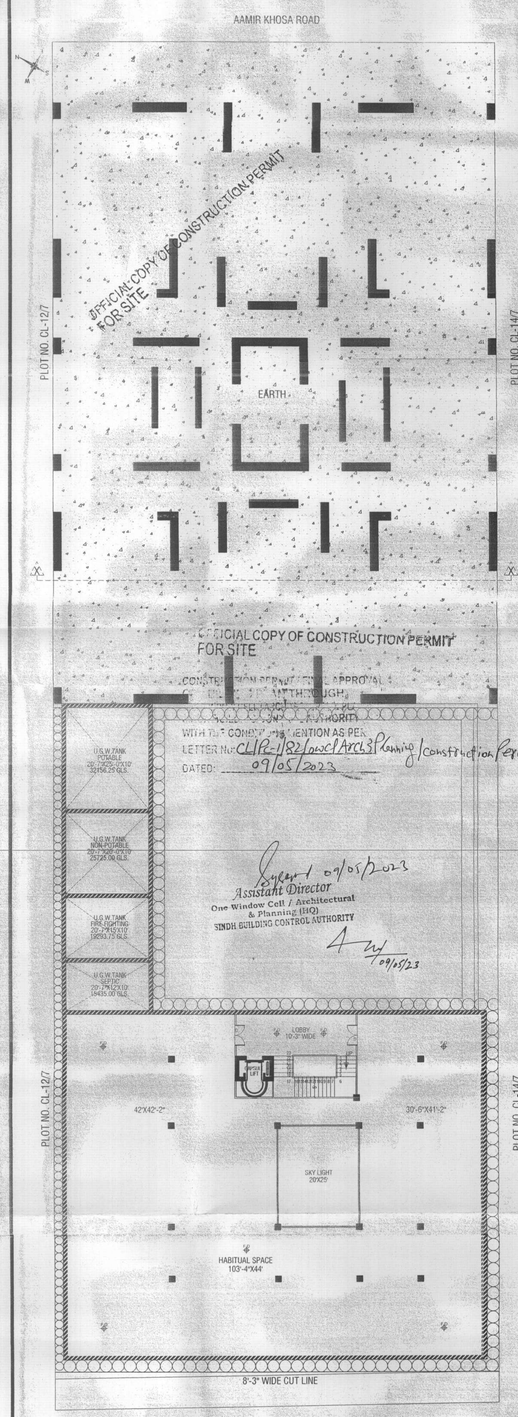
MUHAMMAD ALI MANJHI
Member, Technical Committee

MADAD ALI SINDHI
Member, Technical Committee

HAMEED HAROON
Chairman
Technical Committee for Sindh
Cultural Heritage

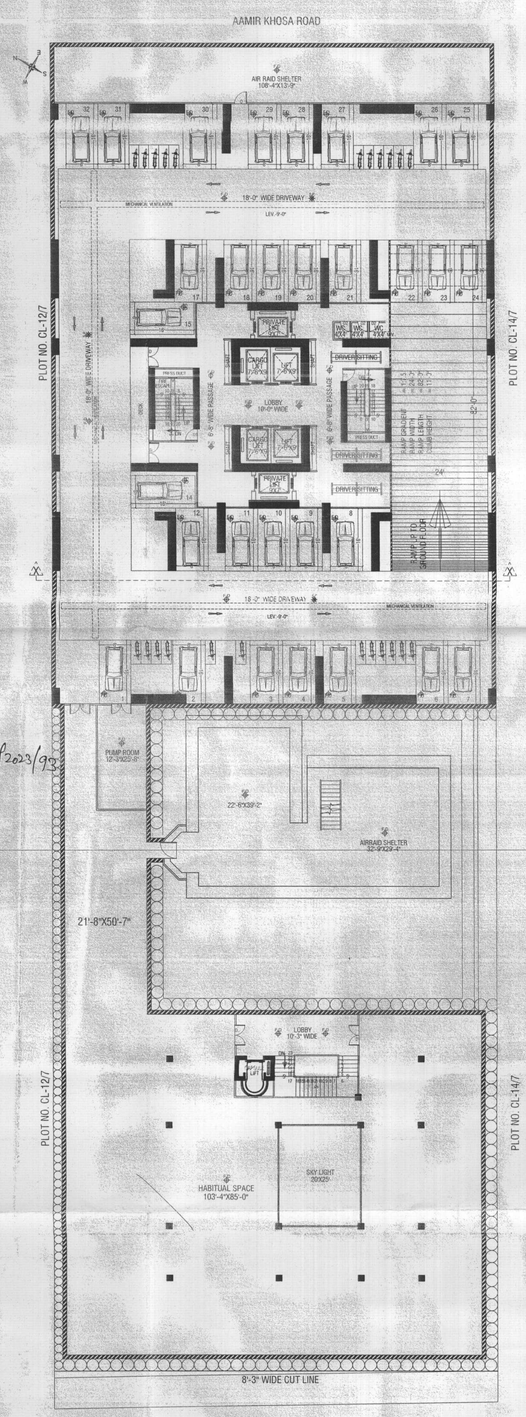
(SOHAIL AHMED KALHORO)
Member.

Annex – III: Drawing



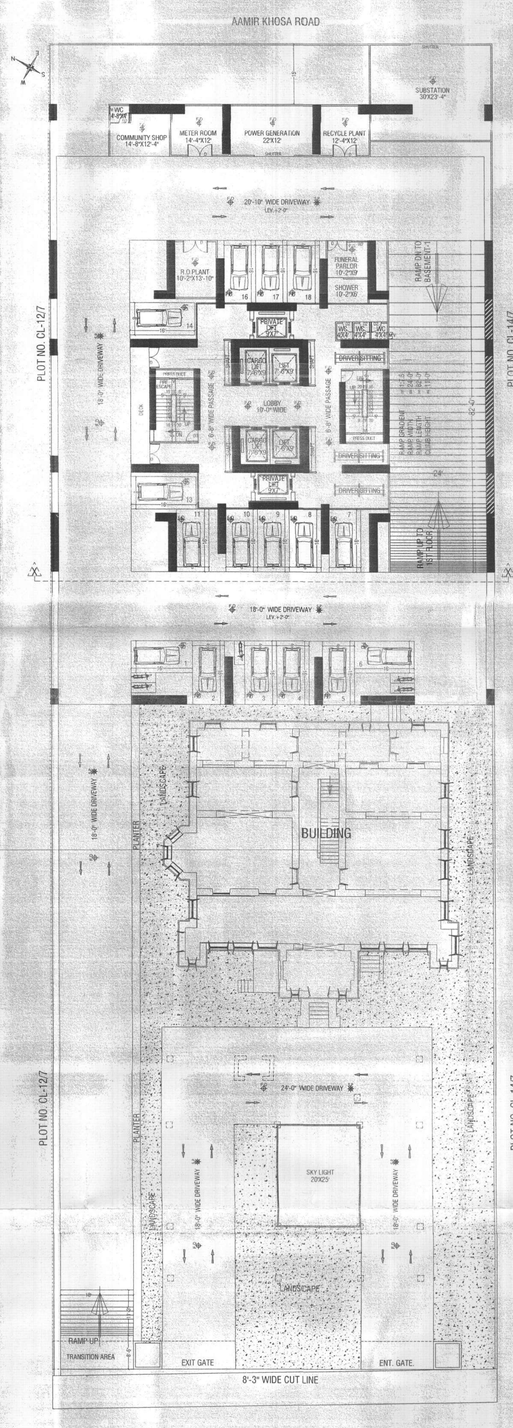
BASEMENT-2 PLAN

U.G.W.TANK POTABLE = 107187.50 GLS.
U.G.W.TANK NON-POTABLE = 62693.75 GLS.
U.G.W.TANK FIRE FIGHTING = 62518.75 GLS.
U.G.W.TANK SEPTIC = 39875.00 GLS.



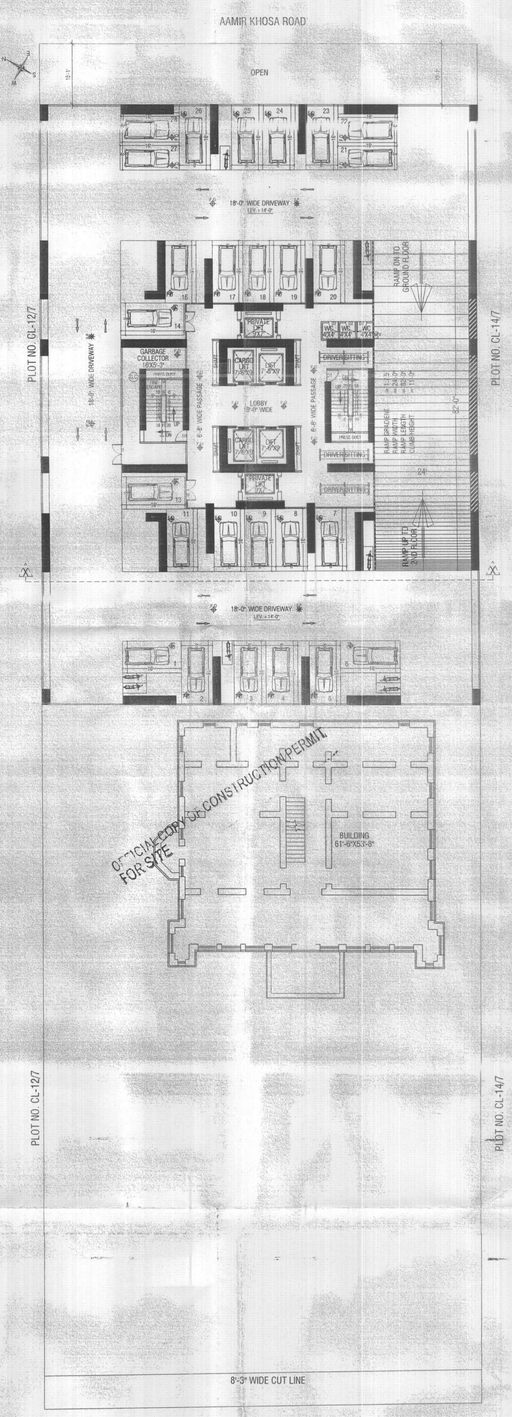
BASEMENT-1 PLAN

TOTAL NO. OF CARS = 32
TOTAL NO. OF M/C = 34



GROUND FLOOR PLAN

TOTAL NO. OF CARS = 19
TOTAL NO. OF M/C = 31
LANDSCAPE



1ST. FLOOR

TOTAL NO. OF CARS = 28
TOTAL NO. OF M/C = 31

ADDRESS: PROPOSED BUILDING PLAN ON OF PLOT NO.13, C.L.-7 , CIVIL LINES, QUARTER ELPHISTONE, STREET KARACHI.	OWNER/ATTORNY :	LIC. ENGINEER: RAMEEZ SILWANI, Civil Engineer, CP No. 6128	LIC.ARCHITECT: SYED JUNAID IQBAL, ARCHITECT, LICENSE # AL-01-791, Sindh Building Control Authority

NORTH: E N S W

SCALE: 1/16"=1'-0"

DRAWN BY: S-R

DRG NO # A- 01 / 05

AAMIR KHOSA ROAD

OPEN

18'-0" WIDE DRIVEWAY

RAMP ON TO 1ST FLOOR

PLOT NO. CL-12/7

PLOT NO. CL-14/7

18'-0" WIDE DRIVEWAY

LOBBY 10'-0" WIDE

8'-8" WIDE PASSAGE

DRIVE/SITTING

RAMP UP TO 3RD FLOOR

18'-0" WIDE DRIVEWAY

BUILDING 61'-6"X53'-6"

8'-3" WIDE CUT LINE

FATIMA JINNAH ROAD

2ND. FLOOR

TOTAL NO. OF CARS = 28.
TOTAL NO. OF M/C. = 31.

AAMIR KHOSA ROAD

OPEN

18'-0" WIDE DRIVEWAY

RAMP DN TO 2ND FLOOR

PLOT NO. CL-12/7

PLOT NO. CL-14/7

18'-0" WIDE DRIVEWAY

LOBBY 10'-0" WIDE

8'-8" WIDE PASSAGE

DRIVE/SITTING

RAMP UP TO 4TH FLOOR

RAMP GRADIENT = 1:7.5
RAMP WIDTH = 24'-0"
RAMP LENGTH = 91'-0"
CLEAR HEIGHT = 11'-0"

18'-0" WIDE DRIVEWAY

OPEN TERRACE

BUILDING 61'-6"X30'-10"

OPEN TERRACE

8'-3" WIDE CUT LINE

FATIMA JINNAH ROAD

3RD. FLOOR

TOTAL NO. OF CARS = 28.
TOTAL NO. OF M/C. = 31.

AAMIR KHOSA ROAD

OPEN

18'-0" WIDE DRIVEWAY

RAMP DN

PLOT NO. CL-12/7

PLOT NO. CL-14/7

18'-0" WIDE DRIVEWAY

LOBBY 10'-0" WIDE

8'-8" WIDE PASSAGE

DRIVE/SITTING

RAMP UP

18'-0" WIDE DRIVEWAY

ROOF OF 3RD. FLOOR

8'-3" WIDE CUT LINE

FATIMA JINNAH ROAD

4TH. TO 10TH. FLOOR

TOTAL NO. OF CARS (28X07) = 196.
TOTAL NO. OF M/C. (31X07) = 217.

AAMIR KHOSA ROAD

OPEN

OPEN

15'-0"

LANDSCAPE

RECREATION
GYM
19'-8"X9'-8"

LOBBY 7'-9" WIDE

SERVICES 11'X3'-3"

LOBBY 10'-0" WIDE

8'-8" WIDE PASSAGE

RECREATION
INDOOR GAME
19'-8"X45'-4"

PLOT NO. CL-12/7

PLOT NO. CL-14/7

8'-3" WIDE CUT LINE

FATIMA JINNAH ROAD

11TH. FLOOR

RECREATION

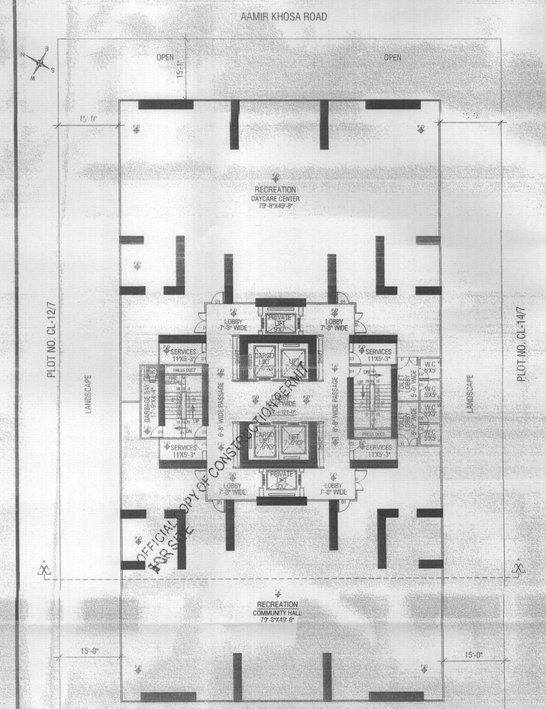
OFFICIAL COPY OF CONSTRUCTION PERMIT FOR SITE

CONSTRUCTION PERMIT / FINAL APPROVAL
OF THIS BUILDING IS ISSUED THROUGH
THE CONSTRUCTION & PLANNING
BUILDING CONTROL AUTHORITY
SUBJECT TO CONDITIONS MENTIONED AS PER
LETTER No: CL/K-1182/Lawsi/Arch/Planning/Construction Permit/2023/93
DATED: 09/05/2023

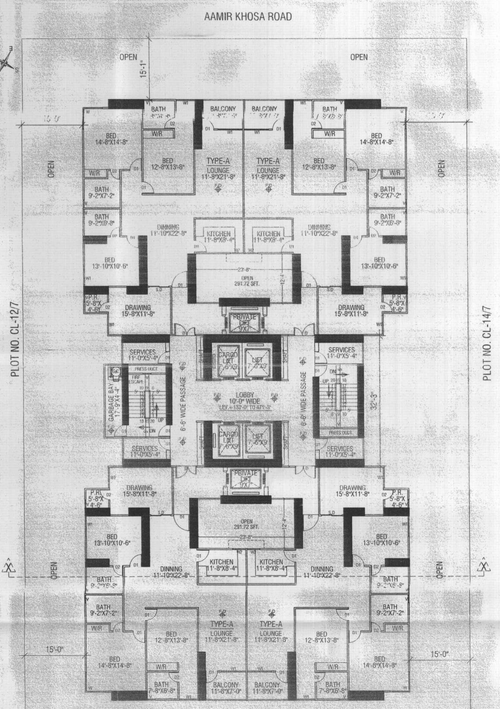
Assistant Director
Site Window Cell / Architectural
& Planning (HQ)
SINDH BUILDING CONTROL AUTHORITY

09/05/23

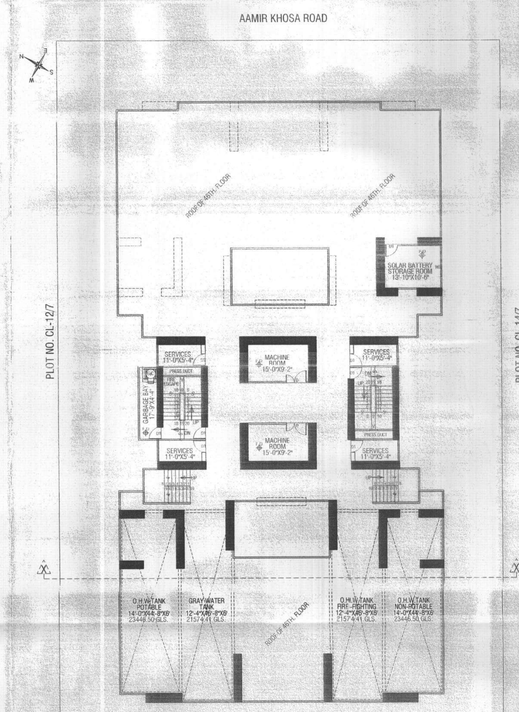
ADDRESS: PROPOSED BUILDING PLAN ON OF PLOT NO.13, C.L.-7 , CIVIL LINES, QUARTER ELPHISTONE, STREET KARACHI.	OWNER/ATTORNY :	LIC. ENGINEER RAMEEZ BILWANI	LIC.ARCHITECT SYED JUNAID IQBAL ARCHITECT LICENSE # AL-01-781 Sindh Building Control Authority	NORTH: N E S W	SCALE: 1/16"=1'-0"
					DRAWN BY: S-R
					DRG NO # A- 02 / 05



12TH. FLOOR
RECREATION

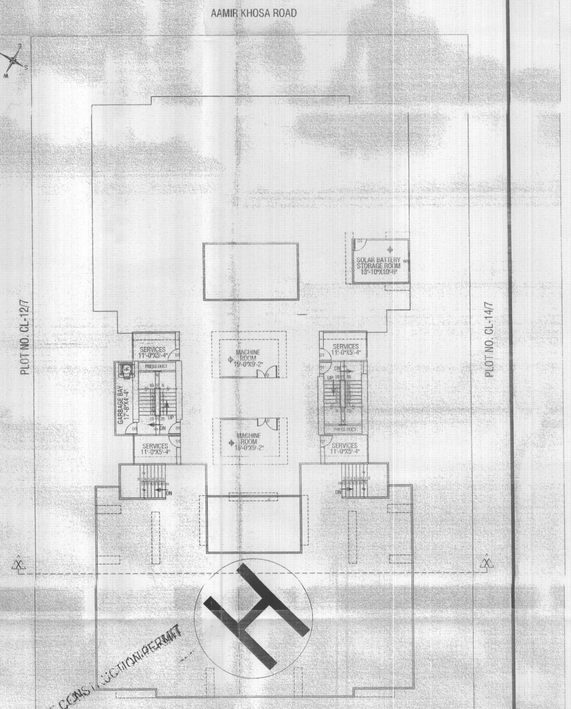


13TH. TO 46TH. FLOOR
TOTAL NO. OF FLATS (04 X 34) = 136.



ROOF PLAN

O.H.W.TANK POTABLE	=	23446.50 GLS.
O.H.W.TANK NON-POTABLE	=	23446.50 GLS.
O.H.W.TANK FIRE FIGHTING	=	21574.41 GLS.
O.H.W.GRAY WATER	=	21574.41 GLS.



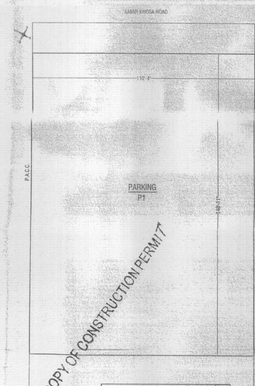
HALIPAD

OFFICIAL COPY OF CONSTRUCTION PERMIT FOR SITE

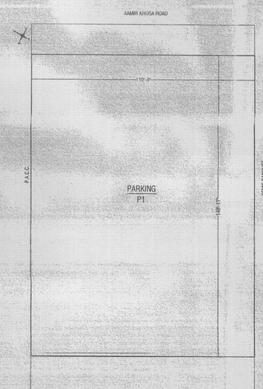
CONSTRUCTION PERMIT / FINAL / APPROVAL
GRANTED THROUGH
ONE WINDOW CELL / ARCHITECTURAL & PLANNING
BUILDING CONTROL AUTHORITY (HQ)
WITH THE CONDITIONS MENTION AS PER
LETTER NO: CW/P-1/82/owc/Arch & Planning/Construction Permit/2023/93
DATED: 09/05/2023

09/05/2023
Assistant Director
One Window Cell / Architectural
& Planning (HQ)
SINDH BUILDING CONTROL AUTHORITY
09/05/23

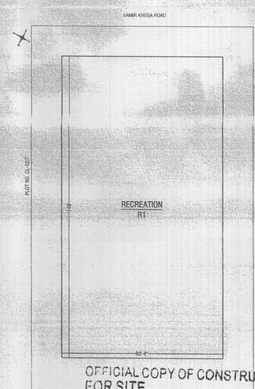
ADDRESS: PROPOSED BUILDING PLAN ON OF PLOT NO.13, C.L.-7 , CIVIL LINES, QUARTER ELPHISTONE, STREET KARACHI.	OWNER/ATTORNY :	LIC. ENGINEER — RAWEEZ BILWANI, Civil Structural Engineer, ROAA/LA&SC: F-301626, CAT NO:A2	LIC.ARCHITECT — SYED JUNAID IQBAL, ARCHITECT, LICENSE # AL-01-791, Sindh Building Control Authority	NORTH: N E S W	SCALE: 1/16"=1'-0" DRAWN BY: S-R DRG NO # A- 03 / 05



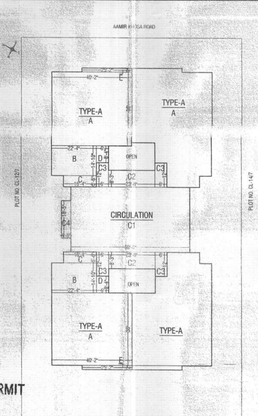
BLOCK PLAN OF
3RD. FLOOR



BLOCK PLAN OF
4TH. TO 10TH. FLOOR



BLOCK PLAN OF
11TH. & 12TH. FLOOR

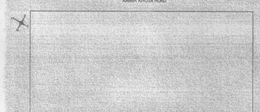


BLOCK PLAN OF
13TH. TO 46TH. FLOOR

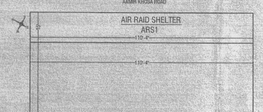
OFFICIAL COPY OF CONSTRUCTION PERMIT
FOR SITE

CONSTRUCTION PERMIT / FINAL APPROVAL
OF BUILDING
ARCHITECT
STRUCTURAL ENGINEER
PLUMBING
ELECTRICAL
LETTER No: C&I/Cpl/82/Gen/Arch/Planning/Construction Permit/2023/93
DATED: 09/05/2023

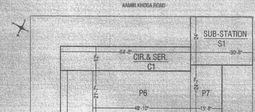
Assistant Director
One Window Cell / Architectural
& Planning (HQ)
SINDH BUILDING CONTROL AUTHORITY
09/05/23



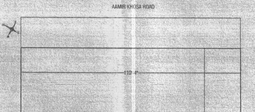
BLOCK PLAN OF
3RD. FLOOR



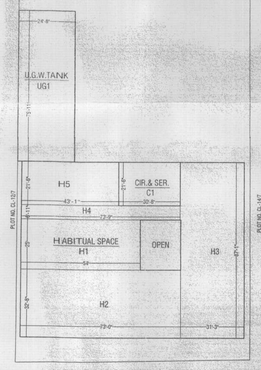
BLOCK PLAN OF
4TH. TO 10TH. FLOOR



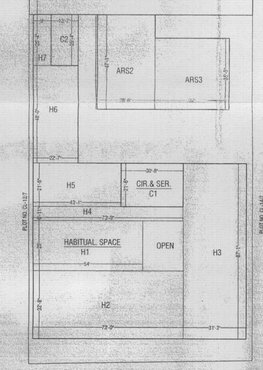
BLOCK PLAN OF
11TH. & 12TH. FLOOR



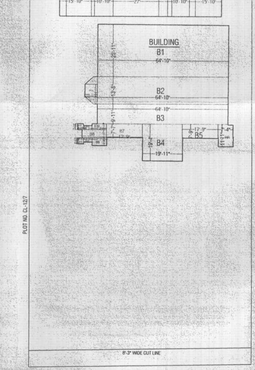
BLOCK PLAN OF
13TH. TO 46TH. FLOOR



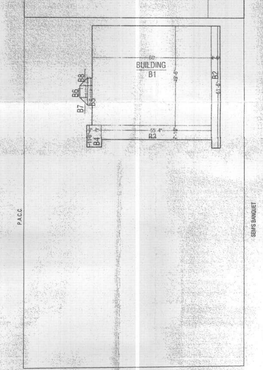
BLOCK PLAN OF BASEMENT-2 PLAN



BLOCK PLAN OF BASEMENT-1 PLAN



BLOCK PLAN OF GROUND FLOOR PLAN



BLOCK PLAN OF
1ST & 2ND. FLOOR

SUMMARY

BASEMENT-02 AREA	(HABITUAL SPACE + CIR. + TANKS)	=	10440.23 SQ.FT.
BASEMENT-01 AREA	(PARKING + R.S.'s + HABITUAL SPACE + CIR.)	=	31062.64 SQ.FT.
GROUND FLOOR AREA	(SHOPS + CIRC + PARKING + CIR.& SER. + SUB-STATION)	=	16708.15 SQ.FT.
1ST FLOOR AREA	(BUILDING + PARKING)	=	19993.59 SQ.FT.
2ND FLOOR AREA	(BUILDING + PARKING)	=	19993.59 SQ.FT.
3RD FLOOR AREA	(BUILDING + PARKING)	=	18530.36 SQ.FT.
4TH FLOOR AREA	(PARKING)	=	16429.24 SQ.FT.
5TH FLOOR AREA	(PARKING)	=	16429.24 SQ.FT.
6TH FLOOR AREA	(PARKING)	=	16429.24 SQ.FT.
7TH FLOOR AREA	(PARKING)	=	16429.24 SQ.FT.
8TH FLOOR AREA	(PARKING)	=	16429.24 SQ.FT.
9TH FLOOR AREA	(PARKING)	=	16429.24 SQ.FT.
10TH FLOOR AREA	(PARKING)	=	16429.24 SQ.FT.
11TH FLOOR AREA	(RECREATION)	=	11969.17 SQ.FT.
12TH FLOOR AREA	(RECREATION)	=	11969.17 SQ.FT.
13TH FLOOR AREA	(FLATS & CIR.& SER.)	=	10556.29 SQ.FT.
14TH FLOOR AREA	(FLATS & CIR.& SER.)	=	10556.29 SQ.FT.
15TH FLOOR AREA	(FLATS & CIR.& SER.)	=	10556.29 SQ.FT.
16TH FLOOR AREA	(FLATS & CIR.& SER.)	=	10556.29 SQ.FT.
17TH FLOOR AREA	(FLATS & CIR.& SER.)	=	10556.29 SQ.FT.
18TH FLOOR AREA	(FLATS & CIR.& SER.)	=	10556.29 SQ.FT.
19TH FLOOR AREA	(FLATS & CIR.& SER.)	=	10556.29 SQ.FT.
20TH FLOOR AREA	(FLATS & CIR.& SER.)	=	10556.29 SQ.FT.
21ST FLOOR AREA	(FLATS & CIR.& SER.)	=	10556.29 SQ.FT.
22ND FLOOR AREA	(FLATS & CIR.& SER.)	=	10556.29 SQ.FT.
23RD FLOOR AREA	(FLATS & CIR.& SER.)	=	10556.29 SQ.FT.
24TH FLOOR AREA	(FLATS & CIR.& SER.)	=	10556.29 SQ.FT.
25TH FLOOR AREA	(FLATS & CIR.& SER.)	=	10556.29 SQ.FT.
26TH FLOOR AREA	(FLATS & CIR.& SER.)	=	10556.29 SQ.FT.
27TH FLOOR AREA	(FLATS & CIR.& SER.)	=	10556.29 SQ.FT.
28TH FLOOR AREA	(FLATS & CIR.& SER.)	=	10556.29 SQ.FT.
29TH FLOOR AREA	(FLATS & CIR.& SER.)	=	10556.29 SQ.FT.
30TH FLOOR AREA	(FLATS & CIR.& SER.)	=	10556.29 SQ.FT.
31ST FLOOR AREA	(FLATS & CIR.& SER.)	=	10556.29 SQ.FT.
32ND FLOOR AREA	(FLATS & CIR.& SER.)	=	10556.29 SQ.FT.
33RD FLOOR AREA	(FLATS & CIR.& SER.)	=	10556.29 SQ.FT.
34TH FLOOR AREA	(FLATS & CIR.& SER.)	=	10556.29 SQ.FT.
35TH FLOOR AREA	(FLATS & CIR.& SER.)	=	10556.29 SQ.FT.
36TH FLOOR AREA	(FLATS & CIR.& SER.)	=	10556.29 SQ.FT.
37TH FLOOR AREA	(FLATS & CIR.& SER.)	=	10556.29 SQ.FT.
38TH FLOOR AREA	(FLATS & CIR.& SER.)	=	10556.29 SQ.FT.
39TH FLOOR AREA	(FLATS & CIR.& SER.)	=	10556.29 SQ.FT.
40TH FLOOR AREA	(FLATS & CIR.& SER.)	=	10556.29 SQ.FT.
41ST FLOOR AREA	(FLATS & CIR.& SER.)	=	10556.29 SQ.FT.
42ND FLOOR AREA	(FLATS & CIR.& SER.)	=	10556.29 SQ.FT.
43RD FLOOR AREA	(FLATS & CIR.& SER.)	=	10556.29 SQ.FT.
44TH FLOOR AREA	(FLATS & CIR.& SER.)	=	10556.29 SQ.FT.
45TH FLOOR AREA	(FLATS & CIR.& SER.)	=	10556.29 SQ.FT.
46TH FLOOR AREA	(FLATS & CIR.& SER.)	=	10556.29 SQ.FT.
ROOF AREA	(ROOF SERVICES)	=	1674.20 SQ.FT.
TOTAL		=	616259.64 SQ.FT.
DEDUCTION AREA			
LESS U.G.W.TANK	(ON BASEMENT-02)	=	1871.94 SQ.FT.
LESS PARKING	(ON BASEMENT-01)	=	16549.50 SQ.FT.
LESS AIRRAID SHELTER	(ON BASEMENT-01)	=	4306.90 SQ.FT.
LESS PARKING	(ON GROUND FLOOR)	=	10721.69 SQ.FT.
LESS PARKING	(ON 1ST FLOOR)	=	16429.24 SQ.FT.
LESS PARKING	(ON 2ND FLOOR)	=	16429.24 SQ.FT.
LESS PARKING	(ON 3RD. FLOOR)	=	16429.24 SQ.FT.
LESS PARKING	(ON 4TH. TO 10TH. FLOOR) (16429.24 X 07)	=	115004.68 SQ.FT.
LESS RECREATION	(3% ALLOWABLE)	=	23915.52 SQ.FT.
LESS CIRCULATION	(PROPOSED)	=	94008.85 SQ.FT.
LESS ROOF SERVICES	(ON ROOF)	=	1674.20 SQ.FT.
TOTAL		=	317341.00 SQ.FT.
DEDUCTION AREA			
616259.64 - 317341.00			
GRAND TOTAL		=	298918.64 SQ.FT.

PARKING SCHEDULE

COV. AREA OF SHOP	=	157.03 SQ.FT
157.03 / 800	=	0.19 CARS
COV. AREA OF FLATS	=	298761.61 SQ.FT
298761.61 / 1000	=	298.76 CARS
0.19 + 298.76 = 298.95	=	299 CARS
DUE TO HIGH DENSITY BYELAWS 25 % EXTRA PARKING AS PER BYELAWS REQUIREMENT		
299 X 25 / 100 = 74.75	=	75 CARS
299 + 75	=	374 CARS
DISABLE PARKING 374 / 50 = 7.48 = (INCLUDED IN 374 CARS)		08 CARS
REQUIRED MOTOR CYCLE PARKING		
374 / 100 X 16 = 59.84	=	60 CARS
374 - 60	=	314 CARS
REQ. CARS	=	314 CARS
REQ. MOTOR CYCLES (60X 6)	=	360 M.C.S
PROVIDED CARS		
32+19+ (28 X 10)	=	331 CARS
PROVIDED M.C.S		
34+ (31 X 11)	=	375 M.C.S

SUB-STATION

SB1	= 30'-8" X 24'-0"	=	735.84 SQ.FT.
TOTAL		=	735.84 SQ.FT.

BUILDING AREA	=	4146.24 SQ.FT.
SHOPS AREA	=	157.03 SQ.FT.
PARKING AREA	=	10721.69 SQ.FT.
CIR.& SER. AREA	=	947.35 SQ.FT.
SUB-STATION AREA	=	735.84 SQ.FT.
TOTAL	=	16708.15 SQ.FT.

DETAIL OF 1ST & 2ND. FLOOR (EACH FLOOR)

BUILDING			
B1	= 60'-0" X 49'-6"	=	2970.00 SQ.FT.
B2	= 4'-6" X 61'-6"	=	276.75 SQ.FT.
B3	= 55'-4" X 7'-10"	=	433.23 SQ.FT.
B4	= 7'-4" X 11'-8"	=	85.46 SQ.FT.
B5	= 2'-4" X 13'-8"	=	31.82 SQ.FT.
B6	= 3'-11" X 5'-11"	=	23.10 SQ.FT.
B7	= 3'-11" X 3'-11"	/2 =	7.64 SQ.FT.
B8	= 3'-11" X 3'-10"	/2 =	7.48 SQ.FT.
TOTAL		=	3835.48 SQ.FT.
PARKING :			
P1	= 110'-4" X 148'-11"	=	16429.24 SQ.FT.
TOTAL		=	16429.24 SQ.FT.

BUILDING AREA	=	3835.48 SQ.FT.
PARKING AREA	=	16158.11 SQ.FT.
TOTAL	=	19993.59 SQ.FT.

DETAIL OF 3RD. FLOOR

PARKING :			
P1	= 110'-4" X 148'-11"	=	16429.24 SQ.FT.
TOTAL		=	16429.24 SQ.FT.
BUILDING			
B1	= 64'-0" X 32'-10"	=	2101.12 SQ.FT.
TOTAL		=	2101.12 SQ.FT.

PARKING AREA	=	16429.24 SQ.FT.
BUILDING AREA	=	2101.12 SQ.FT.
TOTAL	=	18530.36 SQ.FT.

DETAIL OF 4TH. TO 10TH. FLOOR (EACH FLOOR)

PARKING :			
P1	= 110'-4" X 148'-11"	=	16429.24 SQ.FT.
TOTAL		=	16429.24 SQ.FT.

DETAIL OF 11TH. & 12TH. FLOOR (EACH FLOOR)

RECREATION			
R1	= 80'-4" X 149'-0"	=	11969.17 SQ.FT.
TOTAL		=	11969.17 SQ.FT.

SUMMARY OF RECREATION

FLOORS	TOTAL AREA
11TH. FLOOR	11969.17 SQ.FT.
12TH. FLOOR	11969.17 SQ.FT.
TOTAL	23938.34 SQ.FT.

DETAIL OF INDIVIDUAL & CIRCULATION

TYPE-A :			
A	= 40'-2" X 36'-0"	=	1445.76 SQ.FT.
B	= 22'-4" X 14'-10"	=	331.15 SQ.FT.
C	= 16'-4" X 5'-5"	=	89.81 SQ.FT.
D	= 6'-0" X 8'-3"	=	49.98 SQ.FT.
E	= 25'-2" X 2'-0"	=	50.32 SQ.FT.
TOTAL		=	1967.02 SQ.FT.
CIRCULATION :			
C1	= 59'-8" X 32'-3"	=	1924.03 SQ.FT.
C2	= 23'-8" X 8'-3" X2	=	390.39 SQ.FT.
C3	= 6'-0" X 12'-0" X4	=	288.00 SQ.FT.
C4	= 4'-8" X 18'-5"	=	85.79 SQ.FT.
TOTAL		=	2688.21 SQ.FT.

SUMMARY OF 13TH. TO 46TH. FLOOR (EACH FLOOR)

TYPE	NET AREA	NOS.	TOTAL AREA
TYPE-A	1967.02 SQ.FT.	04	7868.08 SQ.FT.
CIRCULATION	2688.21 SQ.FT.	--	2688.21 SQ.FT.
TOTAL		04 UNITS	10556.29 SQ.FT.

DETAIL OF ROOF PLAN

ROOF SERVICES :			
RS1	= 12'-0" X 32'-11" X2	=	789.84 SQ.FT.
RS2	= 19'-0" X 11'-6" X2	=	437.00 SQ.FT.
RS3	= 11'-9" X 8'-6" X2	=	199.75 SQ.FT.
RS4	= 14'-6" X 11'-2"	=	161.82 SQ.FT.
RS5	= 4'-8" X 18'-5"	=	85.79 SQ.FT.
TOTAL		=	1674.20 SQ.FT.

SUMMARY OF CIRCULATION

FLOORS	TOTAL AREA
BASEMENT-2	659.19 SQ.FT.
BASEMENT-1	1003.17 SQ.FT.
GROUND FLOOR	947.35 SQ.FT.
13TH. TO 46TH. FLOOR (2688.21 X 34)	91399.14 SQ.FT.
TOTAL	94008.85 SQ.FT.

SCHEDULE OF AREA

TOTAL PLOT AREA	= 4152.00	SQ.YDS
OR	= 37368.00	SQ.FT.

ITEM	ALLOWABLE	PROPOSED
RATIO = 1: 8	298944.00 SQ.FT.	298918.64 SQ.FT.
FOOR PRINT TYP. (40%)	14947.20 SQ.FT.	10556.29 SQ.FT. (FLATS & CIR.& SER.)
RECREATION (8%)	23915.52 SQ.FT.	(23915.52 + 22.82) 23938.34 SQ.FT. (22.82 IN F.A.R)
CIRCULATION 40%	119577.60 SQ.FT.	94008.85 SQ.FT. (PROPOSED)

DETAIL OF BASEMENT-02 PLAN

HABITUAL SPACE			
H1	= 54'-0" X 25'-0"	=	1350.00 SQ.FT.
H2	= 73'-0" X 32'-8"	=	2384.18 SQ.FT.
H3	= 31'-3" X 87'-1"	=	2721.25 SQ.FT.
H4	= 73'-9" X 6'-11"	=	509.61 SQ.FT.
H5	= 43'-11" X 21'-6"	=	944.06 SQ.FT.
TOTAL		=	7909.10 SQ.FT.
CIRCULATION			
C1	= 30'-8" X 21'-6"	=	659.19 SQ.FT.
TOTAL		=	659.19 SQ.FT.
U.G.W.TANK			
UG1	= 24'-8" X 75'-11"	=	1871.94 SQ.FT.
TOTAL		=	1871.94 SQ.FT.

HABITUAL SPACE	=	7909.10 SQ.FT.
CIRCULATION	=	659.19 SQ.FT.
U.G.W.TANK	=	1871.94 SQ.FT.
TOTAL	=	10440.23 SQ.FT.

DETAIL OF BASEMENT-01 PLAN

PARKING			
P1	= 110'-4" X 150'-0"	=	16549.50 SQ.FT.
TOTAL		=	16549.50 SQ.FT.
AIR RAID SHELTER			
ARS1	= 110'-4" X 15'-0"	=	1654.95 SQ.FT.
ARS2	= 28'-6" X 47'-1"	=	1341.78 SQ.FT.
ARS3	= 37'-0" X 35'-5"	=	1310.17 SQ.FT.
TOTAL		=	4306.90 SQ.FT.
HABITUAL SPACE			
H1	= 54'-0" X 25'-0"	=	1350.00 SQ.FT.
H2	= 73'-0" X 32'-8"	=	2384.18 SQ.FT.
H3	= 31'-3" X 87'-1"	=	2721.25 SQ.FT.
H4	= 73'-9" X 6'-11"	=	509.61 SQ.FT.
H5	= 43'-1" X 21'-6"	=	926.22 SQ.FT.
H6	= 22'-7" X 48'-0"	=	1083.84 SQ.FT.
H7	= 9'-0" X 25'-4"	=	227.97 SQ.FT.
TOTAL		=	9203.07 SQ.FT.
CIRCULATION			
C1	= 30'-8" X 21'-6"	=	659.19 SQ.FT.
C2	= 13'-7" X 25'-4"	=	343.98 SQ.FT.
TOTAL		=	1003.17 SQ.FT.

PARKING AREA	=	16549.50 SQ.FT.
AIR RAID SHELTER	=	4306.90 SQ.FT.
HABITUAL SPACE	=	9203.07 SQ.FT.
CIRCULATION	=	1003.17 SQ.FT.
TOTAL	=	31062.64 SQ.FT.

DETAIL OF GROUND FLOOR

BUILDING			
B1	= 64'-10" X 25'-11"	=	1679.74 SQ.FT.
B2	= 64'-10" X 13'-8"	=	885.57 SQ.FT.
B3	= 64'-10" X 9'-11"	=	642.46 SQ.FT.
B4	= 19'-11" X 19'-4"	=	384.86 SQ.FT.
B5	= 17'-9" X 7'-9"	=	137.56 SQ.FT.
B6	= 7'-4" X 11'-11"	=	87.30 SQ.FT.
B7	= 17'-9" X 7'-7"	=	134.54 SQ.FT.
B8	= 12'-5" X 4'-10"	=	59.16 SQ.FT.
B9	= 7'-5" X 3'-9"	=	27.18 SQ.FT.
B10	= 7'-3" X 2'-11"	=	21.09 SQ.FT.
B11	= 4'-3" X 2'-0"	=	8.50 SQ.FT.
B12	= 2'-11" X 2'-11"	=	8.46 SQ.FT.
B13	= 2'-11" X 2'-11"	=	8.46 SQ.FT.
B14	= 6'-3" X 5'-11"	=	36.93 SQ.FT.
B15	= 6'-3" X 3'-11" X2/2	=	24.43 SQ.FT.
TOTAL		=	4146.24 SQ.FT.
SHOPS.			
SH1	= 10'-10" X 14'-6"	=	157.03 SQ.FT.
TOTAL		=	157.03 SQ.FT.
PARKING			
P1	= 27'-0" X 115'-5"	=	3116.07 SQ.FT.
P2	= 15'-10" X 137'-0"	=	2168.71 SQ.FT.
P3	= 10'-10" X 100'-11"	=	1092.85 SQ.FT.
P4	= 10'-10" X 99'-7"	=	1078.45 SQ.FT.
P5	= 15'-10" X 115'-5"	=	1826.94 SQ.FT.
P6	= 48'-10" X 21'-7"	=	1053.75 SQ.FT.
P7	= 15'-8" X 24'-7"	=	384.92 SQ.FT.
TOTAL		=	10721.69 SQ.FT.
CIR.& SER.			
C1	= 64'-8" X 12'-0"	=	775.92 SQ.FT.
C2	= 10'-10" X 15'-10"	=	171.43 SQ.FT.
TOTAL		=	947.35 SQ.FT.

OFFICIAL COPY OF CONSTRUCTION PERMIT FOR SITE

ADDRESS:

PROPOSED BUILDING PLAN ON OF PLOT NO.13, C.L.-7 ,
CIVIL LINES, QUARTER ELPHISTONE, STREET
KARACHI.

OWNER/ATTORNY :

LIC. ENGINEER

RAMEEZ ELLY
Civil, Structural & Env.
Regd. Lic.# 9321
Engineering Council

LIC.ARCHITECT

SYED JUNAID IQBAL
ARCHITECT
LICENSE # AL-01-791
Sindh Building Control Authority

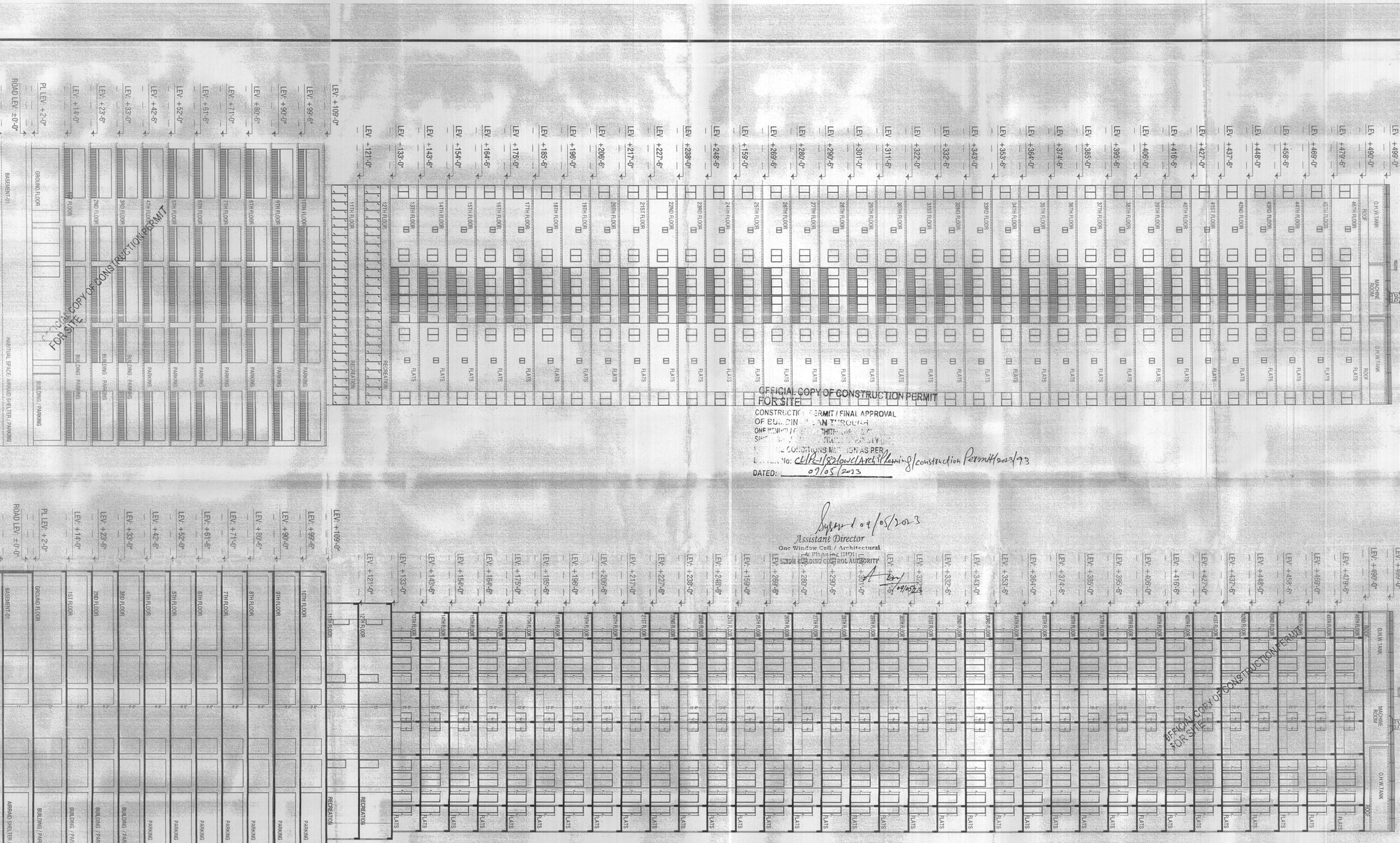
NORTH:

SCALE: 1/16"=1'-0"

DRAWN BY: S-R

DRG NO # A- 04 / 05

FRONT ELEVATION



OFFICIAL COPY OF CONSTRUCTION PERMIT FOR SITE

CONSTRUCTION PERMIT / FINAL APPROVAL OF BUILDING PLAN THROUGH ONE WINDOW CELL / ARCHITECTURAL & PLANNING (WOP) SINDH BUILDING CONTROL AUTHORITY

CONDITIONS MENTIONED AS PER Letter No: CL/R-1/32/owc/Arch/Planning/Construction Permit/2023/93

DATED: 09/05/2023

09/05/2023

Assistant Director
One Window Cell / Architectural
& Planning (WOP)
SINDH BUILDING CONTROL AUTHORITY

SECTION AT X-X



BLOCK PLAN OF ROOF SERVICES



ADDRESS: PROPOSED BUILDING PLAN ON OF PLOT NO.13, C.L.-7 , CIVIL LINES, QUARTER ELPHISTONE, STREET KARACHI.	OWNER/ATTORNY :	LIC. ENGINEER RAMEEZ BILW CSA: Structure-2288 KIA/LIE/S/P-36140-A CSE LIC No: 6128	LIC.ARCHITECT SYED JUNAID IQBAL ARCHITECT LICENSE # AL-01-791 Sindh Building Control Authority	NORTH: N E S W	SCALE: 1/16"=1'-0" DRAWN BY: S-R DRG NO # A- 05 / 05

Annex – IV: Environmental Monitoring Report

Quality TESTING SERVICES

EPA Certified Lab
EPA/LAB/Certificate/QTS-11/2013

BUREAU VERITAS Certification

QMS/III/018 WA	
Revision : 03	Date 14.01.2021

Lab Report Ref. No.: QTS/LK/26/5168 Reporting Date: 17/03/2026

Report to: **L.K Builders & Developers (Metro Address Residential Cum Commercial Building project.)**

SAMPLE DESCRIPTION

Sample ID: Drinking water
Sample Type: Grab Sample
Sample Collected/Submitted by: QTS Representative
Sampling Date: 10/03/2026
Sample Receipt at QTS - Date: 10/03/2026

ANALYTICAL TEST REPORT

S. NO.	PARAMETERS	STANDARDS SSDWQ - LIMITS	LDL	UNITS	RESULTS	TEST METHOD
1	pH value	6.5 – 8.5	0.01	SU	7.55	USEPA 150.1
2	Odour	Non Objectionable / Acceptable	-	Physical	Acceptable	Physical
3	Taste	Non Objectionable / Acceptable	-	Physical	Acceptable	Physical
4	Color	≤ 15	1.0	TCU	01	APHA-2020 B/C
5	Turbidity	< 5	0.01	NTU	0.21	APHA-2130 B
6	Total Dissolved Solids(TDS)	< 1000	1.0	mg/L	452	Hach 8160
7	Total Hardness as $CaCO_3$	< 500	0.1	mg/L	180	EDTA Titration.Hach-8213
8	Fluoride(as F^-)	≤ 1.5	0.01	mg/L	0.071	USEPA 340.1
9	Chloride(as Cl^-)	< 250	0.1	mg/L	140	Hach 8206
10	Nitrate (NO_3)	≤ 0.50	0.01	mg/L	0.15	Hach -8039
11	Nitrite (NO_2)	≤ 3	0.001	mg/L	0.051	Hach - 8153
12	Cyanide(as CN-)total	≤ 0.05	0.001	mg/L	BDL	Hach 8027
13	Phenolic Compound as (Phenols)	< 0.002	0.001	mg/L	BDL	USEPA-420.1
14	Aluminum (Al)	≤ 0.2	0.001	mg/L	BDL	APHA-3111 D
15	Antimony (Sb)	≤ 0.005	0.001	mg/L	BDL	APHA-3111 B
16	Arsenic	≤ 0.05	0.01	mg/L	BDL	APHA-3120 B
17	Cadmium	0.01	0.001	mg/L	BDL	ASTM D-3557
18	Chromium , Total	≤ 0.05	0.01	mg/L	BDL	ASTM D-1687
19	Copper	2	0.01	mg/L	BDL	Hach 8506
20	Lead	≤ 0.05	0.001	mg/L	BDL	ASTM D-3559
21	Mercury	≤ 0.001	0.001	mg/L	BDL	ASTM D-3263
26	Selenium	0.01	0.001	mg/L	BDL	ASTM D-3859
23	Nickel	≤ 0.02	0.01	mg/L	BDL	ASTM D-1886
24	Boron	0.3	0.01	mg/L	BDL	ASTM D-3082
25	Zinc	5.0	0.01	mg/L	0.081	USEPA 3500 Zn B
26	Manganese	≤ 0.5	0.01	mg/L	BDL	Hach 8034
27	Barium	0.7	0.01	mg/L	BDL	Hach 8014
MICROBIOLOGICAL ANALYSIS REPORT						
28	Total Coliform	0cfu/100ml		cfu	Nil	APHA-SM9261B
29	Fecal Coliform	0cfu/100ml		cfu	Nil	APHA-SM9261F
30	Escherichia Coli(E-Coli)	0cfu/100ml		cfu	Nil	APHA-SM9261F

SSDWQ=Sindh Standard for Drinking Water Quality
USEPA=United State Environmental Protection Agency method
Hach USA, method
BDL=Below Detection Limit

Term & Condition:

- This report is not valid for any negotiations
- Report is valid for current batch(sample)
- The remaining portion of the sample will be discarded after 07 days unless otherwise instructed
- This report is intended only for your guidance & not for legal purpose or for advertisement.

Comments:

Test parameters are within the SSDWQ limit.

Sample Analyzed by: Afaq Ahmed

Signature of Laboratory In charge: _____

Name : Haseeb Arshad

Quality Testing Services Karachi Q.T.S

Quality TESTING SERVICES

EPA Certified Lab
EPA/LAB/Certificate/QTS-11/2013

QMS/III/018 WA	
Revision : 03	Date 14.01.2021

Ambient Air Quality Test Report

Client Name:	L.K Builders & Developers	Test Report No	QTS/LK/26/5169
Project Name:	Metro Address Residential Cum Commercial Building project.	Sampling Duration	24hrs.
Sampling Description	Ambient Air	Site Location:	24°50'42.12"N 67° 2'11.33"E

SEQS-PARAMETERS								
Date	Time	NO ($\mu g/m^3$)	NO_2 ($\mu g/m^3$)	SO_2 ($\mu g/m^3$)	PM 10 ($\mu g/m^3$)	PM 2.5 ($\mu g/m^3$)	SPM ($\mu g/m^3$)	Lead (µg/m3)
10.03.2026	10:00	16.4	22.7	8.2	93.3	56.7	287.3	BDL
	11:00	16.8	22.6	8.8	93.9	56.8	287.7	
	12:00	17.2	23.8	9.1	94.2	57.0	288.0	
	13:00	17.7	23.9	9.4	94.4	57.3	289.1	
	14:00	18.0	24.0	9.7	94.8	57.4	289.4	
	15:00	18.1	24.3	9.9	95.1	57.9	289.6	
	16:00	18.3	24.4	10.1	95.5	60.1	289.9	
	17:00	18.6	24.7	10.3	95.8	60.3	290.2	
	18:00	19.0	24.9	10.6	96.1	60.8	290.3	
	19:00	19.3	25.0	10.8	96.5	61.0	290.3	
	20:00	19.4	25.2	10.9	97.2	61.2	290.6	
	21:00	19.8	25.5	11.1	103.1	61.4	290.9	
	22:00	20.0	25.7	11.4	103.8	61.6	291.1	
	23:00	20.2	25.8	11.7	104.2	61.8	291.3	
11.03.2026	00:00	19.9	25.9	11.9	105.5	61.9	291.6	
	01:00	19.8	26.0	12.0	107.3	70.2	291.8	
	02:00	19.6	26.4	12.2	108.8	69.3	292.0	
	03:00	19.5	26.7	12.3	109.2	69.1	293.3	
	04:00	19.2	26.8	12.6	111.4	59.4	293.5	
	05:00	18.8	26.9	12.7	113.3	59.2	293.8	
	06:00	18.9	27.1	13.1	114.4	58.8	293.9	
	07:00	18.4	26.6	12.9	112.2	57.7	194.2	
	08:00	18.3	26.3	12.7	115.2	57.4	294.4	
	09:00	18.1	25.8	12.6	112.9	56.9	294.8	
	10:00	17.9	25.5	12.3	110.4	56.6	295.4	
MIN		21.1	24.7	12.4	91	29	287	BDL
MAX		26	31.8	17.7	168	78	345	BDL
AVG		23.6	27.9	15.0	130.2	52.4	319.5	BDL
SEQS		40	80	120	150	75	500	1.5
LDL-Limits		0.0	0.0	0.0	10	2.5	1.0	-

Quality TESTING SERVICES

EPA Certified Lab
EPA/LAB/Certificate/QTS-11/2013

QMS/III/018 WA	
Revision : 03	Date 14.01.2021

Ambient Air Quality Test Report

Client Name:	**L.K Builders & Developers**	**Test Report No**	**QTS/LK/26/5169**
Project Name:	**Metro Address Residential Cum Commercial Building project.**	**Sampling Duration**	**24hrs.**
Sampling Description	**Ambient Air**	**Site Location:**	**24°50'42.12"N**
			67° 2'11.33"E

Parameter	Unit	Monitoring Duration	Average Obtained Concentration	SEQS	LDL-Limits	Methodology
Carbon Monoxide (CO)	mg/m³	08 Hours	1.13	5.0	0.0	Non Dispersive Intra Red (NDIR)
Nitrogen oxide (NO)	µg/m³	24 Hours	18.6	40.0	0.0	Chemiluminescence
Nitrogen Dioxide (NO_2)	µg/m³	24 Hours	25.2	80.0	0.0	
Sulphur Dioxide (SO_2)	µg/m³	24 Hours	11.1	120.0	0.0	Ultraviolet Fluorescence Method
Ozone (O_3)	µg/m³	01 Hour	15.8	130.0	0.0	Non Dispersive UV Absorption Method
Particulate Matter (PM_{10})	µg/m³	24 Hours	102.2	150.0	10.0	β Ray Absorption Method
Particular Matter ($PM_{2.5}$)	µg/m³	24 Hours	60.5	75.0	2.5	
Suspended Particulate Matter (SPM)	µg/m³	24 Hours	284.2	500.0	1.0	
Lead (Pb)	µg/m³	24 Hours	BDL	1.5	-	ASS Method

*SEQS= Sindh Environmental Quality Standards.
(24 Hours Standard for all the parameters Except O3 and CO),
µg/m3= Micrograms per Cubic Meter
,mg/m3= Milligrams per Cubic Meter
ND= Not Detected
LDL=Least Detection Limit

Remarks: The Tested Parameters are within SEQS Limits for Ambient Air Quality.

Sample Analyzed By: Hassan Ali	**Signature of Laboratory Incharge:** _____ **Name : Haseeb Arshad**

Quality Testing Services Karachi Q.T.S

Quality TESTING SERVICES

EPA Certified Lab
EPA/LAB/Certificate/QTS-11/2013

QMS/III/018 WA	
Revision : 03	Date 14.01.2021

Lab Report Ref. No.: QTS/LK/26/5170 Reporting Date: 17/03/2026

Report to: **L.K Builders & Developers (Metro Address Residential Cum Commercial Building project.)**

SAMPLE DESCRIPTION

Sample ID: Noise Level Test
Sample Description: Ambient *Noise*
Sample Collected/Submitted by: QTS representative
Sampling Date: 10/03/2026
Sample Receipt at QTS - Date: 10/03/2026

AMBIENT NOISE LEVEL

S.NO.	LOCATION/SOURCE	*SEQS Limits : 65dB(A) *Leq		
		Noise Level Readings		
		Minimum	Maximum	Average
1	Left Corner Front side of The Project Area	58.6	59.3	58.9
2	Right Corner Front side of The Project Area	60.1	60.8	60.4
3	Left Corner Back side of The Project Area	59.2	60.1	59.6
4	Right Corner Back side of The Project Area	62.4	62.7	62.5

***SEQS= Sindh Environmental Quality Standard for Category of Area / Zone -2 Commercial Area. (B).**
***dB (A) Leq: Time weighted average of the level of sound in decibel on scale which is relatable to human hearing.**

Terms & Conditions:

- This report is not valid for any negotiations
- Report is valid for current batch(sample)
- This report is intended only for your guidance & not for legal purpose or for advertisement.

Comments:

The Tested Ambient Noise Level Value within SEQS Limits as per describe in SEQS.

Sample Analyzed by: Hassan Ali	**Signature of Laboratory In charge:** **Name : Haseeb Arshad**

Quality Testing Services Karachi Q.T.S

Annex – V: Soil Investigation Report

MR. SARFARAZ KHAMISANI

SUBSOIL INVESTIGATION FOR BUILDING ON PLOT NO. 13 CL-7, CIVIL LINE QUARTERS DISTRICT SOUTH, KARACHI - REVISED REPORT

ORIGINAL REPORT: **MAY, 2023**

REVISED REPORT: **FEBRUARY, 2025**

GEOTECHNICAL SERVICES

Civil & Geotechnical Engineers
Testing Laboratory

52/3, Darul Aman Society, Haider Ali Road,
Off Shaheed-e-Millat Road, Karachi.
Tele: (9221) 34532851 – 34535607
Email: info@geotechnicalservices.com.pk

SUBSOIL INVESTIGATION
FOR BUILDING ON
PLOT # 13, CL-7, CIVIL LINE QUARTERS
DISTRICT SOUTH, KARACHI
REVISED REPORT

CONTENTS

S.No.	Item		Page
1.	INTRODUCTION		01
2.	PROGRAM OF INVESTIGATION		02
3.	SUBSURFACE CHARACTERISTICS		04
4.	FOUNDATION RECOMMENDATIONS		08
	4.1	General	08
	4.2	Foundation Type	08
	4.3	Allowable Bearing Capacity for Raft Foundation	09
	4.4	Pile Load Test	10
	4.5	General Notes on Pile Foundation	10
	4.6	Dewatering	10
	4.7	Stability of Excavation	11
	4.8	Earth Pressure Parameters	11
	4.9	Seismic Coefficients	12
	4.10	Cement Type	12
	DEWATERING PLAN		

APPENDIX

SUBSOIL INVESTIGATION
FOR BUILDING ON
PLOT # 13, CL-7, CIVIL LINE QUARTERS
DISTRICT SOUTH, KARACHI
REVISED REPORT

1. INTRODUCTION:

Mr. Sarfaraz Khamisani has planned to construct a building on Plot # 13, CL-7, Civil Line Quarters, District South, Karachi. The project shall comprise of basement plus ground plus 47 storeys.

Initially, geotechnical investigation was undertaken in June-July, 2022 under different owner (Mr. Shunaid Qureshi). Later on, two additional boreholes were also drilled in May, 2023. However, during the last 2-3 years construction did not proceed. Now, it has been decided to commence the construction with revised planning of B+G+47 storeys. The report was prepared in February, 2025. Revised foundation design will envisage ***'piled raft'***.

M/s Top Engineering are providing consultancy services for the project.

The program of investigation comprised drilling ten boreholes varying in depth from 60.0-100.0 feet. Two additional boreholes each 125.0 feet deep were also drilled at the site.

In order to ascertain the degree of compactness/consistency of substrata, standard penetration tests (SPTs) were performed at various depth horizons. Moreover, core samples were extracted using double tube core barrel.

Selected soil and water samples were sent to the laboratory of 'Geotechnical Services', Karachi, for the evaluation of geo-engineering characteristics.

This report presents a review of subsoil investigation performed at the project site. The field and laboratory data has been analysed for the evaluation of allowable bearing pressure. The recommendations regarding the type and bearing capacity of foundation are incorporated in the report. The foundation design shall envisage piled raft.

2. PROGRAM OF INVESTIGATION:

Field Investigation:

The program of subsurface investigation at the project site consisted of executing ten boreholes, varying in depth from 60.0-100.0 feet. Two additional boreholes each 125 feet deep were also drilled at the site. The boring was accomplished by rotary method.

Following is the break-up of borehole depths:

Boring No.	Investigated Depth (feet)
BH-1	100.0
BH-2	60.0
BH-3	100.0
BH-4	60.0
BH-5	100.0
BH-6	60.0
BH-7	100.0
BH-8	60.0
BH-9	100.0
BH-10	100.0
ABH-1	125.0
ABH-2	125.0

The locations of boreholes are shown in borehole location plan appended to this report

Standard penetration tests (SPTs) were performed at various depth horizons. This test was performed in accordance with ASTM Designation D-1586.This test gives an indication of the degree of compactness/consistency of granular/cohesive substrata. The N-values are shown on borelogs appended to this report.

Disturbed samples were obtained through split spoon sampler used in the standard penetration tests. These samples were carefully examined to identify the soil types at various depths. The samples were placed in plastic containers, marked with borehole number, depth and subsequently, dispatched to the laboratory.

Core drilling was carried out using double tube core barrel in conjunction with tungsten carbide bit. After each run of the core barrel, percent core recovery and rock quality designation (RQD) were determined. The cores were stored in wooden core boxes. Wooden markers indicating depth and run numbers were inserted between each core run. The core boxes were, then, transported to the laboratory for testing. Some of the cores were sealed with molten wax and treated as undisturbed samples.

Laboratory Testing:

In order to arrive at a rational evaluation of the geotechnical properties of substrata encountered at the site, a comprehensive program of laboratory testing was undertaken in the laboratory of Geotechnical Services. The tests were performed to determine classification, strength, compressibility and chemical characteristics. The testing was generally performed, in accordance with relevant American Society for Testing and Materials (ASTM) standards.

Following physical and chemical tests were performed on representative soil and water samples:

- Grain size analysis
- Atterberg limits
- Moisture content
- Bulk density
- Unconfined compression
- Total salts
- Sulphate content
- Chloride content
- pH value

The results of laboratory tests are appended to this report.

Observations were regularly made in boreholes to determine the position of ground water table. The position of water table is indicated on the borelogs.

Dr. Pichai Taechakumthorn
D.E. (Civil), M.Eng, AIT, Bangkok
ผช.ศ.ระดับ 9 ว/2517 Consult/332

3. SUBSURFACE CHARACTERISTICS:

Borehole BH-1 to Borehole BH-5

Subsurface investigation (except BH-2 & BH-4) has revealed that top 2.0-4.0 feet consist of fill material. Beneath the fill, the substrata comprise of medium to very dense, fine to coarse SAND and very dense, sandy GRAVEL upto 12.0-15.0 feet depth. This is underlain by hard, clayey SILT and soft to medium hard, SILTSTONE deposits that continue upto the investigated depth of 100.0 feet.

A study of boreholes (BH-2 & BH-4) show that top 16.0-20.0 feet consist of very dense, sandy GRAVEL and hard, CONGLOMERATE/ SANDSTONE deposits. This is underlain by medium hard, SANDSTONE deposits upto 45.0 feet depth. This is followed by medium hard, SILTSTONE deposits that continue upto the investigated depth of 100.0 feet.

Major subsurface deposits can be described as follows:

- Brown, medium dense, fine to coarse SAND
- Brown, dense to very dense, clayey fine to coarse SAND
- Brown, very dense, sandy GRAVEL
- Brown, hard, coarse grained CONGLOMERATE/SANDSTONE
- Gray to Brown, medium hard, SANDSTONE
- Brown, hard, clayey SILT / soft SILTSTONE
- Brown to Gray, medium hard, SILTSTONE with interlayers of sand

The exact sequence of occurrence of these deposits is shown on boreholes appended to this report.

Borehole BH-6 to Borehole BH-7

Subsurface investigation has revealed that top 20.0-25.0 feet consist of very dense, sandy CLAY / clayey SAND, hard, CONGLOMERATE, very stiff to hard, clayey SILT, and very dense, silty SAND / sandy SILT. Beneath this deposit, the substrata comprise of friable to hard, SANDSTONE, and medium hard, SILTSTONE deposits that continue upto the investigated depth of 100.0 feet.

***It must be noted that top 3.0 feet of BH-6 & BH-7 consist of fill material comprising sandy gravel / gravelly sand, trace clayey silt, trace boulder pieces**

Major subsurface deposits can be described as follows:

- Brown, very dense, sandy CLAY / clayey SAND with gravel
- Brown, hard, CONGLOMERATE
- Brown / Brownish gray, hard, clayey SILT with interlayers of sand
- Brownish gray / gray / Brown, friable to hard, SANDSTONE
- Brownish gray / Gray, medium hard, SILTSTONE with interlayers of sand

The exact sequence of occurrence of these deposits is shown on boreholes appended to this report.

Additional Borehole ABH-1 & ABH-2

Subsoil investigation has revealed that top substrata consist of medium dense, sandy GRAVEL/ gravelly SAND and clayey SAND/ sandy CLAY deposits. This is underlain by very dense, sandy GRAVEL deposits upto 15.0 feet depth. This is followed by medium hard SANDSTONE and medium hard, SILTSTONE deposits that continue upto the investigated depth of 125.0 feet

The principal lithological units can be classified as follows:

A. Brown, medium dense, sandy GRAVEL/ gravelly SAND

B. Brown, medium dense, clayey SAND/ sandy CLAY

C. Brown, very dense, sandy GRAVEL

D. Brown/ Gray, medium hard, SANDSTONE

E. Brown/ Gray, medium hard, SILTSTONE with interlayers of sand

The exact sequence of occurrence of these deposits is shown on borelogs appended to this report.

GROUND WATER TABLE

Ground water table is seen to vary in boreholes drilled on multiple occasions.

Position of ground water depth in boreholes across various dates is shown in the table given below:

Boring No.	Date (DD-MM-YY)	Ground Water Depth (ft)
BH-1	15.06.22	19.00
BH-2	15.06.22	19.00
BH-3	17.06.22	19.00
BH-4	17.06.22	18.83
BH-5	18.06.22	18.91
BH-6	20.06.22	19.50
BH-7	21.06.22	19.50
BH-8	22.06.22	17.00
BH-9	25.06.22	16.67
BH-10	27.06.22	17.33
ABH-1	08.05.23	11.00
ABH-2	12.05.23	11.50

4. FOUNDATION RECOMMENDATIONS:

4.1 General:

The foundation of a structure is considered safe if it satisfies the following conditions:

a) The foundation must be adequately safe against the possibility of shear failure.

b) It must not undergo excessive differential settlement.

Calculations have been made to check allowable soil pressure for both the shear and settlement criteria.

Keeping in view the stratigraphy of the area and field and laboratory test results, the allowable pressures have been computed.

4.2 Foundation Type:

The selection of foundation type depends upon the subsoil conditions, type of structure, and structural loads.

According to the information furnished by the Consultant, the proposed building will have basement whose base will be at about 15.0 feet below adjacent front road level. Taking into account the subsoil conditions and anticipated structural loads, it is proposed that structure be supported on **pile-raft foundation** with the raft placed at 15.0 feet depth below front road level.

4.3 Allowable Bearing Capacity for Raft Foundation:

Field and laboratory data have been analyzed for the estimation of allowable bearing pressure.

Allowable (gross) bearing capacity of **raft foundation** (with basement) placed at **15.0 feet** depth below front road level should be adopted as **2.00 tons/ft^2**.

Modulus of subgrade reaction (k_s) at 15.0 ft depth may be adopted as 80 kcf.
Before placing foundation concrete the excavations should be carefully inspected to ensure that competent bearing stratum has been reached. This precaution is necessary to guard against localized fills and inhomogenities.

Pile Foundation:

Table 4.1 presents allowable capacity for 30, 36 & 40 inches diameter pile for 85.0 & 95.0 feet lengths. These capacities are valid for vertical axial loads in compression:

TABLE 4.1

ALLOWABLE CAPACITY OF PILE

Pile Cut-off Level = -15.0 feet

Pile Dia (in)	Total Length (ft)	*Effective Length	Allowable** Pile Capacity (Tons)
30	85	70	384
	95	80	477
36	85	70	482
	95	80	598
40	85	70	551
	95	80	683

Deformation modulus of SILTSTONE deposit at pile toe may be adopted as 3.0 MN/m^2 (9.32 tsf). (Reference Tomlinson)

Table (A) (B) & (C) at the end of chapter present spreadsheets of statically computed allowable compression capacities of 30, 36 & 40 inches diameter piles. The structural engineer may select the pile length in accordance with the structural loads.

4.4 Pile Load Test:

The statically computed compression capacity given in preceding section must be verified by conducting full scale pile load tests carried to atleast two times the working load on index pile (test pile) and 1.5 times the working load in case of works pile. The test must be conducted in accordance with ASTM D-1143.

4.5 General Notes on Pile Foundation:

1. The capacities given in Table 4.1 are for vertical axial loads in compression.

2. During piling it is absolutely necessary that the bearing stratum is properly identified. Proper borelog must be maintained for each pile. Sample of bearing strata in each pile must be carefully preserved with proper marking.

3. Before commencing concreting, the bottom of borehole should be cleansed of loosened soil, mud or any other debris.

4. Concreting should be done using a tremie pipe. During concreting it should be ensured that the bottom of tremie pipe is always submerged in concrete. The precaution is necessary to prevent 'necking' of soil.

5. The concrete should have a slump of about 150mm so that it may freely pass through the tremie pipe. If necessary, a plasticizer must be used in concrete to improve workability.

4.6 Dewatering:

Since groundwater occurs at varying depth of about 11.0-19.0 feet, the basement excavation will require some dewatering. This can be achieved by a system of well points or by submersible pumps / turbine pumps. **It must be ensured that adequate drains are available to discharge the pumped water.**

Dewatering plan is being attached herewith.

Brig. (Retd.) Rashid Ahmad
M.E. (Civil), C.Engg. (Pak), M.I.E. (Pakistan)
PEC Regn. Civil/2817 Council/862

4.7 Stability of Excavations:

During the construction of basement it will be essential to maintain the stability of excavation cuts and foundation of adjacent structures. In order to stabilize the excavation proper shoring / bracing must be provided.

It is important to note that within the plot premises, there exists an old heritage building. It will be essential to protect the foundation of this old building. Hence, it is recommended that all around the heritage building tangent piles may be provided.

Tangent piles are basically bored cast-in-place RCC piles that are installed before the start of excavation. In this method, series of piles are installed side by side forming a retaining structure. The depth of pile is taken down below the proposed excavation level so as to achieve sufficient passive pressure.

During construction stability of excavation must be carefully monitored and it must be ensured that the excavation is done in dry season.

4.8 Earth Pressure Parameters:

Following earth pressure parameters may be used for the design of retaining walls upto 15.0 feet depth.

Medium to dense, fine to coarse SAND

Unit weight	:	100 pcf
Cohesion `Cu'	:	0.00
Angle of internal friction	:	32.0 deg

Very dense, sandy GRAVEL

Unit weight	:	110 pcf
Cohesion `Cu'	:	0.00
Angle of internal friction	:	35.0 deg

4.9 Seismic Coefficients:

According to the Uniform Building Code (1997), the soil profile type falls in 'S_B' category corresponding to 'rock'.

Following table gives seismic zone, seismic zone factor, soil profile type and seismic coefficients.

Seismic zone	Zone factor 'z'	Soil profile Type	Seismic Coefficient 'Ca'	Seismic Coefficient 'Cv'
2B	0.20	'S_B'	0.20	0.20

4.10 Cement Type:

Sulphate content in ground water has been found to be negligible It is, therefore, recommended that ordinary Portland cement be used in foundation concrete.

.....

For GEOTECHNICAL SERVICES

SAIF AHMED SAEED, P.E.
B.E. (Civil), M. Engg. (AIT)
AMASCE, MIE (Pak), Consult/882

CERTIFICATE

This is to certify that I, Saif Ahmed Saeed, am submitting the soil investigation report for building on Plot No. 13, CL-7, Civil Line Quarters, District South, Karachi, which has been carried out under my guidance and supervision. The recommended bearing capacity is given on page 9 and summarized below:

ALLOWABLE CAPACITY OF PILE
Pile Cut-off Level = -15.0 feet

Pile Dia (in)	Total Length (ft)	*Effective Length	Allowable** Pile Capacity (Tons)
30	85	70	384
	95	80	477
36	85	70	482
	95	80	598
40	85	70	551
	95	80	683

I certify that following conditions have been observed while performing the entire soil investigation:

1. I was present at site from 15.06.22 to 28.06.22 & 08.05.23 to 14.05.23 when field work of the subsoil investigation was in progress on above site.
2. The representative of subsoil testing laboratory Mr. Abdul Rauf / Umer Nazim were present at site to obtain the soil samples for laboratory testing purposes.
3. Books and references considered while giving the final recommendations are listed in the appendix of the report.
4. The borelog results are in conformity with and correlated to laboratory results.

SAIF AHMED SAEED
GEOTECHNICAL ENGINEER
PEC REGN No. CIV/2917

M.Engg.(Civil), M.Engg.AIT, Bangkok
PEC Regn. No. CIV/2917 Council/082

LIST OF REFERENCES

1. FOUNDATION ANALYSIS & DESIGN
   BY J.E. BOWLES

2. FOUNDATION DESIGN & CONSTRUCTION
   BY M.J. TOMLINSON

3. SOIL MECHANICS & FOUNDATIONS
   BY PUNMIA

4. SOIL MECHANICS
   BY LAMB & WHITMAN

5. FOUNDATION ENGINEERING
   BY PECK, HANSON & THORNBURN

.....

Table A

PILE CAPACITY CALCULATIONS

Project: PLOT # 13, CL-7, CIVIL LINES QUARTERS, DISTRICT SOUTH, KARACHI

2/10/2025

Ground Water Depth = 0 ft

Cut-off Level = 15 ft

Pile Dia. = 30 in

Pile Depth (ft)	Stratification	Soil Parameters				Effective Pile Length (ft)	Unit Weight (γ) (pcf)	Overburden pressures (tsf)			Ultimate Capacity			Total Allowable Capacity (tons) FOS = 2.5
		C (tsf)	Phi	Nc	Nq			P_1	P_2	P_{avg}	End Bearing (tons)	Skin Friction (tons)	Total (tons)	
5														
10														
15														
20	sandy GRAVEL	0	35	0	50	5	100	0.00	0.09	0.04	22	1	23	9
25	SANDSTONE/ SILTSTONE	2	0	9	0	10	100	0.09	0.18	0.13	88	32	120	48
30		2	0	9	0	15	100	0.18	0.27	0.22	88	63	152	61
35		2	0	9	0	20	100	0.27	0.36	0.31	88	95	183	73
40		2	0	9	0	25	100	0.36	0.45	0.40	88	126	215	86
45		2	0	9	0	30	100	0.45	0.54	0.49	88	158	246	98
50	SILTSTONE	4	0	9	0	35	120	0.54	0.67	0.60	177	221	397	159
55		4	0	9	0	40	120	0.67	0.80	0.74	177	283	460	184
60		4	0	9	0	45	120	0.80	0.94	0.87	177	346	523	209
65		5	0	9	0	50	120	0.94	1.07	1.00	221	425	646	258
70		5	0	9	0	55	120	1.07	1.21	1.14	221	503	724	290
75		5	0	9	0	60	120	1.21	1.34	1.27	221	582	803	321
80		5	0	9	0	65	120	1.34	1.47	1.41	221	660	881	352
85		5	0	9	0	70	120	1.47	1.61	1.54	221	739	960	384
90		6	0	9	0	75	120	1.61	1.74	1.67	265	833	1098	439
95		6	0	9	0	80	120	1.74	1.88	1.81	265	927	1192	477
100		6	0	9	0	85	120	1.88	2.01	1.94	265	1022	1287	515

Engr. Muhammad Farooq

B.E. (Civil), M. Engg. & T.E. Bangkok

PEC Regn.Civ/2817 Consult/052

Table B

PILE CAPACITY CALCULATIONS

Project: PLOT # 13, CL-7, CIVIL LINES QUARTERS, DISTRICT SOUTH, KARACHI

2/10/2025

Ground Water Depth = 0 ft

Cut-off Level = 15 ft

Pile Dia. = 36 in

Pile Depth (ft)	Stratification	Soil Parameters				Effective Pile Length (ft)	Unit Weight (γ) (pcf)	Overburden pressures (tsf)			Ultimate Capacity			Total Allowable Capacity (tons) FOS = 2.5
		C (tsf)	Phi	Nc	Nq			P_1	P_2	P_{avg}	End Bearing (tons)	Skin Friction (tons)	Total (tons)	
5														
10														
15														
20	sandy GRAVEL	0	35	0	50	5	100	0.00	0.09	0.04	32	1	32	13
25	SANDSTONE/ SILTSTONE	2	0	9	0	10	100	0.09	0.18	0.13	127	38	166	66
30		2	0	9	0	15	100	0.18	0.27	0.22	127	76	203	81
35		2	0	9	0	20	100	0.27	0.36	0.31	127	114	241	96
40		2	0	9	0	25	100	0.36	0.45	0.40	127	152	279	112
45		2	0	9	0	30	100	0.45	0.54	0.49	127	189	316	127
50	SILTSTONE	4	0	9	0	35	120	0.54	0.67	0.60	254	265	519	208
55		4	0	9	0	40	120	0.67	0.80	0.74	254	340	594	238
60		4	0	9	0	45	120	0.80	0.94	0.87	254	415	670	268
65		5	0	9	0	50	120	0.94	1.07	1.00	318	510	828	331
70		5	0	9	0	55	120	1.07	1.21	1.14	318	604	922	369
75		5	0	9	0	60	120	1.21	1.34	1.27	318	698	1016	406
80		5	0	9	0	65	120	1.34	1.47	1.41	318	792	1110	444
85		5	0	9	0	70	120	1.47	1.61	1.54	318	887	1205	482
90		6	0	9	0	75	120	1.61	1.74	1.67	382	1000	1381	553
95		6	0	9	0	80	120	1.74	1.88	1.81	382	1113	1495	598
100		6	0	9	0	85	120	1.74	2.01	1.88	382	1226	1608	643

Engr. Mohammad Nawaz

B.E (Civil), M. Engg. (U.K), Chartered

PEC Regd. No. 6747 Consultant

Table C

PILE CAPACITY CALCULATIONS

Project: PLOT # 13, CL-7, CIVIL LINES QUARTERS, DISTRICT SOUTH, KARACHI

6/3/2025

Ground Water Depth = 0 ft

Cut-off Level = 15 ft

Pile Dia = 40 in

Pile Depth (ft)	Stratification	Soil Parameters				Effective Pile Length (ft)	Unit Weight (γ) (pcf)	Overburden pressures (tsf)			Ultimate Capacity			Allowable Capacity		
		C (tsf)	Phi	Nc	Nq			P_1	P_2	P_{avg}	End Bearing (tons)	Skin Friction (tons)	Total (tons)	End Bearing Qb(tons) FOS=2.5	Skin Friction Qs(tons) FOS=2.0	Total Qall(tons) Qb+ Qs
5																
10																
15																
20	sandy GRAVEL	0	35	0	50	5	100	0.00	0.09	0.04	39	1	40	16	0	16
25	SANDSTONE/ SILTSTONE	2	0	9	0	10	100	0.09	0.18	0.13	157	43	200	63	21	84
30		2	0	9	0	15	100	0.18	0.27	0.22	157	85	242	63	42	105
35		2	0	9	0	20	100	0.27	0.36	0.31	157	126	284	63	63	126
40		2	0	9	0	25	100	0.36	0.45	0.40	157	168	325	63	84	147
45		2	0	9	0	30	100	0.45	0.54	0.49	157	210	367	63	105	168
50	SILTSTONE	4	0	9	0	35	120	0.54	0.67	0.60	314	294	608	126	147	273
55		4	0	9	0	40	120	0.67	0.80	0.74	314	378	692	126	189	315
60		4	0	9	0	45	120	0.80	0.94	0.87	314	462	776	126	231	356
65		5	0	9	0	50	120	0.94	1.07	1.00	393	566	959	157	283	440
70		5	0	9	0	55	120	1.07	1.21	1.14	393	671	1064	157	336	493
75		5	0	9	0	60	120	1.21	1.34	1.27	393	776	1168	157	388	545
80		5	0	9	0	65	120	1.34	1.47	1.41	393	880	1273	157	440	597
85		**5**	**0**	**9**	**0**	**70**	**120**	**1.47**	**1.61**	**1.54**	**393**	**985**	**1378**	**157**	**493**	**650**
90		6	0	9	0	75	120	1.61	1.74	1.67	471	1111	1582	188	555	744
95		**6**	**0**	**9**	**0**	**80**	**120**	**1.74**	**1.88**	**1.81**	**471**	**1237**	**1708**	**188**	**618**	**807**
100		6	0	9	0	85	120	1.74	2.01	1.88	471	1362	1833	188	681	870
105		6	0	9	0	90	120	1.88	2.14	2.01	471	1488	1959	188	744	932

DEWATERING PLAN

DEWATERING REPORT
O N
SUBSOIL INVESTIGATION
FOR BUILDING
ON PLOT NO. 13, CL-7
CIVIL LINE QUARTERS, DISTRUCT SOUTH
K A R A C H I

Soil Conditions:

As per soil investigation report the major subsurface deposits can be described as follows:

- Brown, medium dense, fine to coarse SAND
- Brown, dense to very dense, clayey fine to coarse SAND
- Brown, very dense, sandy GRAVEL
- Brown, hard, coarse grained CONGLOMERATE/SANDSTONE
- Gray to Brown, medium hard, SANDSTONE
- Brown, hard, clayey SILT / soft SILTSTONE
- Brown to Gray, medium hard, SILTSTONE with interlayers of sand

Water occurs at about 11.0 to 19.5 feet depth below existing ground level.

Dewatering of the Plot:

Dewatering involves the lowering of water levels up to predetermined depth and maintenance of that depth for purpose to facilitate the construction for underground structure.

The dewatering can be short term or long term depending on the size of the project type of the foundations and the site conditions it is required for.

M.E (Civil), M.Engg AIT Bangkok
PEC Regn/Cir/2017 Consult/382

Size of Tubewell:

In our recommendation, the size of tubewell should not be less than 12 inches in diameter. Depth of tubewell should be 25 feet below existing ground level. Use of bentonite is not recommended during drilling.

It is recommended that 6" dia PVC Class-C tubewell fixture be installed with full length perforation except 2 feet from the top and 2 feet from the bottom (this 2 feet blind pipe shall act as bail plug of tubewell).

Shrouding Material:

After installation of tubewell fixture, the annular space in the borehole shall be filled with clean pea size gravel and shrouding material. This shrouding material shall be packed in such a manner that it should be atleast 3" all around the well.

Pump Setting:

Submersible / Turbine pumps can be used that could lift water from the subsurface. It is proposed that 1.5" dia suction pipe with non-return valve shall be lowered to tubewell depth. Install submersible / turbine pump at 30 ft depth within the wells.

The spacing of tubewells is shown in the Sketch. The spacing between tubewells can be adjusted as per site condition.

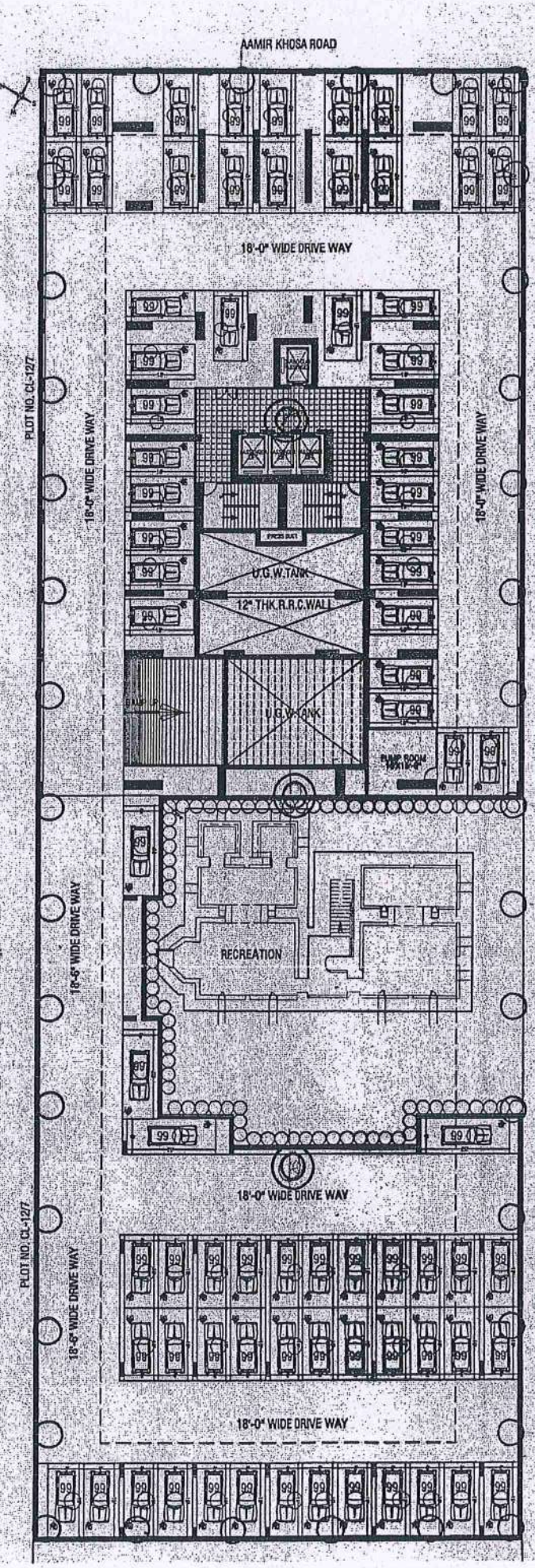
Observation Well / Piezometer:

It is recommended that two piezometers shall be installed in the area of the plot. The length of piezometers shall be 35 feet and dia shall be 3"-4" PVC with full perforation.

Dewatering shall be observed from piezometers and excavation shall not start till the water reaches atleast 2-3 feet below the required excavation level.

.....

Prof. Nikunj Patel



Piezometers

Tubewells:

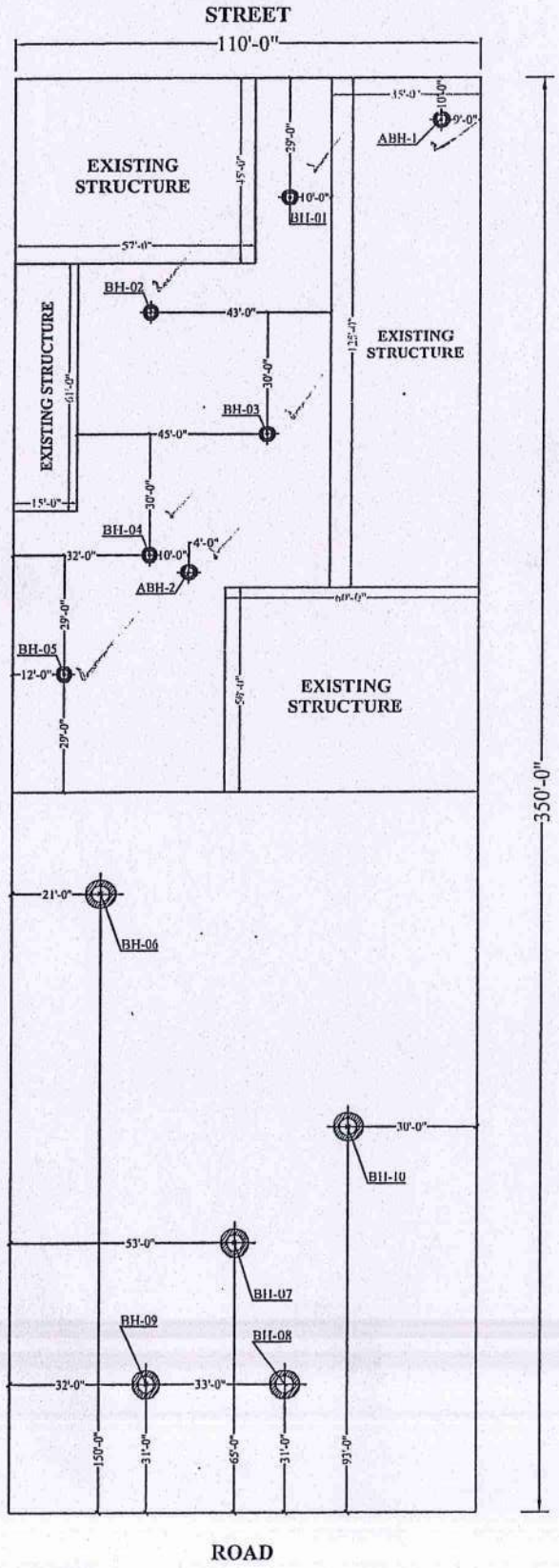
Distance between tubewells is something 22-25 feet.

B.E.(Civil),M.Engg.AIT,Bangkok
PEC Regn:Civ/2917 Consult/682

APPENDIX

BOREHOLE LOCATION PLAN

PLOT NO. 13, CL-7, CIVIL LINES
KARACHI



GEOTECHNICAL SERVICES

Bore Hole No BH-1

Sheet 1 of 2

SUBSURFACE EXPLORATION LOG

Project: PLOT NO. 13, CL-7, CIVIL LINE QUARTERS, DISTRICT SOUTH, KARACHI

Ground Water Depth: 19.00 feet

Geologist: Abdul Rauf Ansari

Type of Boring: ROTARY

Date: 15.06.22 to 17.06.22

Depth (Feet)	Sample No.	Classification	STRATUM DESCRIPTION	Dia of Casing /Hole	SPT 'N' Count	Percent Recovery	R.Q.D.	Unconfined Compression (kg/sq.cm)	REMARKS (Feet)
4.0	DS SPT-1		Fill material comprising of coarse sand, limestone pieces & gravel		50/6"				
9.0	DS SPT-2	SC	Brown, medium dense, fine to coarse SAND with clay, some gravel		14				05
	DS SPT-3				50/4"				
12	DS SPT-4	GP	Brown, very dense, sandy GRAVEL, trace clay		50/6"				10
	CORE SPT-5		Brown, hard, clayey SILT, some sand, trace gravel		54	50	25	2.57	Waxed Core 14.50-15.00
	CORE SPT-6				50/6"	48	12	1.86	15 Waxed Core 19.58-20.00
	CORE SPT-7	ML			50/4"	29	Nil		20
	CORE SPT-8				50/6"	30	10	3.41	25 Waxed Core 29.58-30.00
	CORE SPT-9				75				30
36.5	CORE	GP	Brown, very dense, sandy GRAVEL, trace clay			45	Nil		35
39.5	CORE		Brown, hard, clayey SILT/ soft SILTSTONE with interlayers of sand			35	Nil		40
	CORE					37	13	7.59	45 Waxed Core 49.00-49.50
50									50

Prof. Akhtar Saeed
B.E. (Civil) M. Engg. (RCC) Shanghai
PEC Regd. No. R/1077 Consultant

GEOTECHNICAL SERVICES

Bore Hole No BH-1

Sheet 2 of 2

SUBSURFACE EXPLORATION LOG

Project PLOT NO. 13, CL-7, CIVIL LINE QUARTERS, DISTRICT SOUTH, KARACHI

Ground Water Depth 19.00 feet

Geologist Abdul Rauf Ansari

Type of Boring ROTARY

Date 15.06.22 to 17.06.22

Depth (Feet)	Sample No.	Classification	STRATUM DESCRIPTION	Dia of Casing /Hole	SPT 'N' Count	Percent Recovery	R.Q.D.	Unconfined Compression (kg/sqcm)	REMARKS (Feet)
	CORE		Brown, hard, clayey SILT/ soft SILTSTONE with interlayers of sand			50	27		Waxed Core 53.25-53.66
	CORE					80	38		Waxed Core 57.00-57.42
60	CORE					55	13	11.85	Waxed Core 64.00-64.33
	CORE					40	Nil		
	CORE					55	08		Waxed Core 71.00-71.33
	CORE		Brown to Gray, medium hard, SILTSTONE with interlayers of sand			37	08	26.75	Waxed Core 75.25-75.58
	CORE					53	23		Waxed Core 81.50-81.92
	CORE					60	10		Waxed Core 85.00-85.33
	CORE					45	15	18.96	Waxed Core 92.00-92.42
100	CORE					63	13		Waxed Core 97.42-97.75

BOTTOM OF BOREHOLE

B.E (Civil) M.Engg. (Geotechnical)
PEC Regd. No. 2017 Cont. No. 3882

GEOTECHNICAL SERVICES

Bore Hole No BH-2

Sheet 1 of 2

SUBSURFACE EXPLORATION LOG

Project: PLOT NO. 13, CL-7, CIVIL LINE QUARTERS, DISTRICT SOUTH, KARACHI

Ground Water Depth: 19.00 feet

Geologist: M. Faisal Jawed

Type of Boring: ROTARY

Date: 15.06.22 to 16.06.22

Depth (Feet)	Sample No.	Classification	STRATUM DESCRIPTION	Dia of Casing /Hole	SPT 'N' Count	Percent Recovery	R.Q.D.	Unconfined Compression (kg/sq.cm)	REMARKS (Feet)
	DS		Brown, silty, fine to coarse sand, trace gravel						
3.0	SPT-1				24				
	DS	SM	Brown, medium dense, fine to coarse SAND with silt, little gravel						05
6.0	SPT-2				33				
7.5		SC	Brown, dense, clayey, fine to coarse SAND						
	DS DPT-1				50/2"				
	DS SPT-3	GP	Brownish gray, very dense, sandy GRAVEL		50/2"				10
	DS								
15	SPT-4				50/2"				
	CORE SPT-5					43	17		15
					50/4"			2.18	Waxed Core 19.08-19.50
	CORE SPT-6	ML	Brown, hard, clayey SILT with interlayers of sand			34	Nil		20
					50/4"				
	CORE SPT-7					37	07	2.90	25 Waxed Core 26.08-26.42
					50/2"				30
	CORE					42	12		
35	SPT-8				50/2"			1.46	Waxed Core 34.25-34.58 35
	CORE		Gray, SANDSTONE, fractured			23	Nil		
40	DPT-2				50/2"				40
	CORE SPT-9		Brown, hard, clayey SILT/ soft SILTSTONE with interlayers of sand			33	08		Waxed Core 44.25-44.66
					50/3"				45
	CORE					28	16		
50	SPT-10				50/2"				Waxed Core 49.50-49.84 50

Syed Ahmad Faisal
B.E. (Civil), M.Engg (ATP) Geotech
PEC Registered Engineer (Civil)

GEOTECHNICAL SERVICES

Bore Hole No BH-2

Sheet 2 of 2

SUBSURFACE EXPLORATION LOG

Project PLOT NO. 13, CL-7, CIVIL LINE QUARTERS, DISTRICT SOUTH, KARACHI

Ground Water Depth 19.00 feet

Geologist M. Faisal Jawed

Type of Boring ROTARY

Date 15.06.22 to 16.06.22

Depth (Feet)	Sample No.	Classification	STRATUM DESCRIPTION	Dia of Casing /Hole	SPT 'N' Count	Percent Recovery	R.Q.D.	Unconfined Compression (kg/sqcm)	REMARKS (Feet)
								9.93	
	CORE		Brownish gray, medium hard, SILTSTONE with interlayers of sand			31	08		Waxed Core 50.17-51.58
	SPT-11				50/2"				
									55
	CORE					31	21		Waxed Core 55.75-56.25
60	SPT-12				50/2"				
			BOTTOM OF BOREHOLE						60

M.E. (Civil), M.Engg. (GT), Bangkok
PEC Regd. No. 6317/2013 Consultant

GEOTECHNICAL SERVICES

Bore Hole No BH-3

Sheet 1 of 2

SUBSURFACE EXPLORATION LOG

Project PLOT NO. 13, CL-7, CIVIL LINE QUARTERS, DISTRICT SOUTH. KARACHI

Ground Water Depth 19.00 feet

Geologist Abdul Rauf Ansari

Type of Boring ROTARY

Date 17.06.22 to 19.06.22

Depth (Feet)	Sample No.	Classification	STRATUM DESCRIPTION	Dia of Casing /Hole	SPT 'N' Count	Percent Recovery	R.Q.D.	Unconfined Compression (kg/sq.cm)	REMARKS (Feet)
4.0	DS SPT-1		Fill material comprising of coarse sand, limestone pieces & gravel		50/4"				
13	DS SPT-2 DS SPT-3 DS SPT-4	SC	Brown, dense to very dense, clayey, fine to coarse SAND, little gravel		36 50/5" 50/6"				05 10
40	DS SPT-5 CORE SPT-6 CORE SPT-7 CORE SPT-8 CORE SPT-9 CORE	ML	Brown, hard, clayey SILT, some sand, trace gravel		50/6" 50/6" 50/6" 50/3" 50/5" 50/4"	37 25 39 31 31	12 10 29 09 Nil	3.76 2.70 14.65	15 Waxed Core 19.50-20.00 20 Waxed Core 23.17-23.58 25 Waxed Core 29.58-30.00 30 Waxed Core 34.50-35.00 35 40 Waxed Core 41.00-41.42
50	CORE CORE		Brown, hard, clayey SILT/ soft SILTSTONE with interlayers of sand			47 50	40 17		45 Waxed Core 47.17-47.50 50

Ext. Chief Civil Engg. AFT Bangkok

GEOTECHNICAL SERVICES

Bore Hole No BH-3

Sheet 2 of 2

SUBSURFACE EXPLORATION LOG

Project: PLOT NO. 13, CL-7, CIVIL LINE QUARTERS, DISTRICT SOUTH, KARACHI

Ground Water Depth: 19.00 feet

Geologist: Abdul Rauf Ansari

Type of Boring: ROTARY

Date: 17.06.22 to 19.06.22

Depth (Feet)	Sample No.	Classification	STRATUM DESCRIPTION	Dia of Casing /Hole	SPT 'N' Count	Percent Recovery	R.Q.D.	Unconfined Compression (kg/sqcm)	REMARKS (Feet)
	CORE		Brown, hard, clayey SILT/ soft SILTSTONE with interlayers of sand			55	30		Waxed Core 51.00-51.50
	CORE					62	25	3.46	Waxed Core 56.50-57.00
60	CORE		Gray, medium hard, SILTSTONE with interlayers of sand			60	35		Waxed Core 61.00-61.50
	CORE					43	22		Waxed Core 65.17-65.58
	CORE					60	35	17.18	Waxed Core 73.00-73.42
	CORE					50	22		Waxed Core 78.42-78.84
85	CORE					58	13	11.47	Waxed Core 82.00-82.33
	CORE		Gray, medium hard, SILTSTONE with interlayers of sandstone			52	08		Waxed Core 89.00-89.42
	CORE					60	20		Waxed Core 93.25-93.58
100	CORE					65	10		Waxed Core 96.42-96.75

BOTTOM OF BOREHOLE

Chief Technical Officer
M.S (Civil) U.E.T. Lahore
PEC Regn: Civ/2017 Consult/882

GEOTECHNICAL SERVICES

Bore Hole No BH-4

Sheet 1 of 2

SUBSURFACE EXPLORATION LOG

Project: PLOT NO. 13, CL-7, CIVIL LINE QUARTERS, DISTRICT SOUTH, KARACHI

Ground Water Depth: 18.83 feet

Geologist: M. Faisal Jawed

Type of Boring: ROTARY

Date: 17.06.22 to 18.06.22

Depth (Feet)	Sample No.	Classification	STRATUM DESCRIPTION	Dia of Casing /Hole	SPT 'N' Count	Percent Recovery	R.Q.D.	Unconfined Compression (kg/sq.cm)	REMARKS (Feet)
	DS DPT-1	GP	Brown, very dense, sandy GRAVEL, trace clay		50/3"				
	DS DPT-2				50/2"				05
	DS DPT-3				50/2"				
	DS DPT-4				50/3"				10
	DS DPT-5				50/2"				
20	DS DPT-6				50/2"				15
	CORE	ML	Brown, hard, clayey SILT with interlayers of sand			45	23	2.88	20 Waxed Core 21.00-21.58
25	SPT-1				50/2"			120.24	25
	CORE DPT-7		Brown, medium hard, SANDSTONE		50/2"	28	Nil		Waxed Core 25.00-25.25
	CORE					55	08		30
	CORE					50	33	9.36	Waxed Core 34.58-35.00 35 Waxed Core 36.17-36.58
	CORE					30	07		40 Waxed Core 40.00-40.58
45	CORE		Brown, soft to medium hard, SILTSTONE with interlayers of sand			30	07	7.65	45 Waxed Core 49.25-49.58
50									50

Engr. Ahmad Saeed
B.E.(Civil), M.Engg.AIT Bangkok
PEC RegnCiv/2017 Consult/0282

GEOTECHNICAL SERVICES

Bore Hole No BH-4

Sheet 2 of 2

SUBSURFACE EXPLORATION LOG

Project PLOT NO. 13, CL-7, CIVIL LINE QUARTERS, DISTRICT SOUTH, KARACHI

Ground Water Depth 18.83 feet

Geologist M. Faisal Jawed

Type of Boring ROTARY

Date 17.06.22 to 18.06.22

Depth (Feet)	Sample No.	Classification	STRATUM DESCRIPTION	Dia of Casing /Hole	SPT 'N' Count	Percent Recovery	R.Q.D.	Unconfined Compression (kg/sqcm)	REMARKS (Feet)
								0.93	
	CORE		Brown, medium hard, SILTSTONE with interlayers of sand			29	07		Waxed Core 50.25-50.58
									55
	CORE					38	10		Waxed Core 56.00-56.58
60			BOTTOM OF BOREHOLE						60

M.E. (Civil), M.Engg. AIT, Bangkok
PEC Engineering Consultants

GEOTECHNICAL SERVICES

Bore Hole No BH-5

Sheet 1 of 2

SUBSURFACE EXPLORATION LOG

Project: PLOT NO. 13. CL-7, CIVIL LINE QUARTERS. DISTRICT SOUTH, KARACHI

Ground Water Depth: 18.91 feet

Geologist: M. Faisal Jawed

Type of Boring: ROTARY

Date: 18.06.22 to 20.06.22

Depth (Feet)	Sample No.	Classification	STRATUM DESCRIPTION	Dia of Casing /Hole	SPT 'N' Count	Percent Recovery	R.Q.D.	Unconfined Compression (kg/sq.cm)	REMARKS (Feet)
2.0	DS DPT-1		Fill material comprising of fine to coarse sand, traces of gravel & concrete slab pieces		50/2"				
6.0	DS DPT-2	GP	Brown, very dense, sandy GRAVEL		50/2"			119.66	05 Waxed Core 5.00-5.25
	CORE DPT-3		Brown, hard, coarse grained SANDSTONE/ CONGLOMERATE		50/2"	38	Nil		10 Waxed Core 10.00-10.33
16	CORE SPT-1				50/2"	39	13	132.11	15 Waxed Core 15.50-15.66
	CORE SPT-2				50/2"	25	Nil		20
	CORE SPT-3				50/2"	25	Nil		25
	CORE SPT-4		Gray to brown, medium hard, SANDSTONE		50/2"	33	Nil	21.50	30 Waxed Core 30.00-30.50
	CORE					33	Nil		35 Waxed Core 35.50-35.75
	CORE					30	Nil		40 Waxed Core 41.00-41.66
45	CORE SPT-5				50/2"	60	15		45
50	CORE SPT-6		Brown, hard, clayey SILT/ soft SILTSTONE with interlayers of sand		50/2"	40	Nil		50

Chief Chemist

B.E (Civil), M.Engg (AIT Bangkok)
PEC Regd. Civil/3517 Consult/332

GEOTECHNICAL SERVICES

Bore Hole No BH-5

Sheet 2 of 2

SUBSURFACE EXPLORATION LOG

Project: PLOT NO. 13, CL-7, CIVIL LINE QUARTERS, DISTRICT SOUTH, KARACHI

Ground Water Depth: 18.91 feet

Geologist: M. Faisal Jawed

Type of Boring: ROTARY

Date: 18.06.22 to 20.06.22

Depth (Feet)	Sample No.	Classification	STRATUM DESCRIPTION	Dia of Casing /Hole	SPT 'N' Count	Percent Recovery	R.Q.D.	Unconfined Compression (kg/sqcm)	REMARKS (Feet)
	CORE					30	Nil		
	SPT-6				50/2"			16.04	55
	CORE					36	07		Waxed Core 55.66-56.00
	SPT-7				50/2"				60
	CORE					58	20		Waxed Core 60.33-60.84
	CORE					58	08		65
	CORE							11.86	Waxed Core 68.66-69.08
	CORE		Brown to Gray, medium hard, SILTSTONE with interlayers of sand			30	07		70 Waxed Core 70.33-70.66
	CORE					53	25		75
	CORE					62	40		Waxed Core 78.33-78.84 80 Waxed Core 81.00-81.50
	CORE					60	50		85
	CORE					73	70	29.83	Waxed Core 89.25-89.75 90
	CORE					93	63		95 Waxed Core 94.25-94.75 95.42-96.00
100			BOTTOM OF BOREHOLE						100

GEOTECHNICAL SERVICES

Bore Hole No BH-6

Sheet 1 of 2

SUBSURFACE EXPLORATION LOG

Project PLOT NO. 13, CL-7, CIVIL LINE QUARTERS, DISTRICT SOUTH, KARACHI

Ground Water Depth 19.50 Feet

Geologist Abdul Rauf Ansari / Kq

Type of Boring ROTARY

Date 20.06.22 To 21.06.22

Depth (Feet)	Sample No.	Classification	STRATUM DESCRIPTION	Dia of Casing /Hole	SPT 'N' Count	Percent Recovery	R.Q.D.	Unconfined Compression (Kg/sq.cm)	REMARKS (Feet)
3.0	DS SPT-1		Fill material comprising coarse sand, trace clayey silt, trace gravel		50/2"				
	DS							262.05	
	CORE		Brown, hard, CONGLOMERATE			30	Nil		05
	CORE					40	Nil		10
15	SPT-2				51				15
		SC	Brownish gray, hard, sandy CLAY, trace gravel						
20	SPT-3				50/6"				20
	CORE					45	08	29.29	Waxed Core 23.66-24.00
	CORE		Brownish gray / Gray, friable to medium hard, SANDSTONE			45	09		25 Waxed Core 27.58-28.00
	CORE					29	10	29.93	30 Waxed Core 32.17-32.42 Waxed Core 34.25-34.58
34									35 Waxed Core 35.00-35.50
	CORE					40	20		
	CORE		Brown / Brownish gray, medium hard, SILTSTONE			57	15	14.46	40 Waxed Core 44.00-44.33
	CORE					37	08		45 Waxed Core 48.17-48.50
50									50

GEOTECHNICAL SERVICES

Bore Hole No BH-6

Sheet 2 of 2

SUBSURFACE EXPLORATION LOG

Project PLOT NO. 13, CL-7, CIVIL LINE QUARTERS, DISTRICT SOUTH, KARACHI

Ground Water Depth 19.50 Feet

Geologist Abdul Rauf Ansari / Kq

Type of Boring ROTARY

Date 20.06.22 To 21.06.22

Depth (Feet)	Sample No.	Classification	STRATUM DESCRIPTION	Dia of Casing /Hole	SPT 'N' Count	Percent Recovery	R.Q.D.	Unconfined Compression (kg/sqcm)	REMARKS (Feet)
	CORE		Brown, hard, SANDSTONE			40	12	131.31	Waxed Core 51.00-51.58
	CORE					57	13		55
60			BOTTOM OF BOREHOLE						Waxed Core 58.25-58.58
									60

For [illegible]
[illegible]
[illegible]
PEC Regn. Civil/2017 Consult/2884

GEOTECHNICAL SERVICES

Bore Hole No BH-7

Sheet 1 of 2

SUBSURFACE EXPLORATION LOG

Project PLOT NO. 13, CL-7, CIVIL LINE QUARTERS, DISTRICT SOUTH, KARACHI

Ground Water Depth 19.50 Feet

Geologist Abdul Rauf Ansari / Kq

Type of Boring ROTARY

Date 21.06.22 To 23.06.22

Depth (Feet)	Sample No.	Classification	STRATUM DESCRIPTION	Dia of Casing /Hole	SPT 'N' Count	Percent Recovery	R.Q.D.	Unconfined Compression (Kg/sq.cm)	REMARKS (Feet)
3.0	DS		Fill material comprising coarse gravel with boulder pieces						
5.0	DS	GP	Brown, fine to coarse, GRAVEL						
	CORE		Brown, hard, CONGLOMERATE			32	07	180.56	05 Waxed Core 7.50-7.66
	CORE					36	07		10 Waxed Core 10.00-10.33
16.5	CORE					55	07	1.88	15 Waxed Core 17.50-17.84
	SPT-1	ML	Brown, very stiff to hard, clayey SILT with interlayers of sand		52				20
22.5		SM-ML	Brownish gray, very dense, silty SAND / sandy SILT						
25.5	SPT-2				50/6"				25
	CORE		Brownish gray, friable to medium hard, SANDSTONE			35	05	26.85	Waxed Core 28.00-28.25 30
	CORE					43	11		Waxed Core 33.58-34.00 35 Waxed Core 35.50-36.00
38	CORE					47	23	12.00	Waxed Core 39.00-39.42 40
	CORE		Brown, medium hard, SILTSTONE			53	37		Waxed Core 44.00-44.42 45
45	CORE		Brown, friable to medium hard, SANDSTONE			57	20	17.74	Waxed Core 46.00-46.42
50									50

Shaikh Khurshid Ahmed
B.E. (Civil), M.Engg. (Geotech.), Pakistan
PEC Regd. No. 5917 Consultant/1452

GEOTECHNICAL SERVICES

Bore Hole No BH-7

Sheet 2 of 2

SUBSURFACE EXPLORATION LOG

Project PLOT NO. 13, CL-7, CIVIL LINE QUARTERS, DISTRICT SOUTH, KARACHI

Ground Water Depth 19.50 Feet

Geologist Abdul Rauf Ansari / Kq

Type of Boring ROTARY

Date 21.06.22 To 23.06.22

Depth (Feet)	Sample No.	Classification	STRATUM DESCRIPTION	Dia of Casing /Hole	SPT 'N' Count	Percent Recovery	R.Q.D.	Unconfined Compression (kg/sqcm)	REMARKS (Feet)
	CORE		Brown, friable to medium hard, SANDSTONE			40	08		Waxed Core 50.00-50.33
	CORE					62	18	9.41	55 Waxed Core 55.00-55.58
62	CORE					62	27		Waxed Core 59.00-59.50 60
	CORE		Gray, medium hard, SILTSTONE with interlayers of sand			58	20		Waxed Core 64.00-64.58 65
	CORE					60	40	11.91	Waxed Core 68.50-68.84 70 Waxed Core 72.00-72.50
	CORE					58	35		75 Waxed Core 76.25-76.66
	CORE					70	52		80 Waxed Core 80.00-80.58
	CORE					63	40	22.22	85 Waxed Core 85.25-85.75
	CORE					60	45		90 Waxed Core 90.25-91.00
100	CORE					62	37		95 Waxed Core 96.00-96.33 100

BOTTOM OF BOREHOLE

GEOTECHNICAL SERVICES

Bore Hole No BH-8

Sheet 1 of 2

SUBSURFACE EXPLORATION LOG

Project PLOT NO. 13, CL-7, CIVIL LINE QUARTERS, DISTRICT SOUTH, KARACHI

Ground Water Depth 17.00 Feet

Geologist M. Asif Yousuf / Kq

Type of Boring ROTARY

Date 22.06.22 To 23.06.22

Depth (Feet)	Sample No.	Classification	STRATUM DESCRIPTION	Dia of Casing /Hole	SPT 'N' Count	Percent Recovery	R.Q.D.	Unconfined Compression (Kg/sq.cm)	REMARKS (Feet)
2.0	DS		Brown, very dense, silty, fine to coarse sand, trace gravel						
	SPT-1		Brown, hard, clayey SILT with interlayers of sand, trace gravel		50/6"				
4.5	CORE DPT-1				50/2"	90	Nil		
	CORE		Brown, hard, CONGLOMERATE			48	Nil	157.65	05 Waxed Core 5.84-6.08
	CORE					40	Nil		10
14.2	SPT-2				51				
	CORE	ML	Brown, hard, clayey SILT with interlayers of sand			71	Nil		15
	SPT-3				48				20
22.7	CORE					85	Nil		
	CORE					52	30	18.72	25 Waxed Core 25.50-26.00
	CORE		Brownish gray / Brown, friable to medium hard, SANDSTONE			60	14		30 Waxed Core 30.84-31.17
	CORE					63	23		35
	CORE					63	14	9.87	Waxed Core 39.00-39.50 40 Waxed Core 40.84-41.17
46									45
47.5	CORE		Yellowish brown, sandy LIMESTONE / SANDSTONE			60	30		Waxed Core 46.17-46.50
50			Brownish gray, medium hard, SILTSTONE						50

Engr. Shamil Ansari
B.E. (Civil), M.Engg. M.I.E.(Pak)
Regd. No. 2017 / Consultant

GEOTECHNICAL SERVICES

Bore Hole No BH-8

Sheet 2 of 2

SUBSURFACE EXPLORATION LOG

Project: PLOT NO. 13, CL-7, CIVIL LINE QUARTERS, DISTRICT SOUTH. KARACHI

Ground Water Depth: 17.00 Feet

Geologist: M. Asif Yousuf / Kq

Type of Boring: ROTARY

Date: 22.06.22 To 23.06.22

Depth (Feet)	Sample No.	Classification	STRATUM DESCRIPTION	Dia of Casing /Hole	SPT 'N' Count	Percent Recovery	R.Q.D.	Unconfined Compression (kg/sqcm)	REMARKS (Feet)
56	CORE		Brown, medium hard, SILTSTONE			63	17	25.51	Waxed Core 51.50-52.00
60	CORE		Brown, SANDSTONE			75	14		55 Waxed Core 55.66-56.00
			BOTTOM OF BOREHOLE						60

GEOTECHNICAL SERVICES

Bore Hole No BH-9

Sheet 1 of 2

SUBSURFACE EXPLORATION LOG

Project: PLOT NO. 13, CL-7, CIVIL LINE QUARTERS, DISTRICT SOUTH, KARACHI

Ground Water Depth: 16.67 Feet

Geologist: M. Asif Yousuf / Kq

Type of Boring: ROTARY

Date: 25.06.22 To 26.06.22

Depth (Feet)	Sample No.	Classification	STRATUM DESCRIPTION	Dia of Casing /Hole	SPT 'N' Count	Percent Recovery	R.Q.D.	Unconfined Compression (Kg/sq.cm)	REMARKS (Feet)
1.5	DS		Brown, silty sand / sandy silt, trace gravel						
	SPT-1	SC	Brown, very stiff to hard, sandy CLAY with gravel		21				
	SPT-2				53				05
7.5	CORE	GP	Brown, very dense, sandy GRAVEL with boulder pieces			20	Nil		
	DPT-1				50/2"				10
	CORE					30	Nil		
	DPT-2				50/2"				15
17	CORE SPT-3				47	50	Nil		
	CORE SPT-4	ML	Brown, very stiff, clayey SILT with interlayers of sand		25	90	40	2.22	Waxed Core 19.17-19.66
24	CORE					65	25		20 Waxed Core 22.00-22.50
	CORE		Brown / Brownish gray, medium hard, SANDSTONE			60	17	36.87	25 Waxed Core 25.00-25.50
	CORE					65	10		30
	CORE					62	07		Waxed Core 34.00-34.50 35
40	CORE	ML	Brown, very stiff, clayey SILT with interlayers of sand			60	10	2.14	Waxed Core 39.00-39.33 40 Waxed Core 41.17-41.66
46	CORE		Brownish gray, medium hard, SANDSTONE			65	20		45 Waxed Core 46.00-46.33
50									50

Engr. Mohammad Asad
B.E (Civil) M.Engg (NTU, Singapore)
PEC Regn No: D/2017 Consult/6862

GEOTECHNICAL SERVICES

SUBSURFACE EXPLORATION LOG

Bore Hole No BH-9

Sheet 2 of 2

Project: PLOT NO. 13, CL-7, CIVIL LINE QUARTERS, DISTRICT SOUTH, KARACHI

Ground Water Depth 16.67 Feet

Geologist M. Asif Yousuf / Kq

Type of Boring: ROTARY

Date 25.06.22 To 26.06.22

Depth (Feet)	Sample No.	Classification	STRATUM DESCRIPTION	Dia of Casing /Hole	SPT 'N' Count	Percent Recovery	R.Q.D.	Unconfined Compression (kg/sqcm)	REMARKS (Feet)
	CORE					63	20		Waxed Core 50.84-51.25
	CORE		Brown, medium hard, SANDSTONE with lens of siltstone			75	25	28.40	55 Waxed Core 55.00-55.42
65	CORE					65	20		60 Waxed Core 60.00-60.50
	CORE					67	20		65
	CORE					62	30	22.62	Waxed Core 69.17-69.66 70
	CORE		Gray / Brown, medium hard, SILTSTONE with interlayers of sand			67	23		Waxed Core 74.33-74.75 75 Waxed Core 75.00-75.50
	CORE					70	40		80
	CORE					72	42	22.76	Waxed Core 84.00-84.42 85 Waxed Core 85.33-85.84
	CORE					75	38		90
100	CORE					75	27	19.46	Waxed Core 94.00-94.50 95 Waxed Core 95.00-95.50
			BOTTOM OF BOREHOLE						100

Deputy Controller (Plan)
SP (Civil) Dte, Karachi
PDC Regd Civ/2017 Cnstn/882

GEOTECHNICAL SERVICES

Bore Hole No BH-10

Sheet 1 of 2

SUBSURFACE EXPLORATION LOG

Project: PLOT NO. 13, CL-7, CIVIL LINE QUARTERS, DISTRICT SOUTH, KARACHI

Ground Water Depth: 17.33 Feet

Geologist: M. Asif Yousuf / Kq

Type of Boring: ROTARY

Date: 27.06.22 To 28.06.22

Depth (Feet)	Sample No.	Classification	STRATUM DESCRIPTION	Dia of Casing /Hole	SPT 'N' Count	Percent Recovery	R.Q.D.	Unconfined Compression (Kg/sq.cm)	REMARKS (Feet)
	DS	SC-CL	Brown, very dense, sandy CLAY / clayey SAND with gravel		50/4"				
	SPT-1								
	DS				50/3"				
	SPT-2								
6.8	CORE		Brown, hard, CONGLOMERATE			43	10	220.77	Waxed Core 7.17-7.50
11.5	CORE	ML	Brown / Brownish gray, hard, clayey SILT with interlayers of sand			20	Nil		
	SPT-3				55				
18.3	CORE		Brown / Brownish gray, medium hard, SANDSTONE			90	15	33.97	Waxed Core 19.17-19.50
	CORE					80	37	50.60	Waxed Core 21.00-21.42
	CORE					65	30		Waxed Core 28.66-29.00
	CORE					63	30	26.65	Waxed Core 30.33-30.66
	CORE					63	20		Waxed Core 36.00-36.33
41.5	CORE		Brownish gray, hard, SANDSTONE			72	23	100.07	Waxed Core 42.00-42.33
44	CORE		Brownish gray, medium hard, SANDSTONE			70	25		Waxed Core 46.00-46.50
50									

Chief Technical Officer
B.E. (Civil) M.Engg. (NED) Geotech
PEC Registered/2817 Consultant

GEOTECHNICAL SERVICES

Bore Hole No BH-10

Sheet 2 of 2

SUBSURFACE EXPLORATION LOG

Project: PLOT NO. 13, CL-7, CIVIL LINE QUARTERS, DISTRICT SOUTH, KARACHI

Ground Water Depth: 17.33 Feet

Geologist: M. Asif Yousuf / Kq

Type of Boring: ROTARY

Date: 27.06.22 To 28.06.22

Depth (Feet)	Sample No.	Classification	STRATUM DESCRIPTION	Dia of Casing /Hole	SPT 'N' Count	Percent Recovery	R.Q.D.	Unconfined Compression (kg/sqcm)	REMARKS (Feet)
53	CORE		Brownish gray, medium hard, SANDSTONE			63	07		Waxed Core 52.50-52.84
	CORE		Brown, medium hard, SILTSTONE with interlayers of sand			82	28	28.99	55
59									Waxed Core 58.00-58.42
	CORE		Brown, medium hard, SANDSTONE with conglomerate pieces			65	07		60
63	CORE								Waxed Core 61.66-62.00
	CORE		Gray, medium hard, SILTSTONE with interlayers of sand			62	42		65
	CORE					65	35	12.10	Waxed Core 69.00-69.42
	CORE					72	32		70
	CORE					70	30	15.51	Waxed Core 71.50-72.00
	CORE					73	40		75
	CORE					85	32		Waxed Core 75.75-76.08
	CORE					82	43		80
100									Waxed Core 81.00-81.42
									85
									Waxed Core 86.25-86.75
									90
									Waxed Core 90.00-90.42
									95
									Waxed Core 95.42-95.92
									100

BOTTOM OF BOREHOLE

Chief Engineer
B.E.(Civil), M.Engg.(AIT Bangkok)
PEC Regn: Civil/2317 Consultant

GEOTECHNICAL SERVICES

Bore Hole No ABH-1

Sheet 1 of 3

SUBSURFACE EXPLORATION LOG

Project PLOT #13, CL-7, CIVIL LINES QUARTERS, DISTRICT SOUTH, KARACHI

Ground Water Depth 11.00 feet

Geologist S.M.Umer Nazim

Type of Boring ROTARY

Date 08.05.23 to 11.05.23

Depth (Feet)	Sample No.	Classification	STRATUM DESCRIPTION	Dia of Casing /Hole	SPT 'N' Count	Percent Recovery	R.Q.D.	Unconfined Compression (kg/sq.cm)	REMARKS (Feet)
4.5	SPT-1	GP-SP	Brown, medium dense, sandy GRAVEL/ gravelly SAND with silt		21				
	DS DPT-1	GP	Brown, very dense, sandy GRAVEL, trace silt		50/6"				05
	DS DPT-2				50/6"				
12	DS DPT-3				50/4"				10
15	DS DPT-4		Gray, fragmented SANDSTONE, coarse grained		50/2"				
	CORE		Brown, medium hard, SANDSTONE with lenses of siltstone			40	20	86.91	15 Waxed Core 15.84-16.08
	CORE					43	30	78.66	20 Waxed Core 21.00-21.50
	CORE					33	25	3.20	25 Waxed Core 25.25-25.84
	CORE					57	40		30 Waxed Core 30.58-30.92
35	CORE					45	25	19.34	35 Waxed Core 35.66-36.17
	CORE		Brown, medium hard, SILTSTONE with interlayers of sand			48	40		40 Waxed Core 40.75-41.00
	CORE					33	22	3.86	45 Waxed Core 45.33-45.75
									50

Prof. Ahmed Rind
B.E.(Civil), C.Engg. AIT Bangkok
PEC Regn.Civ/2017 Consult/502

GEOTECHNICAL SERVICES

Bore Hole No ABH-1

Sheet 2 of 3

SUBSURFACE EXPLORATION LOG

Project PLOT #13, CL-7, CIVIL LINES QUARTERS, DISTRICT SOUTH, KARACHI

Ground Water Depth 11.00 feet

Geologist S.M.Umer Nazim

Type of Boring ROTARY

Date 08.05.23 to 11.05.23

Depth (Feet)	Sample No.	Classification	STRATUM DESCRIPTION	Dia of Casing /Hole	SPT 'N' Count	Percent Recovery	R.Q.D.	Unconfined Compression (kg/sq.cm)	REMARKS (Feet)
60	CORE		Brown, medium hard, SILTSTONE with interlayers of sand		SPT NOT FEASIBLE	50	35		Waxed Core 51.50-52.17
	CORE					57	20		55 Waxed Core 56.66-57.17
	CORE					58	53	16.35	60 Waxed Core 60.25-60.84
	CORE					60	37		65 Waxed Core 66.66-67.17
	CORE					63	50		70 Waxed Core 70.42-70.92
	CORE		Gray, medium hard, SILTSTONE with interlayers of sand			50	23	13.49	75 Waxed Core 75.42-75.84
	CORE					53	12		80 Waxed Core 81.50-82.08
	CORE					43	20		85 Waxed Core 85.84-86.33
	CORE					50	23	7.54	90 Waxed Core 90.84-91.17
	CORE					62	33		95 Waxed Core 95.66-96.17
100									100

GEOTECHNICAL SERVICES

Bore Hole No ABH-1

Sheet 3 of 3

SUBSURFACE EXPLORATION LOG

Project PLOT #13, CL-7, CIVIL LINES QUARTERS, DISTRICT SOUTH, KARACHI

Ground Water Depth 11.00 feet

Geologist S.M.Umer Nazim

Type of Boring ROTARY

Date 08.05.23 to 11.05.23

Depth (Feet)	Sample No.	Classification	STRATUM DESCRIPTION	Dia of Casing /Hole	SPT 'N' Count	Percent Recovery	R.Q.D.	Unconfined Compression (kg/sq.cm)	REMARKS (Feet)
	CORE		Gray, medium hard, SILTSTONE with interlayers of sand		SPT NOT FEASIBLE	52	40	5.76	Waxed Core 100.42-101.00
	CORE					50	20		105 Waxed Core 105.50-105.92
	CORE					53	37		110 Waxed Core 110.66-111.08
116	CORE					50	40	25.73	115 Waxed Core 116.00-116.58
	CORE		Gray, medium hard, SANDSTONE			57	30		120 Waxed Core 120.00-120.50
125			BOTTOM OF BOREHOLE						125

GEOTECHNICAL SERVICES

Bore Hole No ABH-2

Sheet 1 of 3

SUBSURFACE EXPLORATION LOG

Project PLOT #13, CL-7, CIVIL LINES QUARTERS, DISTRICT SOUTH, KARACHI

Ground Water Depth 11.50 feet

Geologist S.M.Umer Nazim

Type of Boring ROTARY

Date 12.05.23 to 14.05.23

Depth (Feet)	Sample No.	Classification	STRATUM DESCRIPTION	Dia of Casing /Hole	SPT 'N' Count	Percent Recovery	R.Q.D.	Unconfined Compression (kg/sq.cm)	REMARKS (Feet)
4.5	SPT-1	SC-CL	Brownish gray, medium dense, clayey SAND/ sandy CLAY with gravel		11				
6.5	SPT-2	GP	Brownish gray, medium dense, sandy GRAVEL, some silt		19				05
	DS DPT-1	GP	Gray, very dense, sandy GRAVEL, little silt		50/6"				10
	DS DPT-2				50/6"				
15	DS DPT-3				50/4"				
	CORE	ML	Brown, hard, clayey SILT with interlayers of sand			38	30	1.79	15 Waxed Core 15.17-15.58
20	CORE		Brown, medium hard, SILTSTONE with interlayers of sand			37	20	58.64	20 Waxed Core 20.33-20.66
25	CORE	ML	Brown, hard, clayey SILT with interlayers of sand & fragmented sandstone			42	33		25 Waxed Core 25.50-26.08
	CORE					33	22	2.08	30 Waxed Core 30.50-31.00
35	CORE		Brown, medium hard, SILTSTONE with interlayers of sand			60	48		35 Waxed Core 35.84-36.00
	CORE					45	35	9.57	40 Waxed Core 41.00-41.50
	CORE					50	42		45 Waxed Core 45.66-46.17
									50

Chief Technical Officer

GEOTECHNICAL SERVICES

Bore Hole No ABH-2

Sheet 2 of 3

SUBSURFACE EXPLORATION LOG

Project PLOT #13, CL-7, CIVIL LINES QUARTERS, DISTRICT SOUTH, KARACHI

Ground Water Depth 11.50 feet

Geologist S.M.Umer Nazim

Type of Boring ROTARY

Date 12.05.23 to 14.05.23

Depth (Feet)	Sample No.	Classification	STRATUM DESCRIPTION	Dia of Casing /Hole	SPT 'N' Count	Percent Recovery	R.Q.D.	Unconfined Compression (kg/sq.cm)	REMARKS (Feet)
60	CORE		Brown, medium hard, SILTSTONE with interlayers of sand		SPT NOT FEASIBLE	52	43		Waxed Core 50.42-51.00
	CORE					58	50	9.34	55 Waxed Core 56.17-56.75
	CORE		Gray, medium hard, SILTSTONE with interlayers of sand			60	53		60 Waxed Core 60.92-61.33
	CORE					60	57		65 Waxed Core 66.25-66.84
	CORE					53	27	22.67	70 Waxed Core 70.00-70.33
	CORE					58	40		75 Waxed Core 75.66-76.25
	CORE					43	Nil		80
	CORE					60	40	26.10	85 Waxed Core 85.00-85.50
	CORE					40	33		90 Waxed Core 90.00-90.50
	CORE					47	30		95 Waxed Core 95.25-95.92
100									100

GEOTECHNICAL SERVICES

Bore Hole No ABH-2

Sheet 3 of 3

SUBSURFACE EXPLORATION LOG

Project PLOT #13, CL-7, CIVIL LINES QUARTERS, DISTRICT SOUTH, KARACHI

Ground Water Depth 11.50 feet

Geologist S.M.Umer Nazim

Type of Boring ROTARY

Date 12.05.23 to 14.05.23

Depth (Feet)	Sample No.	Classification	STRATUM DESCRIPTION	Dia of Casing /Hole	SPT 'N' Count	Percent Recovery	R.Q.D.	Unconfined Compression (kg/sq.cm)	REMARKS (Feet)
105	CORE		Gray, medium hard, SILTSTONE with interlayers of sand		SPT NOT FEASIBLE	50	07	15.45	Waxed Core 100.50-100.84
	CORE		Gray, medium hard, SANDSTONE with interlayers of silt			53	33		Waxed Core 106.50-106.92
	CORE					43	12		Waxed Core 111.00-111.58
	CORE					50	Nil		
125	CORE					53	27	24.12	Waxed Core 120.84-121.25
			BOTTOM OF BOREHOLE						

105 110 115 120 125

Chief Engineer (Retd)
S.E. (Civil), Deptt. of Planning & Development, Govt. of Sindh
PEC Registration/2017 (Consult)/882

GEOTECHNICAL SERVICES

Civil & Geotechnical Engineers
Testing Laboratory
52/3, Darul Aman Society, Haider Ali Road, Karachi.
Ph :(021) 34532851 - 34535607
E-mail : info@geotechnicalservices.com.pk
Web : www.geotechnicalservices.com.pk

Ahme[illegible]
B.E. (Civil), M.Engg. AIT Bangkok
Hasan Ahmed Saeed
B.E. (Civil), M.Sc. Birmingham, UK
Geotechnical Engineer
Maria Khan
B.E. (Urban), NED
Design Engineer
Kainat Qadeer
B.E. (Civil), NED
Design Engineer

PROJECT: PLOT NO. 13, CL-7, CIVIL LINE QUARTERS, DISTRICT SOUTH, KARACHI

DATE: May 26, 2023.
L.R. No.: 229/23

GRAIN SIZE ANALYSIS (PER CENT FINER BY WEIGHT)
SIEVE SIZES IN mm

HYDROMETER (DIA IN mm)

S No	BH NO.	SAMPLE	DEPTH (ft)	75.0	37.5	19.0	9.50	4.75	2.36	1.18	0.600	0.300	0.150	0.075	.05	.01	.002	.001
1.	BH-1	SPT-2	6.00	-	100	94	89	79	58	46	43	40	38	34	-	-	-	-
2.	BH-1	Waxed Core	14.50-15.00	-	-	-	100	96	91	89	88	86	83	74	66	50	30	14
3.	BH-2	SPT-1	3.00	-	-	100	92	82	69	59	55	49	45	38	-	-	-	-
4.	BH-2	DS	7.50-10.00	100	75	01	-	-	-	-	-	-	-	-	-	-	-	-
5.	BH-2	Waxed Core	19.08-19.50	-	-	-	-	-	100	98	97	96	95	93	80	56	33	15
6.	BH-3	SPT-4	12.00	-	-	100	91	80	69	56	53	50	48	45	38	30	26	13
7.	BH-3	Waxed Core	19.50-20.00	-	-	-	-	100	97	95	94	93	92	91	81	60	34	15
8.	BH-4	DS	3.00-6.00	100	71	60	11	01	-	-	-	-	-	-	-	-	-	-
9.	BH-4	DS	9.00-12.00	100	58	08	01	-	-	-	-	-	-	-	-	-	-	-
10.	BH-6	SPT-2	15.00	-	-	-	100	90	83	76	73	68	63	54	46	38	28	15
11.	BH-7	DS	3.00-5.00	100	54	12	11	10	09	08	07	06	05	04	-	-	-	-
12.	BH-8	SPT-2	15.00	-	-	100	87	86	84	82	81	79	78	75	66	54	32	15
13.	BH-9	SPT-1	3.00	-	-	-	-	100	98	94	91	86	84	80	72	54	34	16
14.	BH-10	DS	3.84-6.00	100	53	32	21	18	16	13	12	11	10	09	-	-	-	-
15.	BH-10	Core	16.50-20.00	-	-	-	100	98	96	94	93	92	91	83	73	52	32	15
16.	ABH-1	SPT-1	3.00	-	100	94	77	68	58	45	40	36	35	31	-	-	-	-
17.	ABH-1	DS	7.00-10.00	100	61	15	12	10	09	08	07	06	05	04	-	-	-	-
18.	ABH-2	SPT-2	5.00	-	100	89	75	66	54	43	38	30	29	25	-	-	-	-
19.	ABH-2	DS	12.00-15.00	-	100	37	18	17	16	15	14	13	12	11	-	-	-	-
20.	ABH-2	Waxed Core	15.17-15.58	-	-	-	-	-	-	-	-	-	100	99	87	65	34	15

GEOTECHNICAL SERVICES

Civil & Geotechnical Engineers
Testing Laboratory
52/3, Darul Aman Society, Haider Ali Road, Karachi.
Ph :(021) 34532851 - 34535607
E-mail : info@geotechnicalservices.com.pk
Web : www.geotechnicalservices.com.pk

Saif Ahmed Saeed
B.E. (Civil), M.Engg. AIT Bangkok
Hasan Ahmed Saeed
B.E. (Civil), M.Sc. Birmingham, UK
Geotechnical Engineer
Maria Khan
B.E. (Urban), NED
Design Engineer
Kainat Qadeer
B.E. (Civil), NED
Design Engineer

PROJECT: PLOT NO. 13, CL-7, CIVIL LINE QUARTERS, DISTRICT SOUTH, KARACHI

DATE: May 26, 2023.
L.R. No.: 229/23
SHEET 1 OF 3

ATTERBERG LIMITS / MOISTURE CONTENT

S.NO.	BORING NO.	SAMPLE	DEPTH (ft)	LIQUID LIMIT	PLASTICITY INDEX	MOISTURE CONTENT (%)
1.	BH-1	SPT-2	6.00	23	07	12.81
2.	BH-1	Waxed Core	14.50-15.00	32	12	19.39
3.	BH-1	Waxed Core	19.58-20.00	38	14	17.55
4.	BH-1	Waxed Core	29.58-30.00	43	18	18.66
5.	BH-1	Waxed Core	49.00-49.50	40	15	12.87
6.	BH-1	Waxed Core	64.00-64.33	33	12	9.58
7.	BH-1	Waxed Core	75.25-75.58	33	13	8.75
8.	BH-1	Waxed Core	92.00-92.42	33	11	9.07
9.	BH-2	Waxed Core	19.08-19.50	34	12	16.21
10.	BH-2	Waxed Core	26.08-26.42	31	12	17.33
11.	BH-2	Waxed Core	34.25-34.58	32	12	21.22
12.	BH-2	Waxed Core	50.17-50.58	42	17	13.48
13.	BH-3	SPT-4	12.00	30	08	16.53
14.	BH-3	Waxed Core	19.50-20.00	35	13	16.44
15.	BH-3	Waxed Core	23.17-23.58	36	13	19.20
16.	BH-3	Waxed Core	41.00-41.42	39	15	12.57
17.	BH-3	Waxed Core	56.50-57.00	33	10	11.82
18.	BH-3	Waxed Core	73.00-73.42	35	12	8.10
19.	BH-3	Waxed Core	82.00-82.33	33	12	8.84

.....cont'd

GEOTECHNICAL SERVICES

Civil & Geotechnical Engineers
Testing Laboratory
52/3, Darul Aman Society, Haider Ali Road, Karachi.
Ph :(021) 34532851 - 34535607
E-mail : info@geotechnicalservices.com.pk
Web : www.geotechnicalservices.com.pk

Saif Ahmed Saeed
B.E. (Civil), M.Engg. AIT Bangkok
Hasan Ahmed Saeed
B.E. (Civil), M.Sc. Birmingham, UK
Geotechnical Engineer
Maria Khan
B.E. (Urban), NED
Design Engineer
Kainat Qadeer
B.E. (Civil), NED
Design Engineer

PROJECT: PLOT NO. 13, CL-7, CIVIL LINE QUARTERS, DISTRICT SOUTH, KARACHI

DATE: May 26, 2023.
L.R. No.: 229/23
SHEET 2 OF 3

ATTERBERG LIMITS / MOISTURE CONTENT

S.NO.	BORING NO.	SAMPLE	DEPTH (ft)	LIQUID LIMIT	PLASTICITY INDEX	MOISTURE CONTENT (%)
20.	BH-4	Waxed Core	21.00-21.58	39	15	15.27
21.	BH-4	Waxed Core	49.25-49.58	37	14	14.29
22.	BH-5	Waxed Core	55.66-56.00	39	15	12.84
23.	BH-5	Waxed Core	70.33-70.66	34	12	10.40
24.	BH-5	Waxed Core	89.25-89.75	35	12	9.00
25.	BH-6	SPT-2	15.00	33	12	16.96
26.	BH-7	Waxed Core	17.50-17.84	38	14	19.49
27.	BH-7	Waxed Core	39.00-39.42	33	12	14.05
28.	BH-7	Waxed Core	72.00-72.50	31	10	9.78
29.	BH-7	Waxed Core	85.25-85.75	32	12	8.15
30.	BH-8	SPT-2	15.00-16.50	33	11	21.78
31.	BH-8	Waxed Core	51.50-52.00	34	12	10.57
32.	BH-9	SPT-1	3.00	36	12	25.81
33.	BH-9	Waxed Core	19.17-19.66	35	12	20.25
34.	BH-9	Waxed Core	41.17-41.66	30	10	18.05
35.	BH-9	Waxed Core	69.17-69.66	32	12	9.82
36.	BH-9	Waxed Core	84.00-84.42	31	11	7.82
37.	BH-9	Waxed Core	95.00-95.50	33	12	4.91

.....cont'd

GEOTECHNICAL SERVICES

Civil & Geotechnical Engineers
Testing Laboratory
52/3, Darul Aman Society, Haider Ali Road, Karachi.
Ph :(021) 34532851 - 34535607
E-mail : info@geotechnicalservices.com.pk
Web : www.geotechnicalservices.com.pk

Saif Ahmed Saeed
B.E. (Civil), M.Engg. AIT Bangkok
Hasan Ahmed Saeed
B.E. (Civil), M.Sc. Birmingham, UK
Geotechnical Engineer
Maria Khan
B.E. (Urban), NED
Design Engineer
Kainat Qadeer
B.E. (Civil), NED
Design Engineer

PROJECT: PLOT NO. 13, CL-7, CIVIL LINE QUARTERS, DISTRICT SOUTH, KARACHI

DATE: May 26, 2023.
L.R. No.: 229/23
SHEET 3 OF 3

ATTERBERG LIMITS / MOISTURE CONTENT

S.NO.	BORING NO.	SAMPLE	DEPTH (ft)	LIQUID LIMIT	PLASTICITY INDEX	MOISTURE CONTENT (%)
38.	BH-10	Core	16.50-20.00	33	13	7.41
39.	BH-10	Waxed Core	58.00-58.42	28	10	13.50
40.	BH-10	Waxed Core	71.50-72.00	32	11	11.09
41.	BH-10	Waxed Core	81.00-81.42	31	11	8.58
42.	ABH-1	Waxed Core	25.25-25.84	36	14	15.75
43	ABH-1	Waxed Core	35.66-36.17	33	11	5.85
44.	ABH-1	Waxed Core	45.33-45.75	39	15	17.34
45.	ABH-1	Waxed Core	60.25-60.84	30	10	7.62
46.	ABH-1	Waxed Core	75.42-75.84	36	13	8.13
47.	ABH-1	Waxed Core	90.84-91.17	30	11	8.63
48.	ABH-1	Waxed Core	100.42-101.00	25	08	10.00
49.	ABH-2	Waxed Core	15.17-15.58	34	13	14.54
50.	ABH-2	Waxed Core	20.33-20.66	30	11	11.27
51.	ABH-2	Waxed Core	30.50-31.00	36	14	15.93
52.	ABH-2	Waxed Core	41.00-41.50	38	15	11.71
53.	ABH-2	Waxed Core	56.17-56.75	38	15	11.95
54.	ABH-2	Waxed Core	70.00-70.33	31	10	8.52
55.	ABH-2	Waxed Core	85.00-85.50	25	08	9.25
56.	ABH-2	Waxed Core	100.50-100.84	30	10	3.63
57.	ABH-2	Core	120.00-125.00	31	10	3.10

GEOTECHNICAL SERVICES

Civil & Geotechnical Engineers
Testing Laboratory
52/3, Darul Aman Society, Haider Ali Road, Karachi.
Ph :(021) 34532851 - 34535607
E-mail : info@geotechnicalservices.com.pk
Web : www.geotechnicalservices.com.pk

...if Ahi... ...eed
B.E. (Civil), M.Engg. AIT Bangkok
Hasan Ahmed Saeed
B.E. (Civil), M.Sc. Birmingham, UK
Geotechnical Engineer
Maria Khan
B.E. (Urban), NED
Design Engineer
Kainat Qadeer
B.E. (Civil), NED
Design Engineer

PROJECT: PLOT NO. 13, CL-7, CIVIL LINE QUARTERS, DISTRICT SOUTH, KARACHI

DATE: May 26, 2023.
L.R. No.: 229/23
SHEET 1 OF 4

UNCONFINED COMPRESSION / BULK DENSITY

S.NO.	BORING NO.	SAMPLE	DEPTH (ft)	UNCONFINED COMPRESSION		BULK DENSITY (gm/cc)
				qu (kg/cm^2)	STRAIN (%)	
1.	BH-1	Waxed Core	14.50-15.00	2.57	10.65	2.071
2.	BH-1	Waxed Core	19.58-20.00	1.86	6.47	2.062
3.	BH-1	Waxed Core	29.58-30.00	3.41	6.60	2.079
4.	BH-1	Waxed Core	49.00-49.50	7.59	4.62	2.146
5.	BH-1	Waxed Core	64.00-64.33	11.85	1.01	2.170
6.	BH-1	Waxed Core	75.25-75.58	26.75	2.39	2.261
7.	BH-1	Waxed Core	92.00-92.42	18.96	1.46	2.204
8.	BH-2	Waxed Core	19.08-19.50	2.18	8.90	2.069
9.	BH-2	Waxed Core	26.08-26.42	2.90	18.07	2.074
10.	BH-2	Waxed Core	34.25-34.58	1.46	9.22	2.058
11.	BH-2	Waxed Core	50.17-50.58	9.93	5.35	2.157
12.	BH-3	Waxed Core	19.50-20.00	3.76	12.44	2.082
13.	BH-3	Waxed Core	23.17-23.58	2.70	7.26	2.071
14.	BH-3	Waxed Core	41.00-41.42	14.65	3.65	2.187
15.	BH-3	Waxed Core	56.50-57.00	3.46	7.31	2.080
16.	BH-3	Waxed Core	73.00-73.42	17.18	1.22	2.197
17.	BH-3	Waxed Core	82.00-82.33	11.47	2.82	2.168
18.	BH-4	Waxed Core	21.00-21.58	2.88	4.76	2.072
19.	BH-4	Waxed Core	25.00-25.25	120.24	1.63	2.333

.....cont'd

GEOTECHNICAL SERVICES

Civil & Geotechnical Engineers
Testing Laboratory
52/3, Darul Aman Society, Haider Ali Road, Karachi.
Ph :(021) 34532851 - 34535607
E-mail : info@geotechnicalservices.com.pk
Web : www.geotechnicalservices.com.pk

Ahm[illegible]ed
B.E. (Civil), M.Engg. AIT Bangkok
Hasan Ahmed Saeed
B.E. (Civil), M.Sc. Birmingham, UK
Geotechnical Engineer
Maria Khan
B.E. (Urban), NED
Design Engineer
Kainat Qadeer
B.E. (Civil), NED
Design Engineer

PROJECT: PLOT NO. 13, CL-7, CIVIL LINE QUARTERS, DISTRICT SOUTH, KARACHI

DATE: May 26, 2023.
L.R. No.: 229/23

UNCONFINED COMPRESSION / BULK DENSITY

S.NO.	BORING NO.	SAMPLE	DEPTH (ft)	UNCONFINED COMPRESSION		BULK DENSITY (gm/cc)
				qu (kg/cm^2)	STRAIN (%)	
20.	BH-4	Waxed Core	36.17-36.58	9.36	2.21	2.151
21.	BH-4	Waxed Core	49.25-49.58	7.65	3.27	2.147
22.	BH-5	Waxed Core	5.00-5.25	119.66	1.64	2.332
23.	BH-5	Waxed Core	15.50-15.66	132.11	1.51	2.335
24.	BH-5	Waxed Core	30.00-30.50	21.50	2.85	2.086
25.	BH-5	Waxed Core	55.66-56.00	16.04	2.53	2.173
26.	BH-5	Waxed Core	70.33-70.66	11.86	1.58	2.173
27.	BH-5	Waxed Core	89.25-89.75	29.83	3.39	2.287
28.	BH-6	Core	5.00-10.00	262.05	1.38	2.343
29.	BH-6	Waxed Core	23.66-24.00	29.29	1.98	2.298
30.	BH-6	Waxed Core	32.17-32.42	29.93	1.86	2.302
31.	BH-6	Waxed Core	44.00-44.33	14.46	1.36	2.171
32.	BH-6	Waxed Core	51.00-51.58	131.31	1.54	2.335
33.	BH-7	Waxed Core	7.50-7.66	180.56	1.42	2.337
34.	BH-7	Waxed Core	17.50-17.84	1.88	7.30	2.069
35.	BH-7	Waxed Core	28.00-28.25	26.85	1.85	2.273
36.	BH-7	Waxed Core	39.00-39.42	12.00	2.43	2.162
37.	BH-7	Waxed Core	46.00-46.42	17.74	2.41	2.183
38.	BH-7	Waxed Core	59.00-59.50	9.41	2.59	2.150

.....cont`d

GEOTECHNICAL SERVICES

Civil & Geotechnical Engineers
Testing Laboratory

52/3, Darul Aman Society, Haider Ali Road, Karachi.
Ph :(021) 34532851 - 34535607
E-mail : info@geotechnicalservices.com.pk
Web : www.geotechnicalservices.com.pk

Saif Ahmed Saeed
B.E. (Civil), M.Engg. AIT Bangkok
Hasan Ahmed Saeed
B.E. (Civil), M.Sc. Birmingham, UK
Geotechnical Engineer
Maria Khan
B.E. (Urban), NED
Design Engineer
Kainat Qadeer
B.E. (Civil), NED
Design Engineer

PROJECT: PLOT NO. 13, CL-7, CIVIL LINE QUARTERS, DISTRICT SOUTH, KARACHI

DATE: May 26, 2023.
L.R. No.: 229/23
SHEET 3 OF 4

UNCONFINED COMPRESSION / BULK DENSITY

S.NO.	BORING NO.	SAMPLE	DEPTH (ft)	UNCONFINED COMPRESSION		BULK DENSITY (gm/cc)
				qu (kg/cm^2)	STRAIN (%)	
39.	BH-7	Waxed Core	72.00-72.50	11.91	2.40	2.159
40.	BH-7	Waxed Core	85.25-85.75	22.22	2.04	2.219
41.	BH-8	Waxed Core	5.84-6.08	157.65	1.61	2.337
42.	BH-8	Waxed Core	25.50-26.00	18.72	2.94	2.203
43.	BH-8	Waxed Core	39.00-39.50	9.87	2.78	2.153
44.	BH-8	Waxed Core	51.50-52.00	25.51	2.70	2.267
45.	BH-9	Waxed Core	19.17-19.66	2.22	10.34	2.073
46.	BH-9	Waxed Core	25.00-25.50	36.87	1.21	2.296
47.	BH-9	Waxed Core	41.17-41.66	2.14	6.81	2.071
48.	BH-9	Waxed Core	55.00-55.42	28.40	1.12	2.286
49.	BH-9	Waxed Core	69.17-69.66	22.62	1.98	2.233
50.	BH-9	Waxed Core	84.00-84.42	22.76	1.32	2.234
51.	BH-9	Waxed Core	95.00-95.50	19.46	2.25	2.206
52.	BH-10	Waxed Core	7.17-7.50	220.77	1.52	2.340
53.	BH-10	Waxed Core	19.17-19.50	33.97	2.20	2.314
54.	BH-10	Waxed Core	21.00-21.42	50.60	1.50	2.321
55.	BH-10	Waxed Core	30.33-30.66	26.65	2.03	2.260
56.	BH-10	Waxed Core	42.00-42.33	100.07	1.71	2.331
57.	BH-10	Waxed Core	58.00-58.42	28.99	2.35	2.290
58.	BH-10	Waxed Core	71.50-72.00	12.10	1.31	2.177
59.	BH-10	Waxed Core	81.00-81.42	15.51	1.31	2.198

.....cont'd

GEOTECHNICAL SERVICES

Civil & Geotechnical Engineers
Testing Laboratory
52/3, Darul Aman Society, Haider Ali Road, Karachi.
Ph :(021) 34532851 - 34535607
E-mail : info@geotechnicalservices.com.pk
Web : www.geotechnicalservices.com.pk

Saif Ahmed Saeed
B.E. (Civil), M.Engg. AIT Bangkok
Hasan Ahmed Saeed
B.E. (Civil), M.Sc. Birmingham, UK
Geotechnical Engineer
Maria Khan
B.E. (Urban), NED
Design Engineer
Kainat Qadeer
B.E. (Civil), NED
Design Engineer

PROJECT: PLOT NO. 13, CL-7, CIVIL LINE QUARTERS, DISTRICT SOUTH, KARACHI

DATE: May 26, 2023.
L.R. No.: 229/23
SHEET 4 OF 4

UNCONFINED COMPRESSION / BULK DENSITY

S.NO.	BORING NO.	SAMPLE	DEPTH (ft)	UNCONFINED COMPRESSION		BULK DENSITY (gm/cc)
				qu (kg/cm^2)	STRAIN (%)	
60.	ABH-1	Waxed Core	15.84-16.08	86.91	1.94	2.317
61.	ABH-1	Waxed Core	21.00-21.50	78.66	1.98	2.316
62.	ABH-1	Waxed Core	25.25-25.84	3.20	8.28	2.080
63.	ABH-1	Waxed Core	35.66-36.17	19.34	1.04	2.216
64.	ABH-1	Waxed Core	45.33-45.45	3.86	9.96	2.085
65.	ABH-1	Waxed Core	60.25-60.84	16.35	3.53	2.191
66.	ABH-1	Waxed Core	75.42-75.84	13.49	1.79	2.177
67.	ABH-1	Waxed Core	90.84-91.17	7.54	3.57	2.125
68.	ABH-1	Waxed Core	100.42-101.00	5.76	2.44	2.107
69.	ABH-1	Waxed Core	116.00-116.58	25.73	1.11	2.265
70.	ABH-2	Waxed Core	15.17-15.58	1.79	6.94	2.064
71.	ABH-2	Waxed Core	20.33-20.66	58.64	1.30	2.298
72.	ABH-2	Waxed Core	30.50-31.00	2.08	7.67	2.072
73.	ABH-2	Waxed Core	41.00-41.50	9.57	2.56	2.147
74.	ABH-2	Waxed Core	56.17-565.75	9.34	2.23	2.143
75.	ABH-2	Waxed Core	70.00-70.33	22.67	2.83	2.254
76.	ABH-2	Waxed Core	85.00-85.50	26.10	1.26	2.276
77.	ABH-2	Waxed Core	100.50-100:84	15.45	1.54	2.184
78.	ABH-2	Waxed Core	120.84-121.25	24.12	1.06	2.262

GEOTECHNICAL SERVICES

Civil & Geotechnical Engineers
Testing Laboratory
52/3, Darul Aman Society, Haider Ali Road, Karachi.
Ph :(021) 34532851 - 34535607
E-mail : info@geotechnicalservices.com.pk
Web : www.geotechnicalservices.com.pk

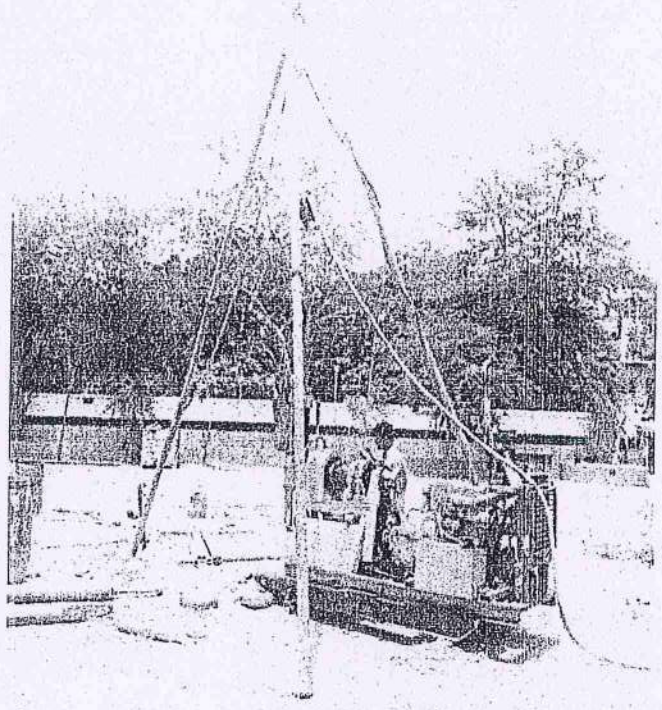
Saif Ahmed Saeed
B.E. (Civil), M.Engg. AIT Bangkok
Hasan Ahmed Saeed
B.E. (Civil), M.Sc. Birmingham, UK
Geotechnical Engineer
Maria Khan
B.E. (Urban), NED
Design Engineer
Kainat Qadeer
B.E. (Civil), NED
Design Engineer

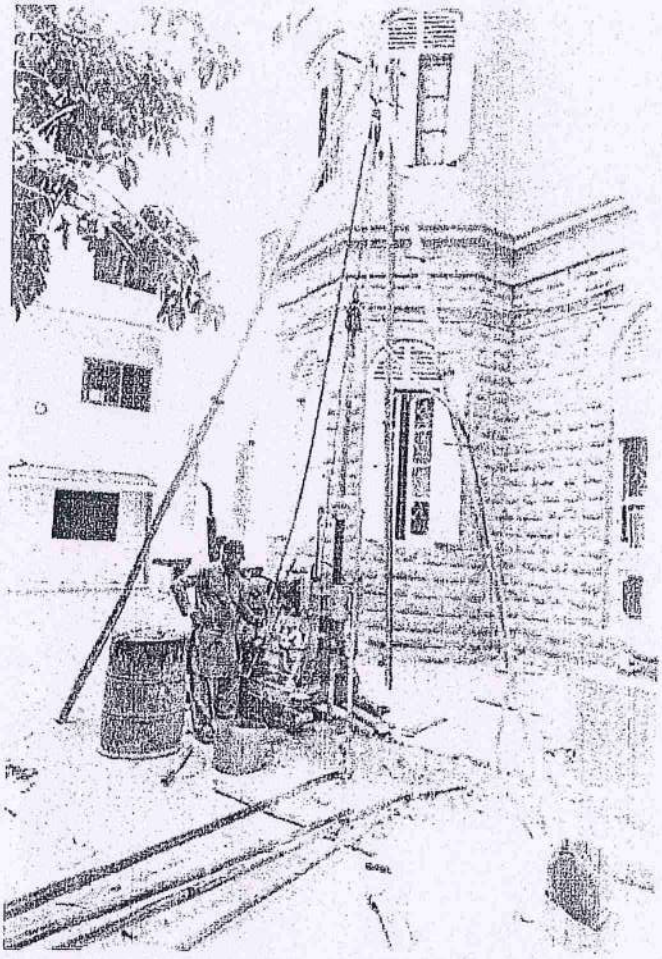
PROJECT: PLOT NO. 13, CL-7, CIVIL LINE QUARTERS, DISTRICT SOUTH, KARACHI

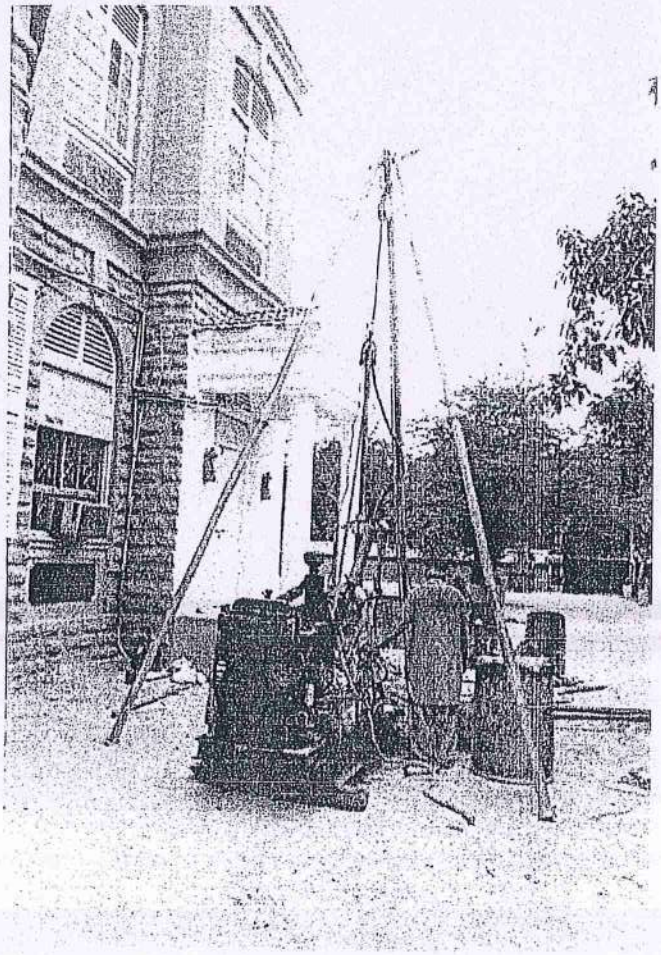
DATE: May 26, 2023.
L.R. No.: 229/23

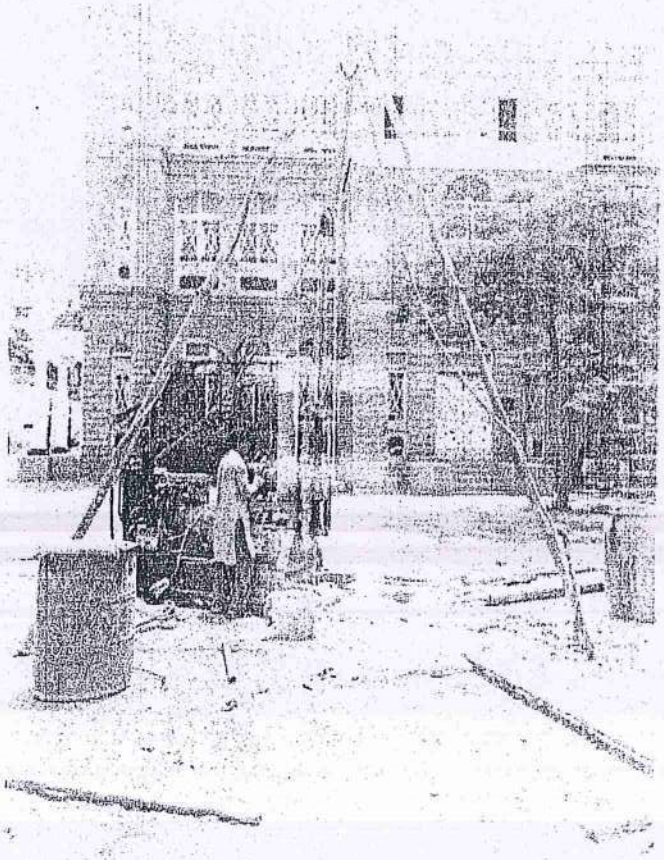
CHEMICAL TESTS

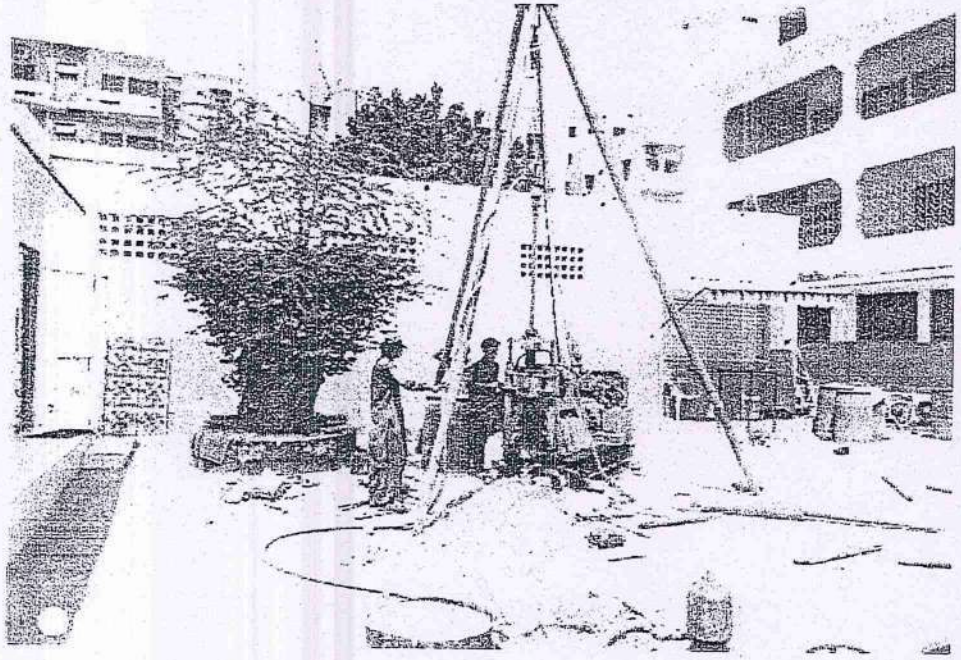
S. NO.	BORING NO.	SAMPLE	DEPTH (ft)	TOTAL DISSOLVED SALTS	SULPHATE CONTENT	CHLORIDE CONTENT	pH VALUE
1.	BH-1	SPT-1	3.00	-	0.050 %	-	-
2.	BH-4	DS	3.00-5.00	-	0.044 %	-	-
3.	BH-6	DS	0.00-3.00	-	0.068 %	-	-
4.	BH-9	SPT-1	3.00	-	0.058 %	-	-
5.	ABH-1	SPT-1	3.00	-	0.054 %	-	-
6.	BH-1	WATER	-	1060 mg/lit	185 mg/lit	390 mg/lit	7.60
7.	BH-2	WATER	-	1000 mg/lit	165 mg/lit	380 mg/lit	7.50
8.	BH-3	WATER	-	1200 mg/lit	310 mg/lit	430 mg/lit	7.60
9.	BH-6	WATER	-	1700 mg/lit	264 mg/lit	600 mg/lit	7.60
10.	BH-7	WATER	-	1300 mg/lit	246 mg/lit	480 mg/lit	7.60
11.	BH-9	WATER	-	1100 mg/lit	195 mg/lit	400 mg/lit	7.60
12.	ABH-1	WATER	-	1800 mg/lit	165 mg/lit	650 mg/lit	7.70

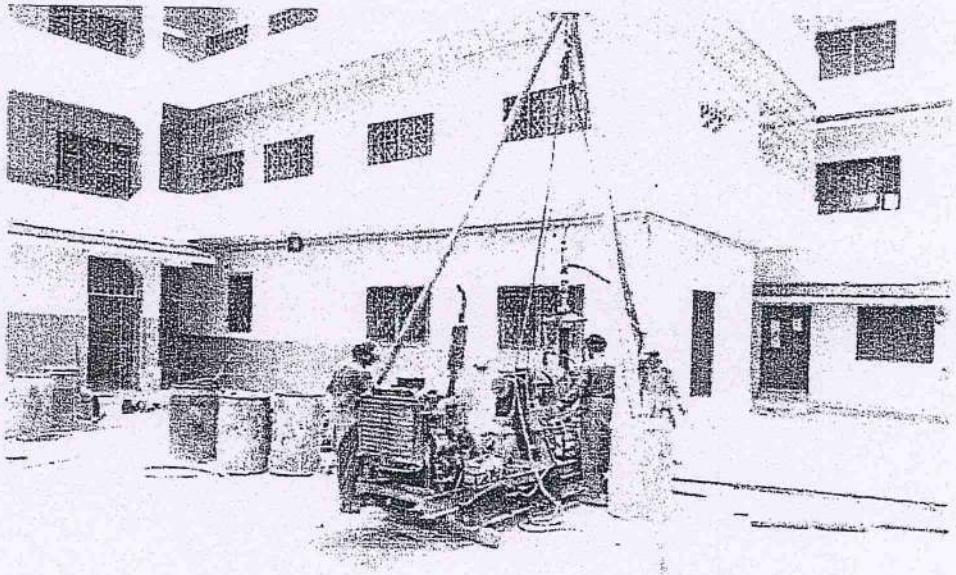


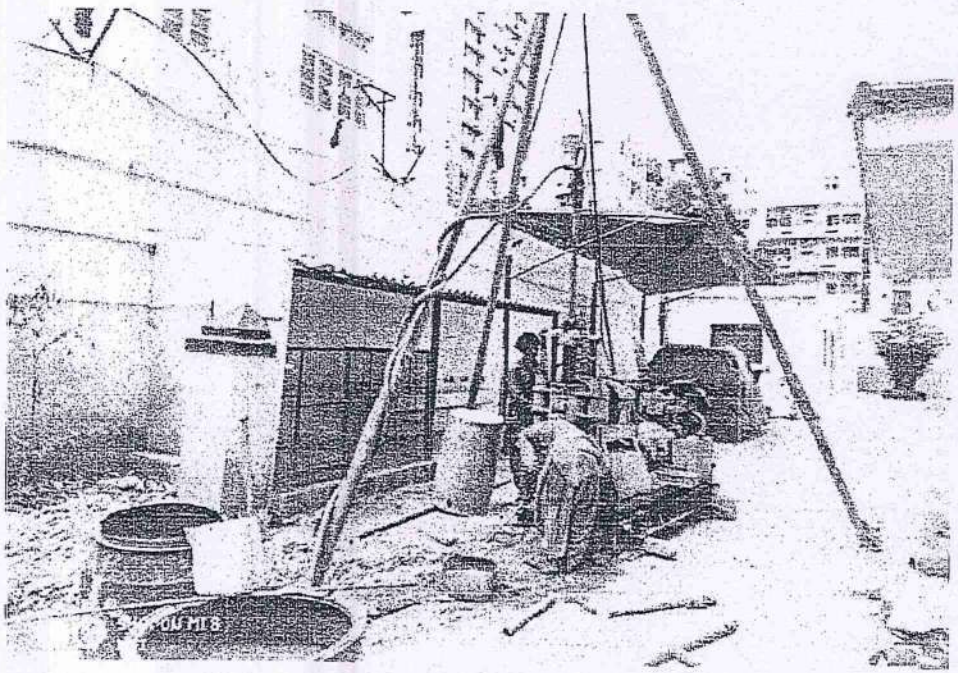




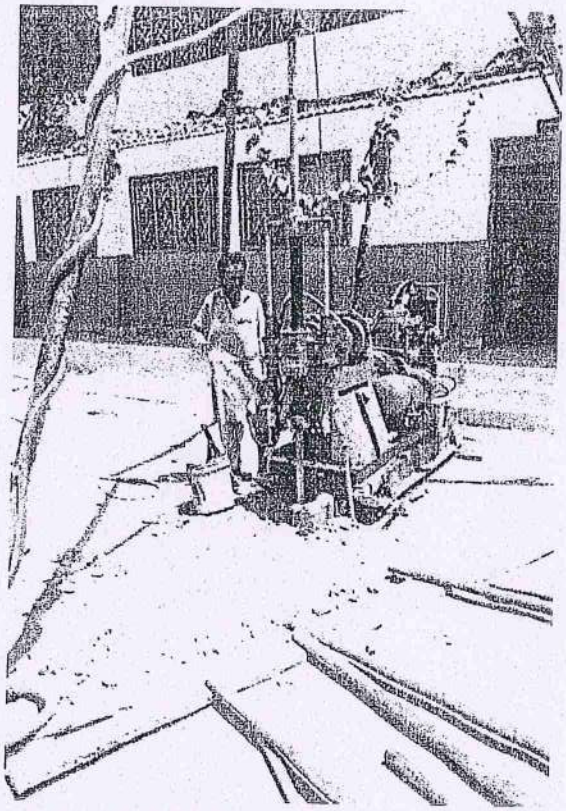


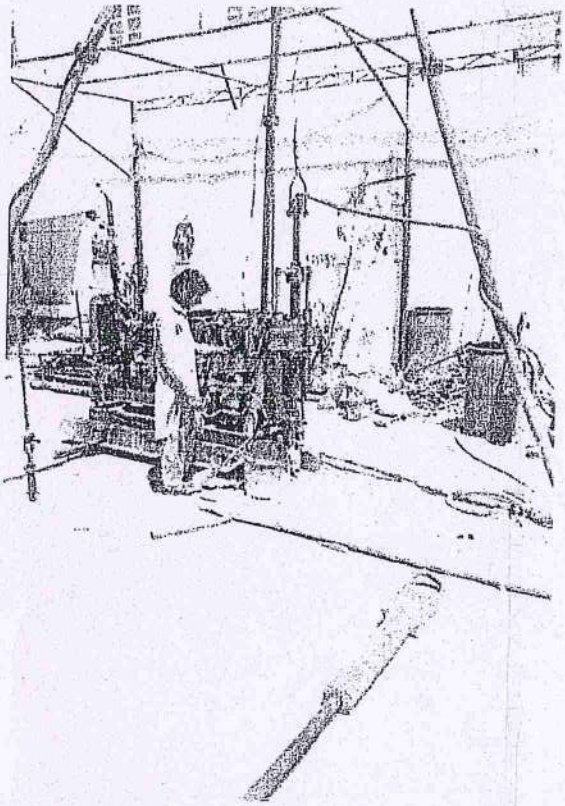


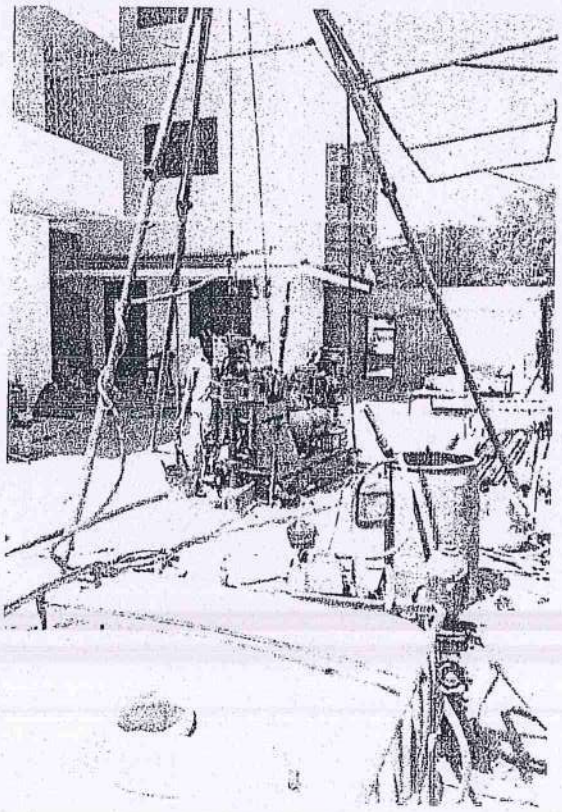


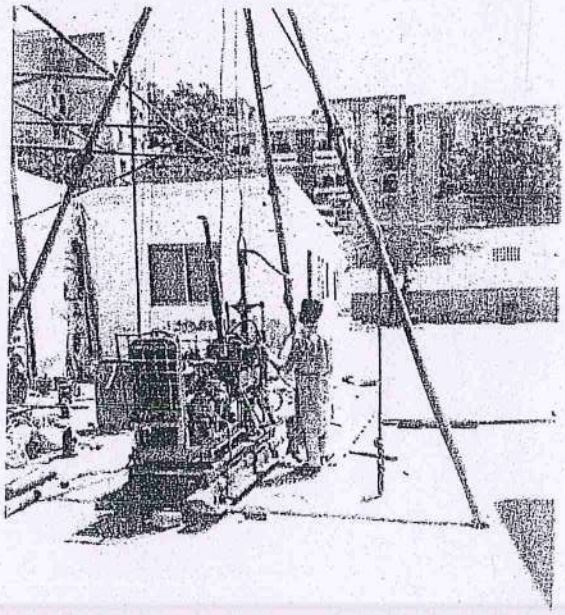












Annex – VI: Traffic Impact Study

Final Report

Traffic Impact Study for

Metro Address – Civil Lines, Fatima Jinnah Road



May 2026

METRO GROUP
BUILDERS & DEVELOPERS

Exponent Engineers

Table of Contents

List of Figures iii

List of Tables iv

1 INTRODUCTION 1-1

1.1 Background: 1-1

1.2 Objectives and Scope of Study: 1-1

1.3 Project Location: 1-2

1.4 Site Access & Egress Plan: 1-3

1.5 Road Infrastructure: 1-4

2 EXISTING TRAFFIC 2-1

2.1 Introduction: 2-1

2.2 Field Surveys: 2-1

2.3 Traffic Surveys Results: 2-1

2.3.1 Flow Characteristics: 2-1

3 TRAFFIC ESTIMATION 3-4

3.1 Land Use and Area Bifurcation 3-4

3.2 Trip Generation 3-5

3.3 Trip Distribution: 3-6

4 TRAFFIC IMPACT ASSESSMENT 4-1

4.1 Software Used 4-1

4.1.1 PTV VISSIM: 4-1

4.2 Model Setup 4-1

4.3 Intersection Performance Criteria: 4-2

4.4 Road Network: 4-2

4.5 Level of Service 4-2

4.6 Junctions Analyzed 4-3

4.7 Model Results: 4-4

4.8 Level of Service Analysis: 4-5

4.9 Future Case : Signalization of Lilly Bridge Junction (Junction 2) 4-7

5 Parking Adequacy 5-1
5.1 Parking Analysis 5-1
5.1.1 SBCA Parking Standards 5-1
5.1.2 Parking Provided 5-2
5.1.3 Parking Adequacy Summary 5-3
5.2 Swept Path Analysis 5-4
6 Summary 6-1
6.1 Summary 6-1

List of Figures

Figure 1-1 Project Location 1-2
Figure 1-2 Entry & Exit from the Development 1-3
Figure 1-3 Road Network of the Development 1-4
Figure 2-1 Turning Movement Count Locations 2-2
Figure 2-2 Traffic Volumes in AM Peak 2-3
Figure 2-3 Traffic Volumes in PM Peak 2-3
Figure 3-1 Entrance Distribution Towards Development 3-6
Figure 3-2 Exit Distribution From Development 3-7
Figure 3-3 Entrance Distribution in AM Peak Hour 3-7
Figure 3-4 Exit Distribution at AM Peak Hours 3-8
Figure 3-5 Entrance Distribution in PM Peak Hour 3-8
Figure 3-6 Exit Distribution at PM Peak Hours 3-9
Figure 4-1 Junctions Analyzed 4-3
Figure 4-2 Level of Service of the analyzed junction in AM Peak 4-5
Figure 4-3 Level of Service of the analyzed junctions in PM Peak 4-6
Figure 4-4 Proposed Junction Improvement at Lilly Bridge & Cantt Station Road Junction 4-7
Figure 5-1 Swept Path Analysis of Floor – Basement 5-5
Figure 5-2 Swept Path Analysis of Floor – Ground Floor (Gate 1) 5-6
Figure 5-3 Swept Path Analysis of Floor – Ground Floor (Gate 2) 5-7
Figure 5-4 Swept Path Analysis of Floor – Ground Floor (Gate 3) 5-8
Figure 5-5 Swept Path Analysis of Floor – First Floor 5-9

List of Tables

Table 2-1 Trip Generation Rates from Previous Studies 3-5
Table 2-2 Project Generated Trips – AM Peak Hour 3-5
Table 2-3 Project Generated Trips – PM Peak Hour 3-5
Table 4-1 Cases and Scenarios Considered 4-1
Table 3-2 Level of Service for Un-signalized Intersections 4-2
Table 3-3 Level of Service for Signalized Intersections 4-3
Table 3-4 HCM LOS Analysis for AM Peak 4-4
Table 3-5 HCM LOS Analysis for PM Peak 4-4
Table 4-1 Parking Calculations as per SBCA 5-1
Table 4-2 Parking Provided per Floor 5-2
Table 4-3 Parking Adequacy Summary 5-3
Table 4-4 Parking Adequacy after adjustment 5-3

1 INTRODUCTION

1.1 Background:

Man has been associated with several different activities since the inception of mankind, but travelling is the most primary activity performed by man for fulfilling his basic needs of life. Since ages the modes of travelling have been transformed with integrating demands and purposes for travel. Thus, it is not audacious to state that almost every human activity is always related to a travelling need, even when driving from one place to another for leisure, the reason for travel still exists. Enlightening the above statement, characteristics of the trips produced or attracted reveal that there are many reasons behind these and therefore trips can be classified based on reason to travel.

The above discussion suggests that all land-use based activities produce trips and thus have some impact / contribution on the traffic network in the vicinity or 'Influence Area'. However, the size of this Influence Area depends on factors such as the magnitude of human activity, placement along the existing traffic network, number of trips generated and / or attracted, existing traffic situation in the area, and socio-economic characteristics of the area as well as of the people involved in the activities, etc.

1.2 Objectives and Scope of Study:

The proposed project involves the development of a 46-storey high-rise mixed-use residential tower with one basement level and a rooftop helipad, located at Plot No. 13, C.L.-7, Civil Lines, Fatima Jinnah Road Street, Karachi. The development is bounded by Fatima Jinnah Road to the south and Aamir Khosa Road to the north. The project accommodates residential apartments on the upper floors (7th through 46th) with utility services in the basement level. Given the residential land use and scale of the development, it is anticipated to generate and attract a significant volume of vehicular trips, necessitating a comprehensive Transportation Impact Study (TIS).

The purpose of this Traffic Impact Study (TIS) is to analyze the internal circulation and parking adequacy of the development. It aims to find a smooth circulation pattern for vehicles under normal and emergency.

Furthermore, it finds smooth access between the proposed development and the surrounding roads and to identify what improvements may be required to adequately and safely accommodate the generated traffic.

The results will be used to develop strategies to mitigate the adverse impact, if any, on the transportation system within the study area.

1.3 Project Location:

The project site is located at Plot No. 13, C.L.-7, Civil Lines, Fatima Jinnah Road Street, Karachi. The development is bounded by Fatima Jinnah Road and Aamir Khosa Road as shown in the figure below:



Figure 1-1 Project Location

1.4 Site Access & Egress Plan:

As discussed, the proposed development is located adjacent to the Grand Marquee. The proposed development has three ramps for entry and exits (Bi- directional). The main access is located at Fatima Jinnah Road, consists of a single-lane access for inbound traffic, while the exit is also provided as a single lane for outbound traffic, both located on the Northwest side of the site.



Figure 1-2 Entry & Exit from the Development

1.5 Road Infrastructure:

The figure below shows the road network of the development, the project site is well connected to the surrounding road network, with direct access provided from Fatima Jinnah Road and proximity to Dr. Daud Pota Road. These roadways facilitate efficient vehicular movement to and from the site and ensure smooth integration with the existing urban traffic network.



Figure 1-3 Road Network of the Development

2 EXISTING TRAFFIC

2.1 Introduction:

This part of the report discusses existing traffic conditions within the study area. This chapter summarizes information gathered from different manual field surveys, mid-blocks and traffic movement counts.

Manual counts were conducted on identified critical intersections within the study area. In addition to the above the chapter also highlights project specific traffic generation and distribution.

2.2 Field Surveys:

The survey locations were identified on the basis of their criticality in the network within the study area, whereas stated above these surveys were conducted via video cameras. The survey locations are defined as shown in Figure 1.2.

The turning movement counts (TMC) were conducted on two junctions (J1-J2) within the study area as shown in figure below; Junction 1 is an un-signalized 3-legged Junction located at Fatima Jinnah Road which is located at the front of the development. Junction 2 is a un-signalized 4-legged junction it is located between Fatima Jinnah Road, Lilly Bridge, Cantt Station Road and Aamir Khosa Road.

2.3 Traffic Surveys Results:

The outcomes of traffic data collection for each survey location are summarized as under:

2.3.1 Flow Characteristics:

This refers to estimating the following traffic parameters:

1. Traffic Volume (Turning Movement Counts)
2. Peak Hour

1. Traffic Volume

Turning Movement Counts were conducted on 2 locations. Figure 2-1-2-2 presents summarization of traffic volumes during morning & evening peak durations on typical weekday. Detailed turning movement counts on hourly basis are presented in Annexure I.

2. Peak Hour

It has been mentioned in the introduction that the development under study is residential land use. Hence after doing a cumulative analysis of field traffic data from

turning movement counts, it was found that the morning peak from 08:00 to 09:00 AM and evening peak from 05:00 to 06:00 PM are the most critical in terms of the combination of base traffic and the development's traffic.

Figure 2-1 Turning Movement Count Locations

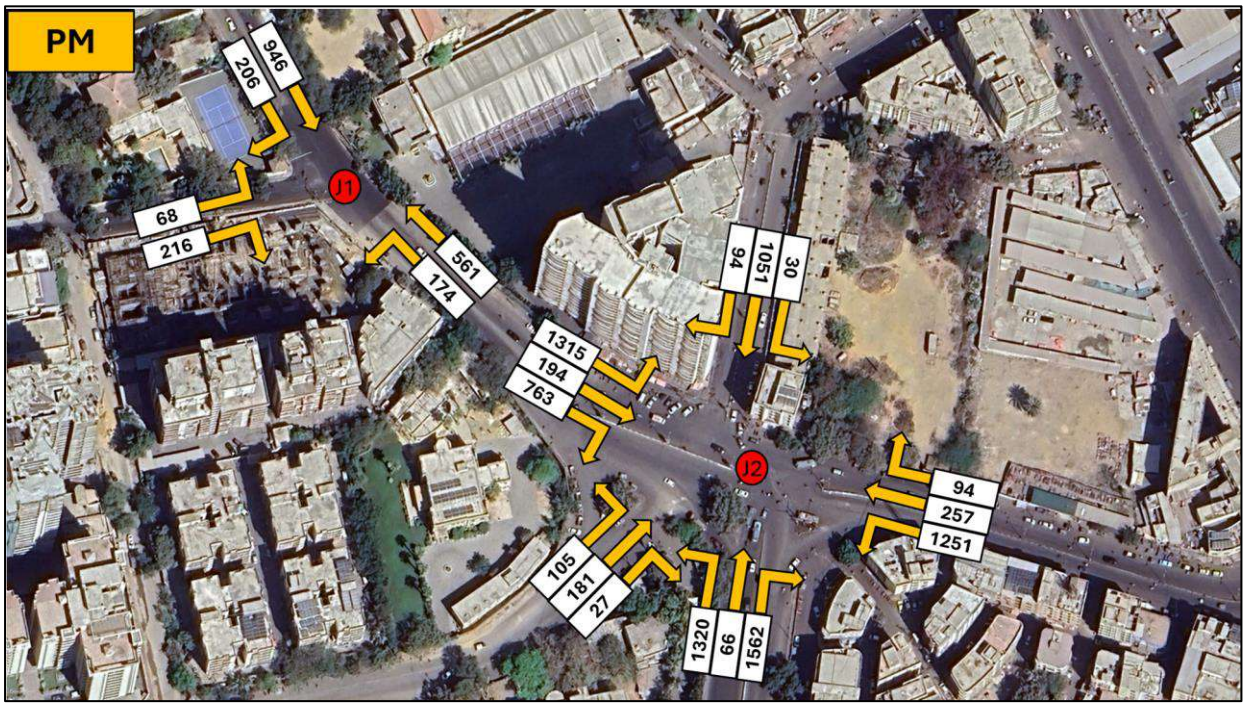


Figure 2-2 Traffic Volumes in AM Peak



Scale: Not to Scale

Figure 2-3 Traffic Volumes in PM Peak



Scale: Not to Scale

3 TRAFFIC ESTIMATION

This part of the report discusses the future traffic generation and its distribution on the road network of the study area. The proposed development is in high density area in Karachi. A detailed discussion on traffic distribution and traffic growth is a part of this section.

3.1 Land Use and Area Bifurcation

The proposed development is a 46-storey high-rise mixed-use tower with one basement level and a rooftop helipad. The basement level accommodates parking, underground water tanks, and an air raid shelter. The ground floor and lower podium floors (1st through 6th) house parking and recreational facilities. The upper floors (7th through 46th) comprise residential apartments with associated circulation and service areas. The land use distribution and corresponding floor areas are detailed in table below.

S.No.	Floor / Level	Land Use	Area (sq. ft.)
1.	Basement	Parking + Air Raid Shelter	32,845.84
2.	Ground Floor	Parking + Recreation + Lobby & Services + Sub-Station	21,506.78
3.	1st Floor	Recreation + Parking	20,648.00
4.	2nd Floor	Recreation + Parking	20,648.00
5.	3rd Floor	Recreation + Parking	20,466.70
6.	4th Floor	Recreation + Parking	16,749.60
7.	5th Floor	Recreation + Parking	16,749.60
8.	6th Floor	Recreation + Parking	16,749.60
9.	7th – 46th Floor	Residential Apartments (Flats + Circulation & Services)	9,889.68
10.	Roof	Roof Services + Helipad	1,148.05
Total Built-Up Area			**572,989.05**

3.2 Trip Generation

The trip generation estimates the amount of traffic expected to access and egress the development at peak hours.

Table 3-1 Trip Generation Rates from Previous Studies

Land Use	AM Rate (trips/unit)	PM Rate (trips/unit)	AM In %	AM Out %	PM In %	PM Out %
Residential	1.5	1.6	22%	77%	44%	55%

The total number of residential units in the proposed development is 205 units. For the horizon year 2031, an occupancy rate of 90% has been assumed, yielding 185 occupied units. The trip generation calculation for the AM and PM peak hours is presented in Tables 3.2a and 3.2b respectively.

Table 3-2 Project Generated Trips – AM Peak Hour

Land Use	Total Units	Occupancy	Occupied Units	AM Rate	Total AM Trips	AM Directional Split		AM Trips	
						In %	Out %	In	Out
Residential	205	90%	185	1.5	278	23%	77%	64	214
Total	**205**	**90%**	**185**	**—**	**278**	**—**	**—**	**64**	**214**

Table 3-3 Project Generated Trips – PM Peak Hour

Land Use	Total Units	Occupancy	Occupied Units	PM Rate	Total PM Trips	PM Directional Split		PM Trips	
						In %	Out %	In	Out
Residential	205	90%	185	1.6	296	44%	56%	130	166
Total	**205**	**90%**	**185**	**—**	**296**	**—**	**—**	**130**	**166**

3.3 Trip Distribution:

Based on the estimated trip generation rates and the surrounding road network hierarchy, traffic volumes have been assigned to specific entry and exit points. The figure below illustrates the directional distribution of vehicle trips during the peak design hours, highlighting the expected flow of traffic to and from the site along the adjacent road network.

Figure 3-1 Entrance Distribution Towards Development

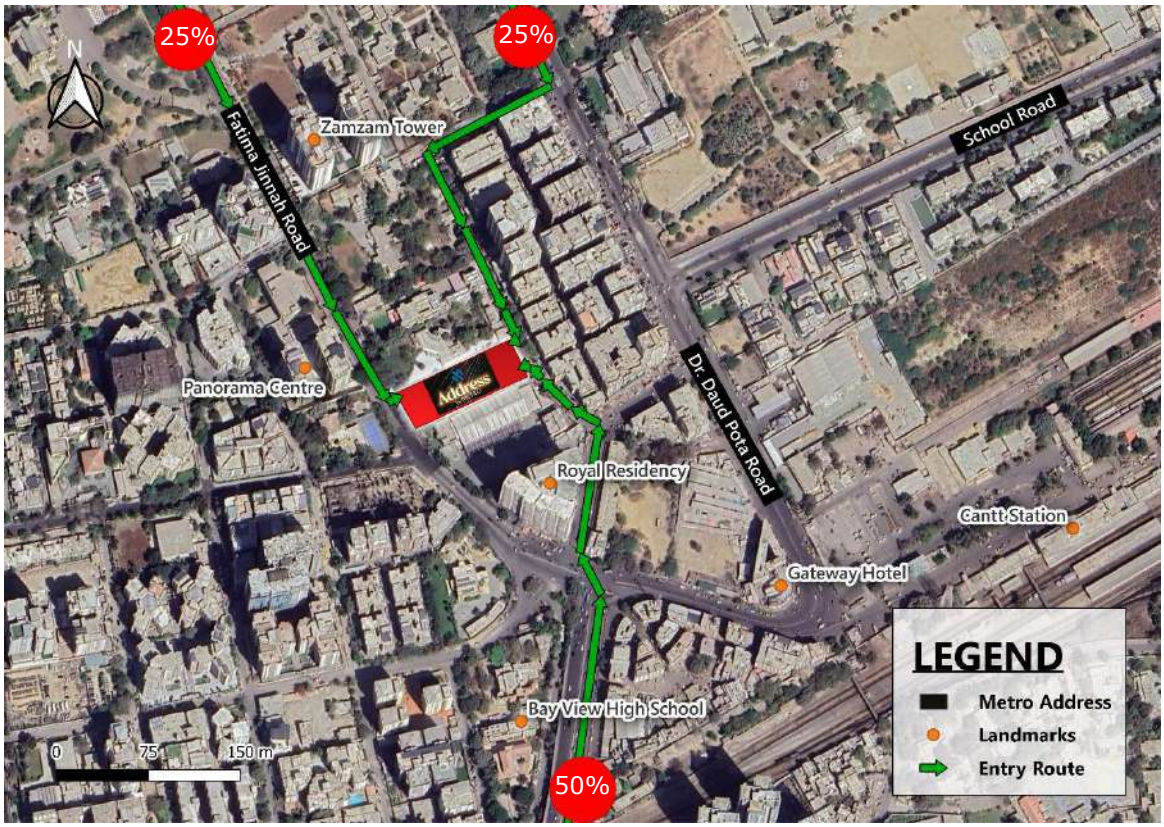


Figure 3-2 Exit Distribution From Development

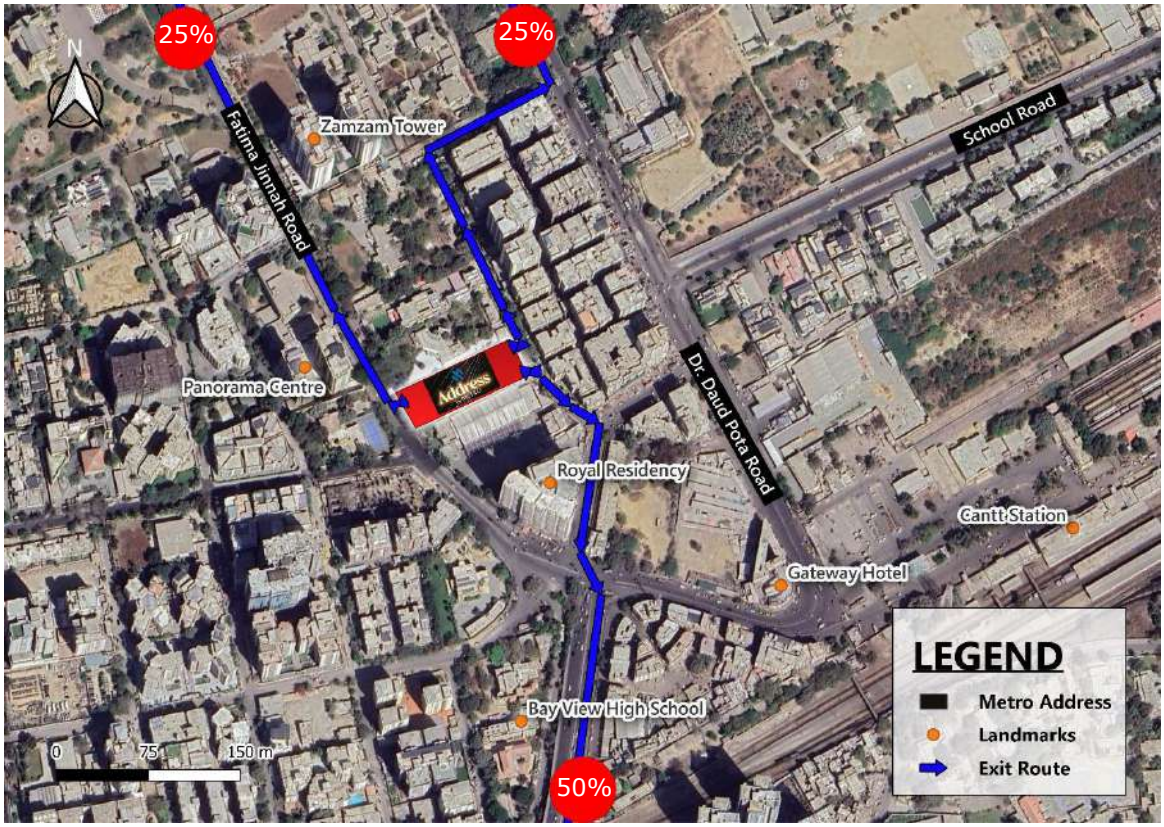


Figure 3-3 Entrance Distribution in AM Peak Hour

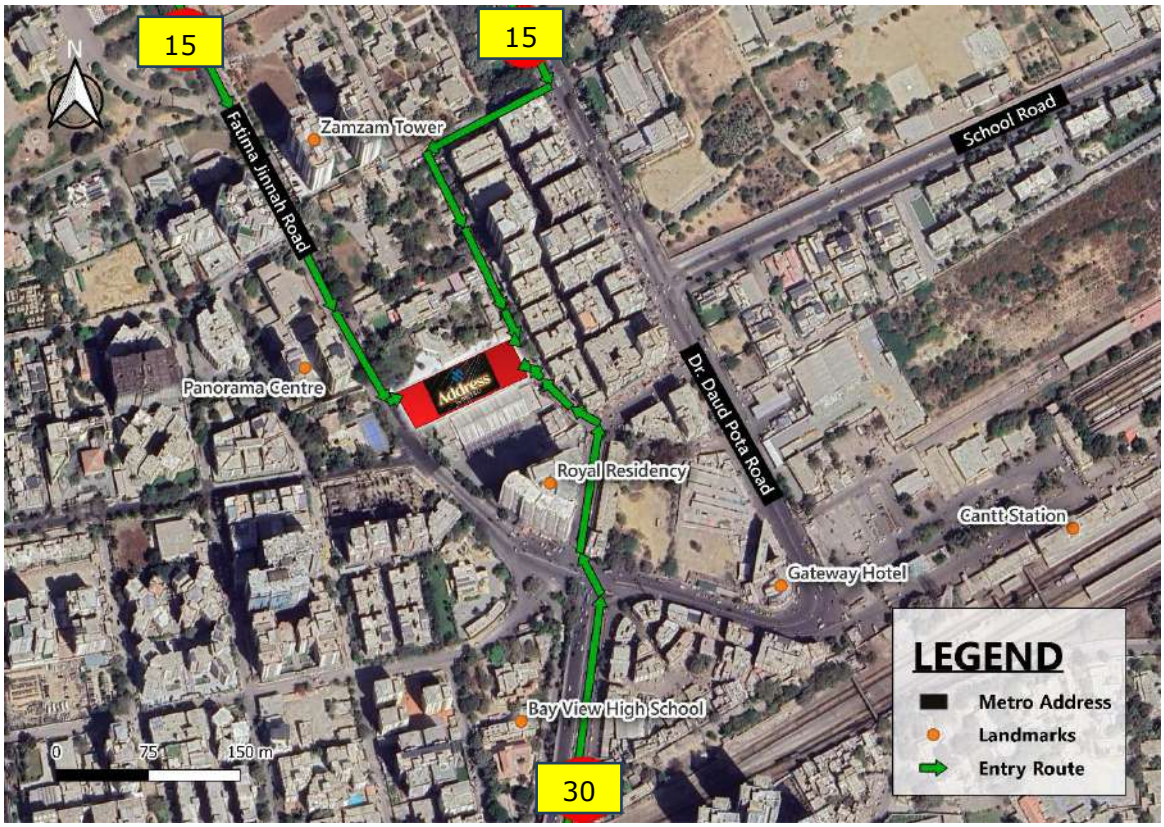


Figure 3-4 Exit Distribution at AM Peak Hours

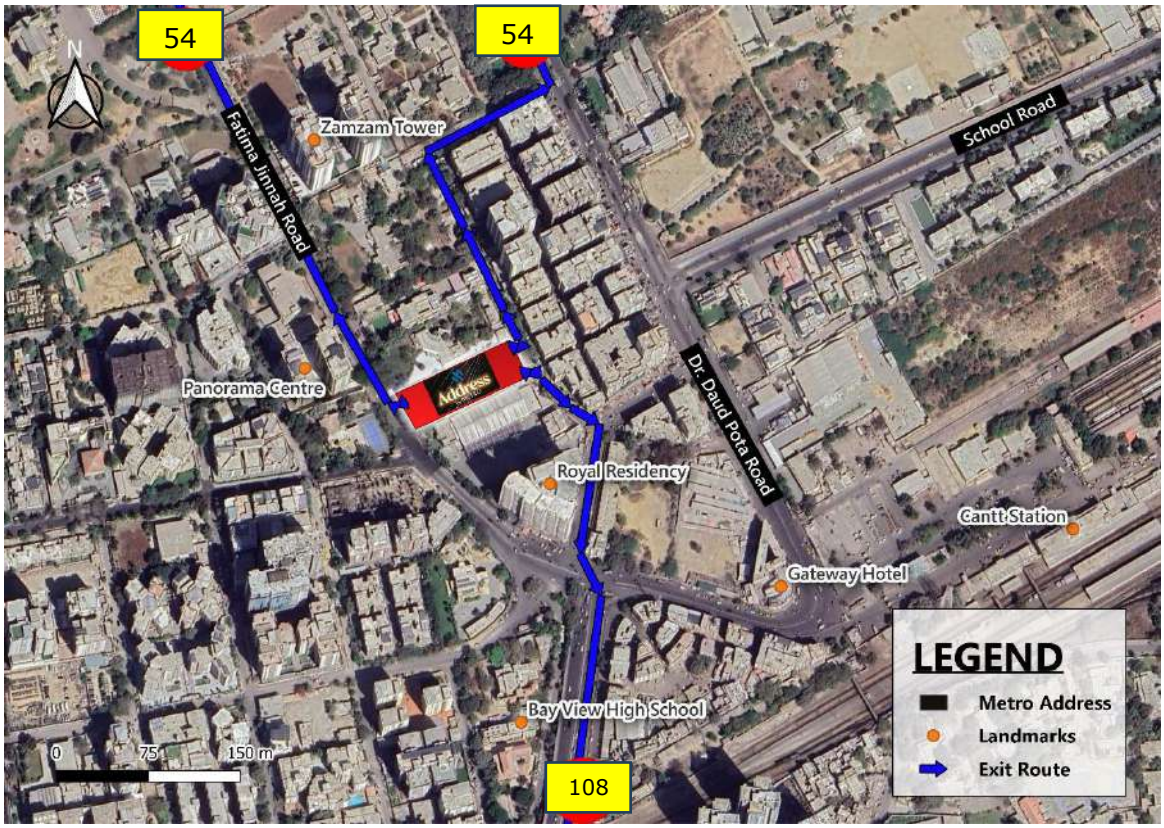


Figure 3-5 Entrance Distribution in PM Peak Hour

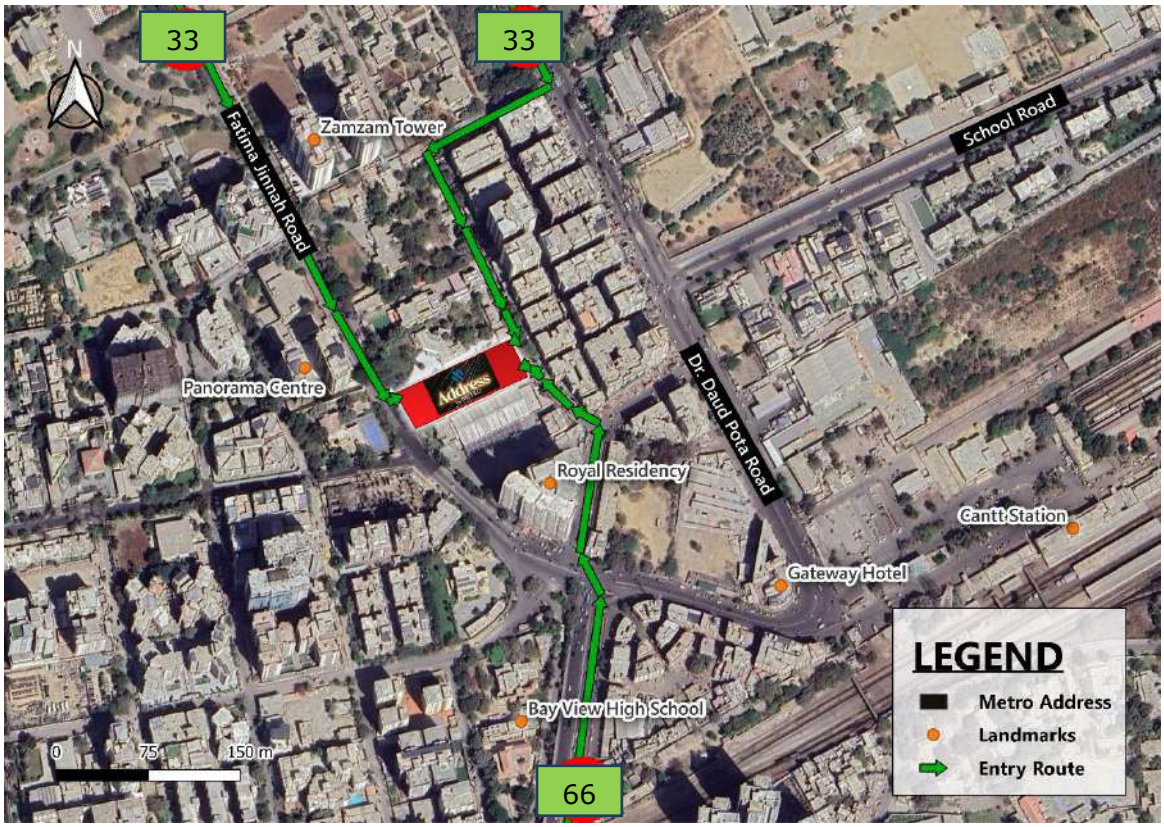
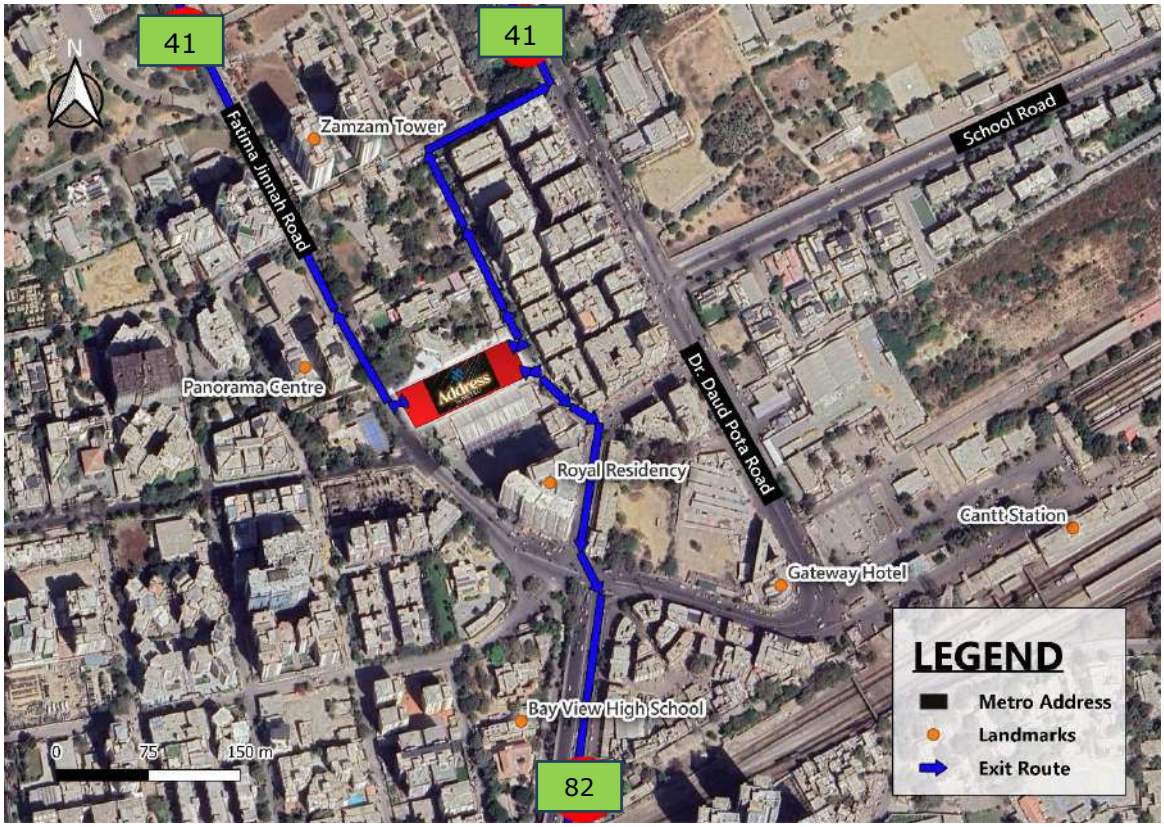


Figure 3-6 Exit Distribution at PM Peak Hours



4 TRAFFIC IMPACT ASSESSMENT

This section of the report discusses performance of traffic junctions, entrance and exits of the proposed development within the study area.

Table 4-1 Cases and Scenarios Considered

S.No.	Case	Scenario	Peak Period
1.	Base Case (2026)	Scenario I	AM Peak
2.		Scenario II	PM Peak
3.	Future Case Without Development (2036)	Scenario III	AM Peak
4.		Scenario IV	PM Peak
5.	Future Case With Development (2036)	Scenario V	AM Peak
6.		Scenario VI	PM Peak

4.1 Software Used

For the analysis, the state of art microsimulation software "PTV VISSIM" was used. The analysis is done by building the internal road network and the simulation results extracted after running the actual condition on this software.

4.1.1 PTV VISSIM:

For the purpose of micro simulation commercial software VISSIM was used. VISSIM is a behavior based multi-purpose traffic simulation program. It is a tool which gives a chance to do optimization of complex technical systems with the help of simulation. It deals with a variety of urban and highway applications, by integrating public and private transportation. Complex scenarios can be visualized to an extent of detail to demonstrate the operational aspects of the traffic model. It also provides with the opportunity to model other road users such as pedestrians and cyclists and to replicate their behavior to simulate a real life like situation. The 28 package also provides the user with the option to input user written programs in the form of *.vap and *.pua files, through which signal priority and other signal control options could be performed.

4.2 Model Setup

A model for study area was developed for all scenarios in VISSIM and simulated in VISSIM. The model developed for entire study area. As discussed earlier, the models have been developed for both morning and evenings peak for all scenarios.

A Security Check is installed at the entrance of the proposed Parking Building for screening, which would take about 5 seconds of processing time for each vehicle.
Model for the checking of interfacing of External and Internal Traffic Flow was developed in order to simulate smooth flow. The area of influence is being finalized based on the possibility of effecting roads in the vicinity of the project. The geometry of the entrances and exits network is developed with the help of material provided by the client and then it has been digitized on the micro simulation software.

4.3 Intersection Performance Criteria:

The performance of the individual intersections was evaluated based on the following performance measure.

- Level of Service (LOS) based on Average Vehicle Delay (seconds).

4.4 Road Network:

The study area for network development was developed and simulated in PTV VISSIM.

4.5 Level of Service

LOS is an index of the operational performance of the intersection based on the service measures such as delay, degree of saturation and density during a given flow period. LOS 'A' is the highest level with LOS 'F' occurring when traffic volumes are at or close to capacity with drivers experiencing significant delays.
The assessment criteria followed for all estimating LOS for each junction is based on Table 3 & 4.

Table 4-2 Level of Service for Un-signalized Intersections

S. No.	LOS	Un-Signalized Intersections
1	A	Less than or equal to 10 seconds
2	B	Greater than 10 to 15 seconds
3	C	Greater than 15 to 25 seconds
4	D	Greater than 25 to 35 seconds
5	E	Greater than 35 to 50 seconds
6	F	Greater than 50 seconds

Table 4-3 Level of Service for Signalized Intersections

S. No.	LOS	Signalized Intersections
1	A	Less than or equal to 10 seconds
2	B	Greater than 10 to 20 seconds
3	C	Greater than 20 to 35 seconds
4	D	Greater than 35 to 55 seconds
5	E	Greater than 55 to 80 seconds
6	F	Greater than 80 seconds

4.6 Junctions Analyzed

The Following Figure provides the junctions that were analyzed through the model, and the results will be provided in the subsequent sections of the report.



Figure 4-1 Junctions Analyzed

4.7 Model Results:

The junction in the network was found to have the following delays and levels of services as shown in the table below in both scenarios of morning and evening peaks.

Table 4-4 HCM LOS Analysis for AM Peak

S. No.	Junction Name	Junctions Delay Summary					
		Base Case - 2026		2036 Without Development		2036 With Development	
		Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS
1	Junction 1	1.3	A	3.9	A	6.1	A
2	Junction 2	17.2	C	43.7	D	52.2	D

Table 4-5 HCM LOS Analysis for PM Peak

S. No.	Junction Name	Junctions Delay Summary					
		Base Case - 2026		2026 Without Development		2025 With Development	
		Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS
1	Junction 1	2.1	A	37.5	D	54.4	D
2	Junction 2	38.4	E	120.5	F	125.7	F

4.8 Level of Service Analysis:

The Level of Service were assigned based on the junction delays; the following figures shows the Level of services at morning and evening peaks.



Figure 4-2 Level of Service of the analyzed junction in AM Peak



Figure 4-3 Level of Service of the analyzed junctions in PM Peak

4.9 Future Case : Signalization of Lilly Bridge Junction (Junction 2)

To accommodate the forecast, increase in traffic volumes up to the 2036 design year, a signalized intersection is proposed at the Lilly Bridge junction as the primary mitigation measure. Traffic modelling indicates that the existing yield-controlled arrangement will not operate efficiently under future demand conditions, with increased delays, queuing, and potential safety concerns. Therefore, signalization of the junction is mandatory even without development in order to process the traffic in horizon years.

Figure 4-4 Proposed Junction Improvement at Lilly Bridge & Cantt Station Road Junction



Scale : Not to scale

5 Parking Adequacy

This section enlightens parking requirements, provisions and adequacy for the proposed project. The analysis on the parking scenario of any proposed area is one of the main essences of interfacing internal traffic flow which incorporates analysis for queue adequacy and traffic conflict management.

5.1 Parking Analysis

The proposed development provides parking across twelve levels — the Basement and Ground Floor through 10th Floor — with a combined total of 314 car parking stalls and 344 motorcycle spaces.

5.1.1 SBCA Parking Standards

The parking requirements have been evaluated using the standards prescribed by the Sindh Building Control Authority (SBCA). The applicable parking standards for this development are as follows:

- For residential land use, one parking stall is required per 1,000 square feet of covered floor area.
- An additional 25% of the calculated parking requirement is mandated under the Sindh High Density Development Board Rules (SHDDBR) for high-density developments.
- One disabled parking stall is required for every 50 standard parking stalls.
- Motorcycle parking must constitute 16% of the total car parking stalls, with six motorcycles accommodated per car stall.

Table 5-1 Parking Calculations as per SBCA

Description	Value	Remarks
Covered Area of Flats	295,991.04 sq.ft.	
Parking Required (295,991.04 ÷ 1,000)	296 Cars	SBCA Standard: 1 car per 1,000 sq.ft. for residential
25% Extra – High Density By-laws (296 × 25/100)	74 Cars	SHDDBR High Density Requirement

Description	Value	Remarks
Total Cars Required (296 + 74)	**370 Cars**	
Disabled Parking (370 ÷ 50 = 7.4)	8 Cars	Included in 370 Cars
Motorcycle Stalls Required (370 × 16/100 = 59.2)	60 Motorcycle Stalls	16% of total car stalls
Net Car Stalls Required (370 – 60)	**310 Cars**	
Motorcycle Spaces Required (60 × 6)	**360 Motorcycle Spaces**	**6 motorcycles per stall**

5.1.2 Parking Provided

The proposed development provides parking across eight levels as detailed in Table 5.2 below. Car parking stalls and motorcycle spaces are distributed across the Basement and Ground Floor through 10th Floor.

Table 5-2 Parking Provided per Floor

Floor / Level	Car Stalls Provided	Motorcycle Spaces Provided
Basement	73	80
Ground Floor	71	40
1st Floor	28	40
2nd Floor	28	40
3rd Floor	28	40
4th Floor	28	40
5th Floor	28	40
6th Floor	30	24
Total	**314**	**344**

5.1.3 Parking Adequacy Summary

Table 5.3 presents a summary comparison of the parking required as per SBCA By-laws and SHDDBR against the parking provided by the proposed development.

Table 5-3 Parking Adequacy Summary

Parking Type	Required	Provided	Surplus / Deficit
Car Parking Stalls	310	314	+4 (Surplus)
Disabled Parking Stalls	8 (included in car stalls)	—	—
Motorcycle Spaces	360	344	−16 (Deficit)

As indicated in Table 5.3, the proposed development provides a surplus of 4 car parking stalls over the SBCA requirement. With regard to motorcycle parking, the provided 344 motorcycle spaces fall marginally short of the required 360 spaces, representing a deficit of 16 spaces. The deficit of 16 motorcycle stalls can be covered by 3 car stalls. Yielding the following results:

Table 5-4 Parking Adequacy after adjustment

Parking Type	Required	Provided	Surplus / Deficit
Car Parking Stalls	310	314	+1 (Surplus)
Disabled Parking Stalls	8 (included in car stalls)	—	—
Motorcycle Spaces	360	365	+5 (Surplus)

5.2 Swept Path Analysis

Swept Path Analysis is an essential engineering simulation utilized to assess the manoeuvrability of vehicles within a proposed or existing site layout. It serves as a critical validation tool to ensure that road networks, intersections, and industrial circulation areas are designed to accommodate the specific physical dimensions and turning capabilities of vehicles. By visualizing the trajectory of vehicle movement, this analysis identifies potential conflicts between moving traffic and static infrastructure, thereby ensuring safe access, efficient traffic flow, and adherence to geometric design standards.

The Swept Path Analysis are given below:

Figure 5-1 Swept Path Analysis of Floor – Basement

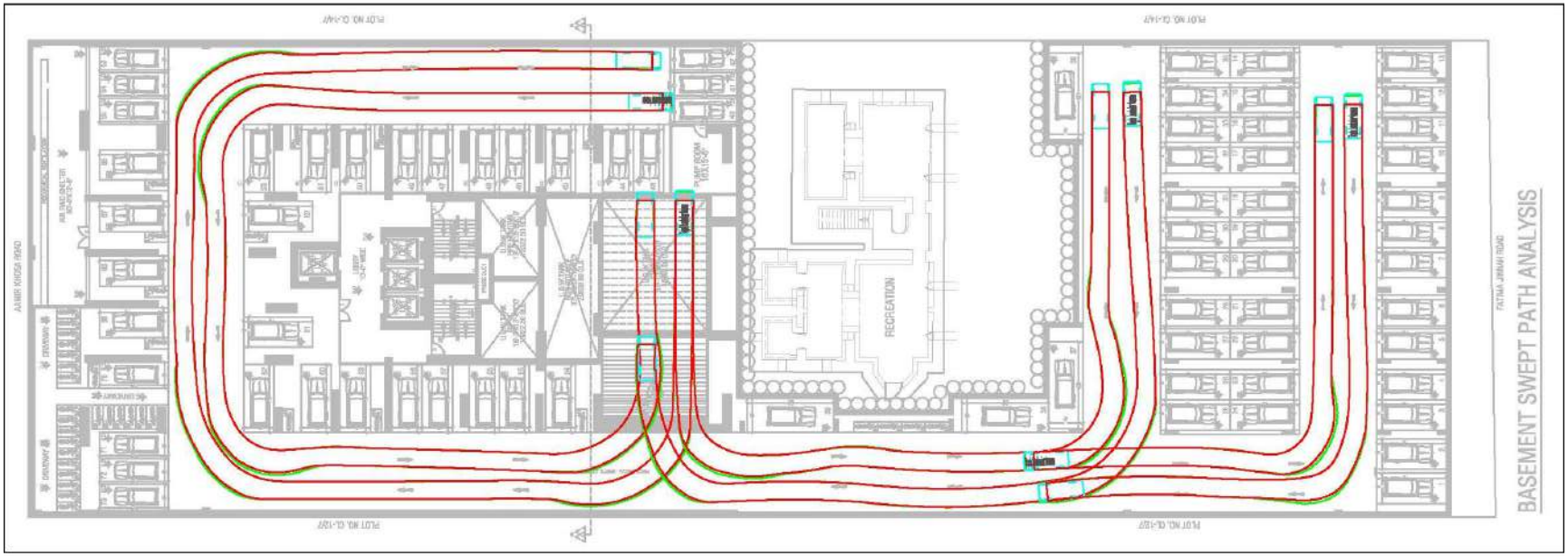


Figure 5-2 Swept Path Analysis of Floor – Ground Floor (Gate 1)

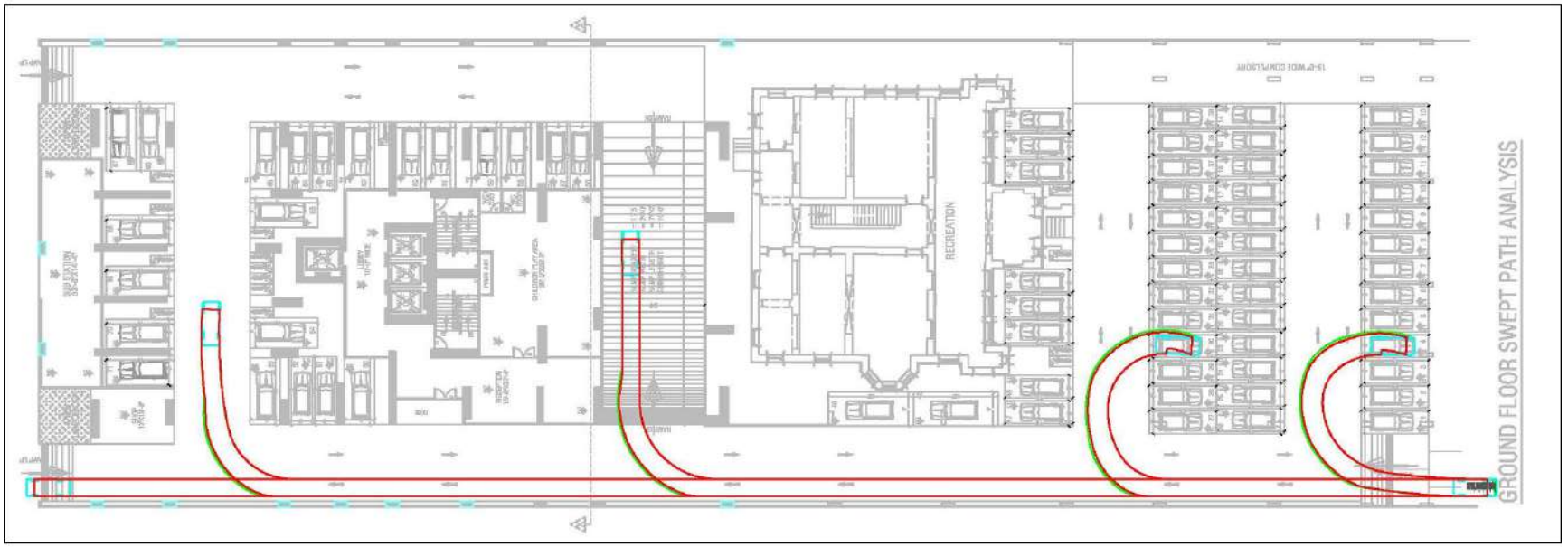


Figure 5-3 Swept Path Analysis of Floor – Ground Floor (Gate 2)

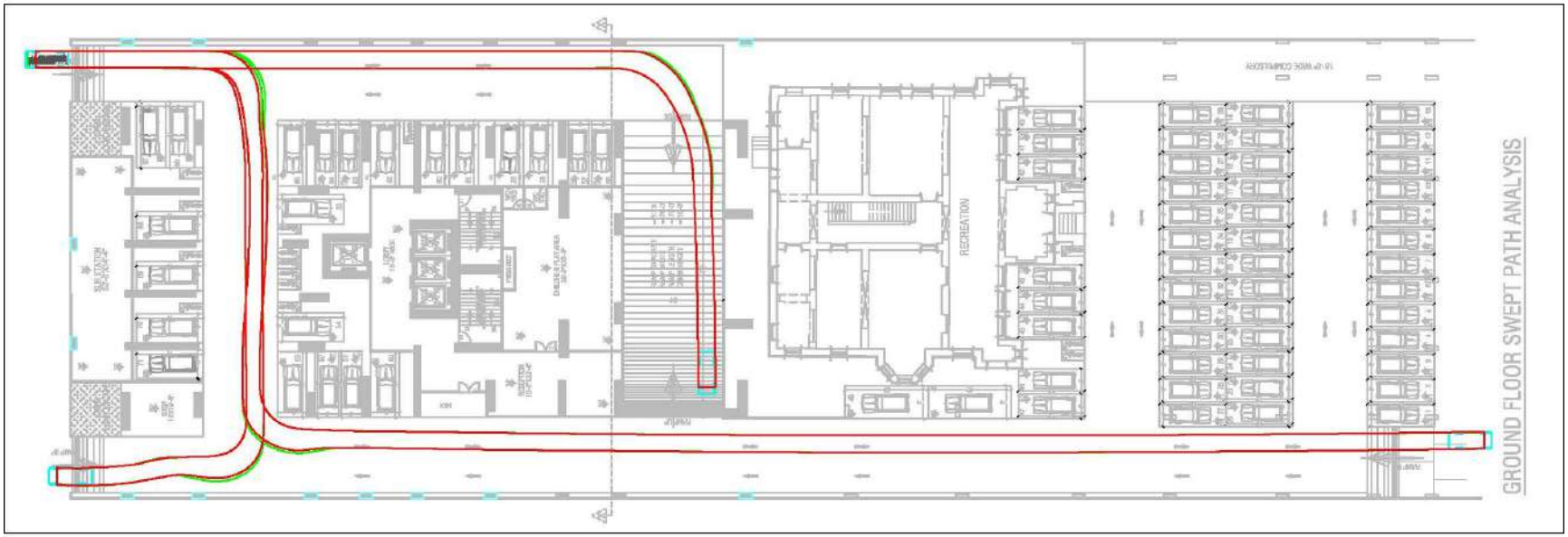


Figure 5-4 Swept Path Analysis of Floor – Ground Floor (Gate 3)

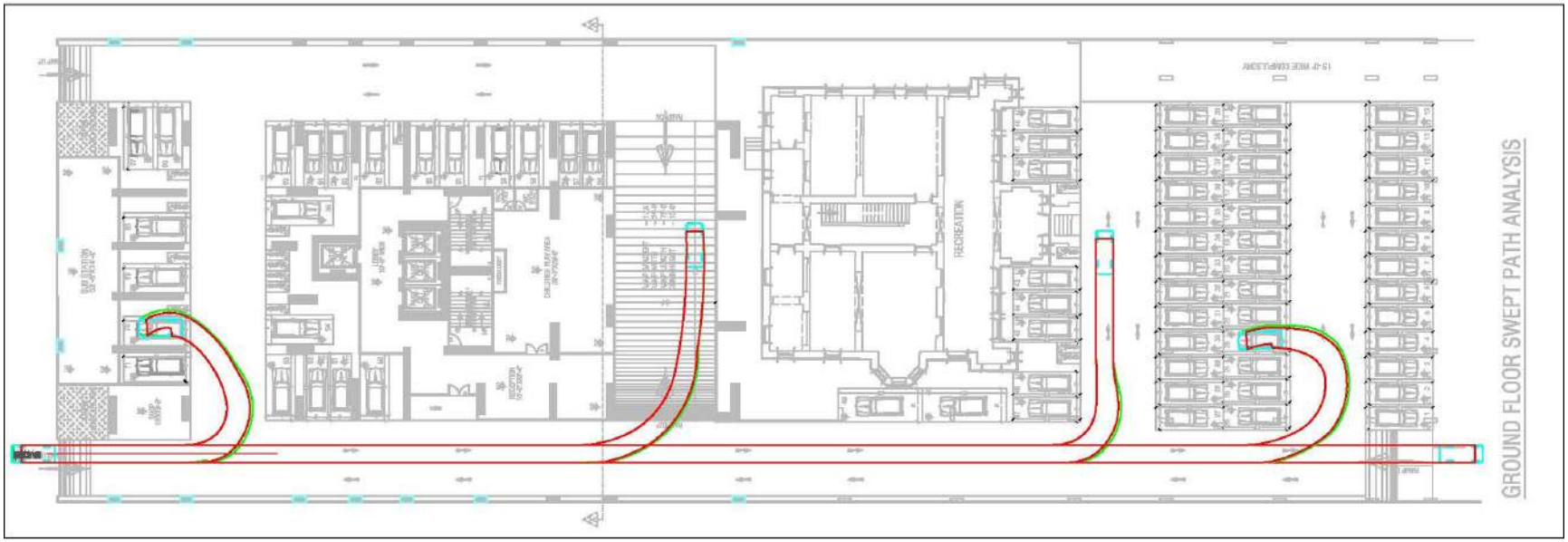
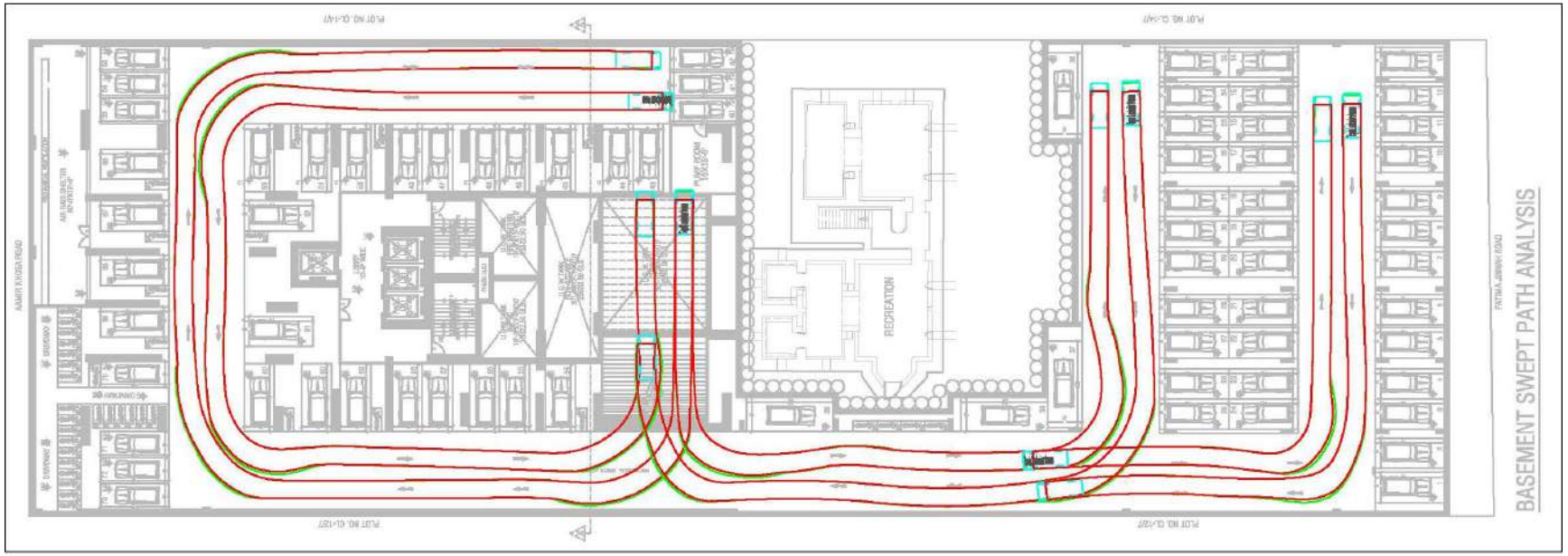


Figure 5-5 Swept Path Analysis of Floor – First Floor



6 Summary

6.1 Summary

The following are the summarizing points of the study.

1. The proposed residential plaza has an covered area is 572,989.05 sq. ft.
2. The land use of the proposed area is "Residential".
3. The total car parking stalls available for the development are 365 while the total car parking stalls required for the development are 360, shows excess parking stalls were provided for the cars.
4. In AM Peak Total trips generated by development are 278.
5. In PM Peak Total trips generated by development are 296.
6. The delay analysis shows no detrimental impact on the surrounding junctions because of the development.

Annexure - I

Mid-Block Count (TMC) For Metro Address Tower Karachi
Classified Traffic Volume Counts Surveys

Survey Location: [Name & ID]: Junction 1 (Claremont Rd)	Direction: Fatima Jinnah Rd to Claremont Rd	Day: 15-April-2026	Enumerator:	Shift Supervisor:

Time of the Day			Private Cars [Including Jeeps & Station Wagons]	Taxies [Yellow & Black Cabs, Yellow Cabs & Radio Cabs]	3 Seator Rickshaws	Motorcycles & Scooters	6 Seator Rickshaws	MINI BUS	Peoples Bus	large Bus/ Contract carriage	Intercity Bus	Coaster HIACE	Light Freight Vehicles [Pickups, Shehzoor, etc]	Freight Transport: Single Unit Trucks [2 & 3 Axle]	Freight Transport: Trailers	Total
8:00	-	8:15	37		-	13	-	-	-	-	-	-	-	-	-	50
8:15	-	8:30	51		-	26	-	-	-	-	-	-	-	-	-	77
8:30	-	8:45	81		2	49	-	-	-	-	-	-	-	-	-	132
8:45	-	9:00	101		2	66	-	-	-	-	-	1	-	-	-	170
9:00	-	9:15	98		-	65	-	-	-	-	-	-	-	-	-	163
9:15	-	9:30	95		5	59	-	-	-	-	-	-	-	-	-	159
9:30	-	9:45	94		1	53	-	-	-	-	-	-	-	-	-	148
9:45	-	10:00	89		-	41	-	-	-	-	-	-	2	-	-	132
10:00	-	10:15	80		-	38	-	-	-	-	-	-	-	-	-	118
10:15	-	10:30	41		-	28	-	-	-	-	-	-	1	-	-	70
10:30	-	10:45	60		5	29	-	-	-	-	-	-	-	-	-	94
10:45	-	11:00	59		2	28	-	-	-	-	-	-	2	-	-	91
17:00	-	17:15	34		1	18	-	-	-	-	-	-	-	-	-	53
17:15		17:30	37		1	13	-	-	-	-	-	-	-	-	-	51
17:30	-	17:45	49		3	18	-	-	-	-	-	-	-	-	-	70
17:45	-	18:00	22		1	9	-	-	-	-	-	-	-	-	-	32
18:00		18:15	36		2	16	-	-	-	-	-	-	1	-	-	55
18:15	-	18:30	40		3	18	-	-	-	-	-	-	-	-	-	61
18:30	-	18:45	26		5	14	-	-	-	-	-	1	1	-	-	47
18:45		19:00	23		1	14	-	-	-	-	-	-	-	-	-	38
19:00	-	19:15	25		2	15	-	-	-	-	-	-	-	-	-	42
19:15	-	19:30	26		2	13	-	-	-	-	-	-	-	-	-	41
19:30		19:45	16		1	7	-	-	-	-	-	-	-	-	-	24
19:45	-	20:00	17		2	8	-	-	-	-	-	-	-	-	-	27
20:00	-	20:15	16		1	7	-	-	-	-	-	-	-	-	-	24
20:15		20:30	13		2	13	-	-	-	-	-	-	1	-	-	29
20:30	-	20:45	21	-	-	7	-	-	-	-	-	-	-	-	-	28
20:45	-	21:00	18	-	-	8	-	-	-	-	-	-	-	-	-	26
Total			1,305	-	44	693	-	-	-	-	-	2	8	-	-	2,052

Hourly Summary																
8:00	-	9:00	270	-	4	154	-	-	-	-	-	1	-	-	-	429
9:00	-	10:00	376	-	6	218	-	-	-	-	-	-	2	-	-	602
10:00	-	11:00	240	-	7	123	-	-	-	-	-	-	3	-	-	373
17:00	-	18:00	142	-	6	58	-	-	-	-	-	-	-	-	-	206
18:00	-	19:00	125	-	11	62	-	-	-	-	-	1	2	-	-	201
19:00	-	20:00	84	-	7	43	-	-	-	-	-	-	-	-	-	134
20:00	-	21:00	68	-	3	35	-	-	-	-	-	-	1	-	-	107
Total			1,305	-	44	693	-	-	-	-	-	2	8	-	-	2,052

Mid-Block Count (TMC) For Metro Address Tower Karachi
Classified Traffic Volume Counts Surveys

Survey Location: [Name & ID]:Junction 1 (Claremont Rd)	Direction: Fatima Jinnah Rd to Cantt. Station Rd	Day: 15-April-2026	Enumerator:	Shift Supervisor:

Time of the Day			Private Cars [Including Jeeps & Station Wagons]	Taxies [Yellow & Black Cabs, Yellow Cabs & Radio Cabs]	3 Seator Rickshaws	Motorcycles & Scooters							Freight Transport		Total
							6 Seator Rickshaws	MINI BUS	Peoples Bus	large Bus/ Contract carriage	Intercity Bus	Coaster HIACE	Light Freight Vehicles [Pickups, Shehzoor, etc]	Single Unit Trucks [2 & 3 Axle]	Trailers	
8:00	-	8:15	43	1	7	101	1	3	-	-	-	2	1	-	-	159
8:15	-	8:30	53	-	8	83	2	5	-	-	-	2	3	-	-	156
8:30	-	8:45	51	-	11	114	-	3	-	-	-	1	1	-	-	181
8:45	-	9:00	44	-	12	101	1	4	-	-	-	1	-	-	-	163
9:00	-	9:15	47	-	9	125	-	4	-	-	-	3	3	-	-	191
9:15	-	9:30	58	2	17	107	-	5	-	-	-	-	2	-	-	191
9:30	-	9:45	63	-	17	109	1	5	-	-	-	2	3	-	-	200
9:45	-	10:00	53	1	18	136	-	6	-	-	-	1	5	1	-	221
10:00	-	10:15	60	-	18	128	-	5	-	-	-	1	4	-	-	216
10:15	-	10:30	49	-	14	100	-	4	-	-	-	1	5	-	-	173
10:30	-	10:45	49	1	14	93	-	4	-	-	-	1	4	-	-	166
10:45	-	11:00	53	-	11	101	-	2	-	-	-	1	4	-	-	172
17:00	-	17:15	72	-	28	127	-	2	-	-	-	1	12	-	-	242
17:15		17:30	87	-	23	115	-	5	-	-	-	1	7	-	-	238
17:30	-	17:45	86	-	23	112	-	4	-	-	-	1	4	-	-	230
17:45	-	18:00	92	2	23	113	-	2	-	-	-	1	3	-	-	236
18:00		18:15	87	-	19	122	-	2	-	-	-	-	6	-	-	236
18:15	-	18:30	91	-	27	125	-	3	-	-	-	1	3	-	-	250
18:30	-	18:45	86	-	20	162	-	3	-	-	-	-	2	-	-	273
18:45		19:00	73	-	16	117	-	5	-	-	-	-	8	-	-	219
19:00	-	19:15	77	-	16	117	-	3	-	-	-	-	3	-	-	216
19:15	-	19:30	79	-	16	120	-	4	-	-	-	-	3	-	-	222
19:30		19:45	87	-	25	104	-	3	-	-	-	-	5	-	-	224
19:45	-	20:00	77	1	20	104	-	1	-	-	-	-	7	-	-	210
20:00	-	20:15	73	-	19	103	-	2	-	-	-	-	2	-	-	199
20:15		20:30	80	-	28	103	-	2	-	-	-	1	3	-	-	217
20:30	-	20:45	61	-	18	108	-	1	-	-	-	1	7	-	-	196
20:45	-	21:00	63	-	12	118	-	2	-	-	-	1	2	-	-	198
Total			1,894	8	489	3,168	5	94	-	-	-	24	112	1	-	5,795

Hourly Summary																
8:00	-	9:00	191	5	38	399	4	15	-	-	-	6	5	-	-	659
9:00	-	10:00	221	2	61	477	1	20	-	-	-	6	13	1	-	803
10:00	-	11:00	211	2	57	422	-	15	-	-	-	4	17	-	-	727
17:00	-	18:00	337	2	97	467	-	13	-	-	-	4	26	-	-	946
18:00	-	19:00	337	2	82	526	-	13	-	-	-	1	19	-	-	978
19:00	-	20:00	320	-	77	445	-	11	-	-	-	-	18	-	-	872
20:00	-	21:00	277	-	77	432	-	7	-	-	-	3	14	-	-	810
Total			1,894	13	489	3,168	5	94	-	-	-	24	112	1	-	5,795

Mid-Block Count (TMC) For Metro Address Tower Karachi
Classified Traffic Volume Counts Surveys

Survey Location: [Name & ID]:Junction 1 (Claremont Rd)	Direction:Claremont Rd to Fatima Jinnah Rd	Day: 15-April-2026	Enumerator:	Shift Supervisor:

Time of the Day			Private Cars [Including Jeeps & Station Wagons]	Taxies [Yellow & Black Cabs, Yellow Cabs & Radio Cabs]	3 Seator Rickshaws	Motorcycles & Scooters	6 Seator Rickshaws	MINI BUS	Peoples Bus	large Bus/ Contract carriage	Intercity Bus	Coaster HIACE	Light Freight Vehicles [Pickups, Shehzoor, etc]	Freight Transport: Single Unit Trucks [2 & 3 Axle]	Freight Transport: Trailers	Total
8:00	-	8:15	6	-	-	5	-	-	-	-	-	-	-	-	-	11
8:15	-	8:30	11	-	-	1	-	-	-	-	-	-	-	-	-	12
8:30	-	8:45	7	-	2	3	-	-	-	-	-	-	-	-	-	12
8:45	-	9:00	5	-	1	-	-	-	-	-	-	-	-	-	-	6
9:00	-	9:15	6	-	-	3	-	-	-	-	-	-	-	-	-	9
9:15	-	9:30	7	-	2	3	-	-	-	-	-	-	-	-	-	12
9:30	-	9:45	7	-	2	2	-	-	-	-	-	-	1	-	-	12
9:45	-	10:00	12	-	1	3	-	-	-	-	-	-	-	-	-	16
10:00	-	10:15	8	-	1	2	-	-	-	-	-	-	1	-	-	12
10:15	-	10:30	5	-	1	9	-	-	-	-	-	-	-	-	-	15
10:30	-	10:45	4	-	2	9	-	-	-	-	-	-	1	-	-	16
10:45	-	11:00	6	-	2	4	-	-	-	-	-	-	-	-	-	12
17:00	-	17:15	9	-	3	5	-	-	-	-	-	-	-	-	-	17
17:15		17:30	4	-	-	3	-	-	-	-	-	-	-	-	-	7
17:30	-	17:45	9	-	3	10	-	-	-	-	-	-	1	-	-	23
17:45	-	18:00	10	-	2	9	-	-	-	-	-	-	-	-	-	21
18:00		18:15	6	-	2	8	-	-	-	-	-	-	1	-	-	17
18:15	-	18:30	10	-	1	10	-	-	-	-	-	-	-	-	-	21
18:30	-	18:45	7	-	-	10	-	-	-	-	-	-	-	-	-	17
18:45		19:00	12	-	2	8	-	-	-	-	-	-	-	-	-	22
19:00	-	19:15	8	-	2	9	-	-	-	-	-	-	1	-	-	20
19:15	-	19:30	8	-	1	11	-	-	-	-	-	-	-	-	-	20
19:30		19:45	8	-	-	9	-	-	-	-	-	-	-	-	-	17
19:45	-	20:00	10	-	-	9	-	-	-	-	-	-	-	-	-	19
20:00	-	20:15	3	-	1	10	-	-	-	-	-	-	-	-	-	14
20:15		20:30	7	-	-	3	-	-	-	-	-	-	-	-	-	10
20:30	-	20:45	5	-	1	2	-	-	-	-	-	-	-	-	-	8
20:45	-	21:00	5	-	-	9	-	-	-	-	-	-	-	-	-	14
Total			205	-	32	169	-	-	-	-	-	-	6	-	-	412

Hourly Summary

8:00	-	9:00	29	-	3	9	-	-	-	-	-	-	-	-	-	41
9:00	-	10:00	32	-	5	11	-	-	-	-	-	-	1	-	-	49
10:00	-	11:00	23	-	6	24	-	-	-	-	-	-	2	-	-	55
17:00	-	18:00	32	-	8	27	-	-	-	-	-	-	1	-	-	68
18:00	-	19:00	35	-	5	36	-	-	-	-	-	-	1	-	-	77
19:00	-	20:00	34	-	3	38	-	-	-	-	-	-	1	-	-	76
20:00	-	21:00	20	-	2	24	-	-	-	-	-	-	-	-	-	46
Total			205	-	32	169	-	-	-	-	-	-	6	-	-	412

Mid-Block Count (TMC) For Metro Address Tower Karachi
Classified Traffic Volume Counts Surveys

Survey Location: [Name & ID]:Junction 1 (Claremont Rd)	Direction:Claremont Rd to Cantt. Station Rd	Day: 15-April-2026	Enumerator:	Shift Supervisor:

Time of the Day			Private Cars [Including Jeeps & Station Wagons]	Taxies [Yellow & Black Cabs, Yellow Cabs & Radio Cabs]	3 Seator Rickshaws	Motorcycles & Scooters	6 Seator Rickshaws	MINI BUS	Peoples Bus	large Bus/ Contract carriage	Intercity Bus	Coaster HIACE	Light Freight Vehicles [Pickups, Shehzoor, etc]	Freight Transport: Single Unit Trucks [2 & 3 Axle]	Freight Transport: Trailers	Total
8:00	-	8:15	12	-	2	8	1	-	-	-	-	-	1	-	-	24
8:15	-	8:30	12	-	3	14	-	-	-	-	-	-	-	-	-	29
8:30	-	8:45	12	-	4	12	-	-	-	-	-	-	-	-	-	28
8:45	-	9:00	9	-	1	8	-	-	-	-	-	-	-	-	-	18
9:00	-	9:15	11	-	5	13	-	-	-	-	-	-	-	-	-	29
9:15	-	9:30	7	-	2	9	-	-	-	-	-	-	-	-	-	18
9:30	-	9:45	11	-	8	12	-	-	-	-	-	-	-	-	-	31
9:45	-	10:00	17	1	1	5	-	-	-	-	-	-	2	-	-	26
10:00	-	10:15	13	-	5	20	-	-	-	-	-	-	1	-	-	39
10:15	-	10:30	9	-	1	8	-	-	-	-	-	-	-	-	-	18
10:30	-	10:45	11	1	5	21	-	-	-	-	-	-	-	-	-	38
10:45	-	11:00	9	-	3	17	-	-	-	-	-	-	-	-	-	29
17:00	-	17:15	16	-	5	25	-	-	-	-	-	-	1	-	-	47
17:15		17:30	26	-	2	26	-	-	-	-	-	-	-	-	-	54
17:30	-	17:45	19	-	-	22	-	-	-	-	-	-	-	-	-	41
17:45	-	18:00	25	-	2	44	-	-	-	-	-	-	3	-	-	74
18:00		18:15	23	-	3	26	-	-	-	-	-	-	-	-	-	52
18:15	-	18:30	19	-	2	19	-	-	-	-	-	-	1	-	-	41
18:30	-	18:45	20	-	1	27	-	-	-	-	-	-	-	-	-	48
18:45		19:00	11	-	4	28	-	-	-	-	-	-	1	-	-	44
19:00	-	19:15	16	-	5	24	-	-	-	-	-	-	-	-	-	45
19:15	-	19:30	21	-	3	21	-	-	-	-	-	-	1	-	-	46
19:30		19:45	11	-	2	18	-	-	-	-	-	-	-	-	-	31
19:45	-	20:00	16	-	1	25	-	-	-	-	-	-	3	-	-	45
20:00	-	20:15	12	-	2	22	-	-	-	-	-	-	2	-	-	38
20:15		20:30	7	-	1	30	-	-	-	-	-	-	-	-	-	38
20:30	-	20:45	14	-	1	18	-	-	-	-	-	-	2	-	-	35
20:45	-	21:00	17	-	1	24	-	-	-	-	-	-	5	-	-	47
Total			406	2	75	546	1	-	-	-	-	-	23	-	-	1,053

Hourly Summary

8:00	-	9:00	45	2	10	42	1	-	-	-	-	-	1	-	-	99
9:00	-	10:00	46	-	16	39	-	-	-	-	-	-	2	-	-	104
10:00	-	11:00	42	-	14	66	-	-	-	-	-	-	1	-	-	124
17:00	-	18:00	86	-	9	117	-	-	-	-	-	-	4	-	-	216
18:00	-	19:00	73	-	10	100	-	-	-	-	-	-	2	-	-	185
19:00	-	20:00	64	-	11	88	-	-	-	-	-	-	4	-	-	167
20:00	-	21:00	50	-	5	94	-	-	-	-	-	-	9	-	-	158
Total			406	2	75	546	1	-	-	-	-	-	23	-	-	1,053

Mid-Block Count (TMC) For Metro Address Tower Karachi
Classified Traffic Volume Counts Surveys

Survey Location: [Name & ID]:Junction 1 (Claremont Rd)	Direction: Cantt. Station Rd to Fatima Jinnah Rd	Day: 15-April-2026	Enumerator:	Shift Supervisor:

Time of the Day			Private Cars [Including Jeeps & Station Wagons]	Taxies [Yellow & Black Cabs, Yellow Cabs & Radio Cabs]	3 Seator Rickshaws	Motorcycles & Scooters	6 Seator Rickshaws	MINI BUS	Peoples Bus	large Bus/ Contract carriage	Intercity Bus	Coaster HIACE	Light Freight Vehicles [Pickups, Shehzoor, etc]	Freight Transport: Single Unit Trucks [2 & 3 Axle]	Freight Transport: Trailers	Total
8:00	-	8:15	38	-	5	50	-	5	-	-	-	-	-	-	-	98
8:15	-	8:30	34	-	5	61	-	5	-	-	-	1	-	-	-	106
8:30	-	8:45	32	-	5	48	-	4	-	-	-	-	4	-	-	93
8:45	-	9:00	42	-	6	50	-	5	-	-	-	2	1	-	-	106
9:00	-	9:15	46	3	27	61	-	5	-	-	-	-	2	-	-	144
9:15	-	9:30	41	-	19	41	-	4	-	-	-	-	2	-	-	107
9:30	-	9:45	36	-	17	48	-	4	-	-	-	-	3	-	-	108
9:45	-	10:00	33	1	14	43	1	3	-	-	-	-	1	-	-	96
10:00	-	10:15	24	-	13	50	-	3	-	-	-	-	1	-	-	91
10:15	-	10:30	37	-	10	36	-	6	-	-	-	-	3	-	-	92
10:30	-	10:45	30	2	20	36	-	6	-	-	-	-	2	-	-	96
10:45	-	11:00	38	2	27	34	-	5	-	-	-	-	3	-	-	109
17:00	-	17:15	35	-	15	73	-	4	-	-	-	-	2	-	-	129
17:15		17:30	43	1	25	86	-	3	-	-	-	-	3	-	-	161
17:30	-	17:45	36	1	20	70	-	2	-	-	-	2	7	-	-	138
17:45	-	18:00	34	-	17	70	-	5	-	-	-	1	6	-	-	133
18:00		18:15	47	-	17	79	-	2	-	-	-	-	9	-	-	154
18:15	-	18:30	32	-	11	60	-	2	-	-	-	1	3	-	-	109
18:30	-	18:45	38	1	19	78	-	2	-	-	-	1	2	-	-	141
18:45		19:00	22	-	7	89	-	2	-	-	-	1	1	-	-	122
19:00	-	19:15	19	-	15	64	-	1	-	-	-	-	2	-	-	101
19:15	-	19:30	33	-	10	74	-	1	-	-	-	-	4	-	-	122
19:30		19:45	41	-	15	70	-	1	-	-	-	1	4	-	-	132
19:45	-	20:00	33	-	11	68	-	1	-	-	-	-	2	-	-	115
20:00	-	20:15	33	-	14	78	-	2	-	-	-	-	2	-	-	129
20:15		20:30	30	-	10	62	-	1	-	-	-	-	3	-	-	106
20:30	-	20:45	24	1	5	54	-	2	-	-	-	2	2	1	-	91
20:45	-	21:00	22	-	7	59	-	1	-	-	-	-	3	-	-	92
Total			953	12	386	1,692	1	87	-	-	-	12	77	1	-	3,221

Hourly Summary																
8:00	-	9:00	146	8	21	209	-	19	-	-	-	3	5	-	-	403
9:00	-	10:00	156	2	77	193	1	16	-	-	-	-	8	-	-	455
10:00	-	11:00	129	2	70	156	-	20	-	-	-	-	9	-	-	388
17:00	-	18:00	148	1	77	299	-	14	-	-	-	3	18	-	-	561
18:00	-	19:00	139	1	54	306	-	8	-	-	-	3	15	-	-	526
19:00	-	20:00	126	1	51	276	-	4	-	-	-	1	12	-	-	470
20:00	-	21:00	109	1	36	253	-	6	-	-	-	2	10	1	-	418
Total			953	16	386	1,692	1	87	-	-	-	12	77	1	-	3,221

Mid-Block Count (TMC) For Metro Address Tower Karachi
Classified Traffic Volume Counts Surveys

Survey Location: [Name & ID]:Junction 1 (Claremont Rd)	Direction: Cantt. Station Rd to Claremont Rd	Day: 15-April-2026	Enumerator:	Shift Supervisor:

Time of the Day			Private Cars [Including Jeeps & Station Wagons]	Taxies [Yellow & Black Cabs, Yellow Cabs & Radio Cabs]	3 Seator Rickshaws	Motorcycles & Scooters							Freight Transport		Total
							6 Seator Rickshaws	MINI BUS	Peoples Bus	large Bus/ Contract carriage	Intercity Bus	Coaster HIACE	Light Freight Vehicles [Pickups, Shehzoor, etc]	Single Unit Trucks [2 & 3 Axle]	Trailers	
8:00	-	8:15	21	-	5	8	-	-	-	-	-	-	-	-	-	34
8:15	-	8:30	27	-	3	3	-	-	-	-	-	-	-	-	-	33
8:30	-	8:45	18	-	2	10	-	-	-	-	-	-	-	-	-	30
8:45	-	9:00	30	-	2	18	-	-	-	-	-	-	-	-	-	50
9:00	-	9:15	28	-	3	15	-	-	-	-	-	-	-	-	-	46
9:15	-	9:30	31	1	6	24	-	-	-	-	-	-	1	-	-	63
9:30	-	9:45	21	-	5	18	-	-	-	-	-	-	-	-	-	44
9:45	-	10:00	18	-	5	12	-	-	-	-	-	-	1	-	-	36
10:00	-	10:15	17	-	3	11	-	-	-	-	-	1	2	-	-	34
10:15	-	10:30	24	-	3	15	-	-	-	-	-	-	1	-	-	43
10:30	-	10:45	11	-	1	16	-	-	-	-	-	-	2	-	-	30
10:45	-	11:00	14	-	5	18	-	-	-	-	-	-	-	-	-	37
17:00	-	17:15	22	-	5	14	-	-	-	-	-	-	1	-	-	42
17:15		17:30	34	-	6	11	-	-	-	-	-	-	-	-	-	51
17:30	-	17:45	19	-	2	16	-	-	-	-	-	-	-	-	-	37
17:45	-	18:00	24	-	6	13	-	-	-	-	-	-	1	-	-	44
18:00		18:15	20	-	2	22	-	-	-	-	-	-	-	-	-	44
18:15	-	18:30	19	-	4	18	-	-	-	-	-	-	-	-	-	41
18:30	-	18:45	17	-	3	17	-	-	-	-	-	-	-	-	-	37
18:45		19:00	19	-	-	14	-	-	-	-	-	-	-	-	-	33
19:00	-	19:15	14	-	1	12	-	-	-	-	-	-	-	-	-	27
19:15	-	19:30	17	-	5	22	-	-	-	-	-	-	1	-	-	45
19:30		19:45	15	-	-	17	-	-	-	-	-	-	-	-	-	32
19:45	-	20:00	18	-	-	14	-	-	-	-	-	-	-	-	-	32
20:00	-	20:15	21	-	-	21	-	-	-	-	-	-	-	-	-	42
20:15		20:30	17	-	-	17	-	-	-	-	-	-	-	-	-	34
20:30	-	20:45	13	-	-	27	-	-	-	-	-	-	-	-	-	40
20:45	-	21:00	15	-	-	24	-	-	-	-	-	-	-	-	-	39
Total			564	1	77	447	-	-	-	-	-	1	10	-	-	1,100

Hourly Summary																
8:00	-	9:00	96	1	12	39	-	-	-	-	-	-	-	-	-	147
9:00	-	10:00	98	-	19	69	-	-	-	-	-	-	2	-	-	189
10:00	-	11:00	66	-	12	60	-	-	-	-	-	1	5	-	-	144
17:00	-	18:00	99	-	19	54	-	-	-	-	-	-	2	-	-	174
18:00	-	19:00	75	-	9	71	-	-	-	-	-	-	-	-	-	155
19:00	-	20:00	64	-	6	65	-	-	-	-	-	-	1	-	-	136
20:00	-	21:00	66	-	-	89	-	-	-	-	-	-	-	-	-	155
Total			564	1	77	447	-	-	-	-	-	1	10	-	-	1,100

Mid-Block Count (TMC) For Metro Address Tower Karachi

Classified Traffic Volume Counts Surveys

Survey Location: [Name & ID]: Junction 2 (Lilly Bridge)	Direction: Cantt. Station Rd to Cantt. Station Rd	Day: 15-April-2026	Enumerator:	Shift Supervisor:

Time of the Day			Private Cars [Including Jeeps & Station Wagons]	Taxies [Yellow & Black Cabs, Yellow Cabs & Radio Cabs]	3 Seator Rickshaws	Motorcycles & Scooters	6 Seator Rickshaws	MINI BUS	Peoples Bus	large Bus/ Contract carriage	Intercity Bus	Coaster HIACE	Light Freight Vehicles [Pickups, Shehzoor, etc]	Freight Transport: Single Unit Trucks [2 & 3 Axle]	Freight Transport: Trailers	Total
8:00	-	8:15	8	-	13	5	-	-	-	-	-	1	-	-	-	27
8:15	-	8:30	6	-	14	12	-	-	-	-	-	-	1	-	-	33
8:30	-	8:45	4	-	8	6	-	-	-	-	-	-	1	-	-	19
8:45	-	9:00	6	2	18	15	-	-	-	-	-	-	4	-	-	45
9:00	-	9:15	14	1	17	15	-	-	-	-	-	2	3	-	-	52
9:15	-	9:30	16	-	15	19	-	-	-	-	-	2	6	-	-	58
9:30	-	9:45	8	2	23	12	-	-	-	-	-	-	4	-	-	49
9:45	-	10:00	9	1	20	14	-	-	-	-	-	-	1	-	-	45
10:00	-	10:15	7	-	9	8	-	-	-	-	-	-	5	-	-	29
10:15	-	10:30	4	-	14	11	-	-	-	-	-	1	5	-	-	35
10:30	-	10:45	7	-	12	7	-	-	-	-	-	-	1	-	-	27
10:45	-	11:00	5	2	25	13	-	-	-	-	-	1	7	-	-	53
17:00	-	17:15	16	-	21	12	-	-	-	-	-	-	1	-	-	50
17:15		17:30	11	2	18	12	-	-	-	-	-	1	2	-	-	46
17:30	-	17:45	15	1	14	18	-	-	-	-	-	-	2	-	-	50
17:45	-	18:00	11	4	17	13	-	-	-	-	-	-	3	-	-	48
18:00		18:15	8	1	8	15	-	-	-	-	-	1	2	-	-	35
18:15	-	18:30	18	2	11	14	-	-	-	-	-	-	2	-	-	47
18:30	-	18:45	8	3	8	12	-	-	-	-	-	-	6	-	-	37
18:45		19:00	6	-	11	22	-	-	-	-	-	-	1	-	-	40
19:00	-	19:15	9	2	9	22	-	-	-	-	-	-	2	-	-	44
19:15	-	19:30	6	2	11	21	-	-	-	-	-	-	4	-	-	44
19:30		19:45	8	-	8	17	-	-	-	-	-	-	1	-	-	34
19:45	-	20:00	9	-	6	11	-	-	-	-	-	-	3	-	-	29
20:00	-	20:15	5	-	8	21	-	-	-	-	-	-	3	-	-	37
20:15		20:30	12	2	7	15	-	-	-	-	-	-	2	-	-	38
20:30	-	20:45	9	2	12	20	-	-	-	-	-	-	8	-	-	51
20:45	-	21:00	10	1	9	17	-	-	-	-	-	-	5	-	-	42
Total			255	30	366	399	-	-	-	-	-	9	85	-	-	1,144

Hourly Summary

8:00	-	9:00	24	8	53	38	-	-	-	-	-	1	6	-	-	124
9:00	-	10:00	47	7	75	60	-	-	-	-	-	4	14	-	-	204
10:00	-	11:00	23	8	60	39	-	-	-	-	-	2	18	-	-	144
17:00	-	18:00	53	8	70	55	-	-	-	-	-	1	8	-	-	194
18:00	-	19:00	40	10	38	63	-	-	-	-	-	1	11	-	-	159
19:00	-	20:00	32	6	34	71	-	-	-	-	-	-	10	-	-	151
20:00	-	21:00	36	7	36	73	-	-	-	-	-	-	18	-	-	168
Total			255	54	366	399	-	-	-	-	-	9	85	-	-	1,144

Mid-Block Count (TMC) For Metro Address Tower Karachi
Classified Traffic Volume Counts Surveys

Survey Location: [Name & ID]: Junction 2 (Lilly Bridge)	Direction: Cantt. Station Rd to Aamir Khosa Rd,	Day: 15-April-2026	Enumerator:	Shift Supervisor:

Time of the Day			Private Cars [Including Jeeps & Station Wagons]	Taxies [Yellow & Black Cabs, Yellow Cabs & Radio Cabs]	3 Seator Rickshaws	Motorcycles & Scooters								Freight Transport		Total
							6 Seator Rickshaws	MINI BUS	Peoples Bus	large Bus/ Contract carriage	Intercity Bus	Coaster HIACE	Light Freight Vehicles [Pickups, Shehzoor, etc]	Single Unit Trucks [2 & 3 Axle]	Trailers	
8:00	-	8:15	1	-	4	-	-	-	-	-	-	-	-	-	-	5
8:15	-	8:30	1	-	7	-	-	-	-	-	-	-	-	-	-	8
8:30	-	8:45	1	1	6	-	-	-	-	-	-	-	-	-	-	8
8:45	-	9:00	-	1	7	-	-	-	-	-	-	-	-	-	-	8
9:00	-	9:15	-	2	10	-	-	-	-	-	-	-	-	-	-	12
9:15	-	9:30	1	5	9	-	-	-	-	-	-	-	-	-	-	15
9:30	-	9:45	-	1	11	-	-	-	-	-	-	-	-	-	-	12
9:45	-	10:00	-	4	6	-	-	-	-	-	-	-	-	-	-	10
10:00	-	10:15	1	-	4	-	-	-	-	-	-	-	-	-	-	5
10:15	-	10:30	-	-	6	-	-	-	-	-	-	-	-	-	-	6
10:30	-	10:45	-	2	4	-	-	-	-	-	-	-	-	-	-	6
10:45	-	11:00	-	2	2	-	-	-	-	-	-	-	-	-	-	4
17:00	-	17:15	1	-	2	9	-	-	-	-	-	-	-	-	-	12
17:15		17:30	1	-	2	15	-	-	-	-	-	-	-	-	-	18
17:30	-	17:45	-	-	-	11	-	-	-	-	-	-	-	-	-	11
17:45	-	18:00	-	-	-	11	-	-	-	-	-	-	-	-	-	11
18:00		18:15	-	-	-	9	-	-	-	-	-	-	-	-	-	9
18:15	-	18:30	-	-	1	20	-	-	-	-	-	-	-	-	-	21
18:30	-	18:45	-	-	1	12	-	-	-	-	-	-	-	-	-	13
18:45		19:00	-	-	-	10	-	-	-	-	-	-	-	-	-	10
19:00	-	19:15	-	-	-	8	-	-	-	-	-	-	-	-	-	8
19:15	-	19:30	-	-	1	10	-	-	-	-	-	-	-	-	-	11
19:30		19:45	-	-	2	12	-	-	-	-	-	-	-	-	-	14
19:45	-	20:00	1	-	1	7	-	-	-	-	-	-	-	-	-	9
20:00	-	20:15	1	-	-	6	-	-	-	-	-	-	-	-	-	7
20:15		20:30	2	-	1	7	-	-	-	-	-	-	-	-	-	10
20:30	-	20:45	2	-	2	12	-	-	-	-	-	-	-	-	-	16
20:45	-	21:00	-	-	1	10	-	-	-	-	-	-	-	-	-	11
Total			13	18	90	169	-	-	-	-	-	-	-	-	-	290

Hourly Summary

8:00	-	9:00	3	18	24	-	-	-	-	-	-	-	-	-	-	29
9:00	-	10:00	1	-	36	-	-	-	-	-	-	-	-	-	-	49
10:00	-	11:00	1	-	16	-	-	-	-	-	-	-	-	-	-	21
17:00	-	18:00	2	-	4	46	-	-	-	-	-	-	-	-	-	52
18:00	-	19:00	-	-	2	51	-	-	-	-	-	-	-	-	-	53
19:00	-	20:00	1	-	4	37	-	-	-	-	-	-	-	-	-	42
20:00	-	21:00	5	-	4	35	-	-	-	-	-	-	-	-	-	44
Total			13	18	90	169	-	-	-	-	-	-	-	-	-	290

Mid-Block Count (TMC) For Metro Address Tower Karachi
Classified Traffic Volume Counts Surveys

Survey Location: [Name & ID]: Junction 2 (Lilly Bridge)	Direction: Cantt. Station Rd to Lilly Bridge	Day: 15-April-2026	Enumerator:	Shift Supervisor:

Time of the Day			Private Cars [Including Jeeps & Station Wagons]	Taxies [Yellow & Black Cabs, Yellow Cabs & Radio Cabs]	3 Seator Rickshaws	Motorcycles & Scooters								Freight Transport		Total
							6 Seator Rickshaws	MINI BUS	Peoples Bus	large Bus/ Contract carriage	Intercity Bus	Coaster HIACE	Light Freight Vehicles [Pickups, Shehzoor, etc]	Single Unit Trucks [2 & 3 Axle]	Trailers	
8:00	-	8:15	42	-	29	94	2	2	-	2	-	2	2	-	-	175
8:15	-	8:30	69	-	20	162	-	6	-	3	-	1	3	-	-	264
8:30	-	8:45	95	-	29	215	1	6	-	3	-	2	1	-	-	352
8:45	-	9:00	76	1	39	226	-	5	-	3	-	1	6	-	-	357
9:00	-	9:15	79	1	42	236	-	5	-	3	-	2	3	-	-	371
9:15	-	9:30	70	-	30	201	-	6	-	2	-	1	1	-	-	311
9:30	-	9:45	70	1	21	204	-	12	-	3	-	-	1	-	-	312
9:45	-	10:00	69	-	24	225	-	9	-	8	-	-	4	-	-	339
10:00	-	10:15	65	-	30	218	-	7	-	4	-	-	2	-	-	326
10:15	-	10:30	75	-	30	204	-	4	-	5	-	-	3	-	-	321
10:30	-	10:45	71	-	24	184	-	5	-	2	-	-	4	-	-	290
10:45	-	11:00	59	-	26	178	-	7	-	6	-	-	6	-	-	282
17:00	-	17:15	71	1	28	207	-	6	-	2	-	1	-	8	-	324
17:15		17:30	93	-	31	194	-	6	-	1	-	-	-	7	-	332
17:30	-	17:45	87	-	27	164	-	7	-	2	-	-	-	11	-	298
17:45	-	18:00	74	-	22	185	-	9	-	1	1	-	-	5	-	297
18:00		18:15	70	-	10	132	-	6	-	1	-	1	-	2	-	222
18:15	-	18:30	69	1	27	185	-	8	-	-	-	1	-	3	-	294
18:30	-	18:45	77	-	25	134	-	5	-	-	-	-	-	3	-	244
18:45		19:00	60	2	14	115	-	7	-	1	-	1	-	2	-	202
19:00	-	19:15	61	-	13	102	-	6	-	1	-	-	-	2	-	185
19:15	-	19:30	75	-	17	156	-	2	-	1	-	-	-	6	2	259
19:30		19:45	50	-	18	120	-	4	-	-	-	-	-	4	-	196
19:45	-	20:00	60	-	15	139	-	4	-	1	-	2	-	4	-	225
20:00	-	20:15	58	-	18	151	-	2	-	1	-	-	-	3	-	233
20:15		20:30	53	-	9	128	-	2	-	2	-	-	-	1	-	195
20:30	-	20:45	61	-	15	121	-	2	-	1	-	-	-	1	-	201
20:45	-	21:00	56	-	12	114	-	1	-	-	-	-	-	2	-	185
Total			1,915	7	645	4,694	3	151	-	59	1	15	36	64	2	7,592

Hourly Summary																
8:00	-	9:00	282	3	117	697	3	19	-	11	-	6	12	-	-	1,148
9:00	-	10:00	288	1	117	866	-	32	-	16	-	3	9	-	-	1,333
10:00	-	11:00	270	-	110	784	-	23	-	17	-	-	15	-	-	1,219
17:00	-	18:00	325	1	108	750	-	28	-	6	1	1	-	31	-	1,251
18:00	-	19:00	276	1	76	566	-	26	-	2	-	3	-	10	-	962
19:00	-	20:00	246	3	63	517	-	16	-	3	-	2	-	16	2	865
20:00	-	21:00	228	3	54	514	-	7	-	4	-	-	-	7	-	814
Total			1,915	12	645	4,694	3	151	-	59	1	15	36	64	2	7,592

Mid-Block Count (TMC) For Metro Address Tower Karachi
Classified Traffic Volume Counts Surveys

Survey Location: [Name & ID]: Junction 2 (Lilly Bridge)	Direction: Cantt. Station Rd to Fatima Jinnah Rd	Day: 15-April-2026	Enumerator:	Shift Supervisor:

Time of the Day			Private Cars [Including Jeeps & Station Wagons]	Taxies [Yellow & Black Cabs, Yellow Cabs & Radio Cabs]	3 Seator Rickshaws	Motorcycles & Scooters	6 Seator Rickshaws	MINI BUS	Peoples Bus	large Bus/ Contract carriage	Intercity Bus	Coaster HIACE	Light Freight Vehicles [Pickups, Shehzoor, etc]	Freight Transport: Single Unit Trucks [2 & 3 Axle]	Freight Transport: Trailers	Total
8:00	-	8:15	8	-	5	6	-	2	-	-	-	-	-	-	-	21
8:15	-	8:30	7	-	2	7	-	3	-	-	-	-	-	-	-	19
8:30	-	8:45	10	-	2	11	-	2	-	-	-	2	-	-	-	27
8:45	-	9:00	11	1	5	16	-	1	-	-	-	-	-	-	-	34
9:00	-	9:15	12	-	5	13	-	-	-	-	-	-	-	-	-	30
9:15	-	9:30	9	-	8	16	-	2	-	-	-	-	1	-	-	36
9:30	-	9:45	9	-	6	12	-	3	-	-	-	-	2	-	-	32
9:45	-	10:00	5	-	5	16	-	2	-	-	-	-	1	-	-	29
10:00	-	10:15	6	-	4	15	-	2	-	-	-	-	2	-	-	29
10:15	-	10:30	6	-	5	12	-	3	-	-	-	-	3	1	-	30
10:30	-	10:45	9	3	13	25	-	3	-	-	-	-	1	-	-	54
10:45	-	11:00	11	1	9	20	-	1	-	-	-	-	-	-	-	42
17:00	-	17:15	16	1	9	28	-	1	-	-	-	-	2	-	-	57
17:15		17:30	27	-	13	30	-	-	-	-	-	-	3	-	-	73
17:30	-	17:45	20	-	12	32	-	2	-	-	-	1	2	-	-	69
17:45	-	18:00	23	1	7	24	-	-	-	-	-	-	3	-	-	58
18:00		18:15	17	-	4	20	-	1	-	-	-	-	2	-	-	44
18:15	-	18:30	10	-	7	23	-	-	-	-	-	1	3	-	-	44
18:30	-	18:45	17	-	3	20	-	-	-	-	-	-	2	-	-	42
18:45		19:00	8	-	4	23	-	1	-	-	-	-	2	-	-	38
19:00	-	19:15	9	-	2	19	-	1	-	-	-	-	1	-	-	32
19:15	-	19:30	13	1	8	27	-	1	-	-	-	-	1	-	-	51
19:30		19:45	11	-	4	23	-	1	-	-	-	-	3	-	-	42
19:45	-	20:00	10	-	4	18	-	1	-	-	-	-	2	-	-	35
20:00	-	20:15	7	-	2	14	-	-	-	-	-	-	4	-	-	27
20:15		20:30	11	-	4	21	-	-	-	-	-	-	2	-	-	38
20:30	-	20:45	8	-	2	26	-	-	-	-	-	-	1	-	-	37
20:45	-	21:00	9	-	2	23	-	-	-	-	-	-	1	-	-	35
Total			319	8	156	540	-	33	-	-	-	4	44	1	-	1,105

Hourly Summary																
8:00	-	9:00	36	5	14	40	-	8	-	-	-	2	-	-	-	101
9:00	-	10:00	35	2	24	57	-	7	-	-	-	-	4	-	-	127
10:00	-	11:00	32	1	31	72	-	9	-	-	-	-	6	1	-	155
17:00	-	18:00	86	1	41	114	-	3	-	-	-	1	10	-	-	257
18:00	-	19:00	52	1	18	86	-	2	-	-	-	1	9	-	-	168
19:00	-	20:00	43	-	18	87	-	4	-	-	-	-	7	-	-	160
20:00	-	21:00	35	-	10	84	-	-	-	-	-	-	8	-	-	137
Total			319	10	156	540	-	33	-	-	-	4	44	1	-	1,105

Mid-Block Count (TMC) For Metro Address Tower Karachi
Classified Traffic Volume Counts Surveys

Survey Location: [Name & ID]: Junction 2 (Lilly Bridge)	Direction: Aamir Khosa Rd, to Cantt. Station Rd	Day: 15-April-2026	Enumerator:	Shift Supervisor:

Time of the Day			Private Cars [Including Jeeps & Station Wagons]	Taxies [Yellow & Black Cabs, Yellow Cabs & Radio Cabs]	3 Seator Rickshaws	Motorcycles & Scooters	6 Seator Rickshaws	MINI BUS	Peoples Bus	large Bus/ Contract carriage	Intercity Bus	Coaster HIACE	Light Freight Vehicles [Pickups, Shehzoor, etc]	Freight Transport: Single Unit Trucks [2 & 3 Axle]	Freight Transport: Trailers	Total
8:00	-	8:15	-	-	5	3	-	-	-	-	-	-	-	-	-	8
8:15	-	8:30	1	-	3	3	-	-	-	-	-	-	-	-	-	7
8:30	-	8:45	2	-	2	3	-	-	-	-	-	-	-	-	-	7
8:45	-	9:00	-	-	3	3	-	-	-	-	-	-	-	-	-	6
9:00	-	9:15	-	-	2	3	-	-	-	-	-	-	-	-	-	5
9:15	-	9:30	1	-	2	3	-	-	-	-	-	-	-	-	-	6
9:30	-	9:45	2	-	2	-	-	-	-	-	-	-	-	-	-	4
9:45	-	10:00	-	-	1	3	-	-	-	-	-	-	-	-	-	4
10:00	-	10:15	-	-	2	2	-	-	-	-	-	-	-	-	-	4
10:15	-	10:30	1	-	2	4	-	-	-	-	-	-	-	-	-	7
10:30	-	10:45	3	1	1	2	-	-	-	-	-	-	-	-	-	7
10:45	-	11:00	2	-	3	4	-	-	-	-	-	-	-	-	-	9
17:00	-	17:15	-	-	2	5	-	-	-	-	-	-	-	-	-	7
17:15		17:30	3	-	1	6	-	-	-	-	-	-	1	-	-	11
17:30	-	17:45	1	-	1	3	-	-	-	-	-	-	-	-	-	5
17:45	-	18:00	-	-	1	6	-	-	-	-	-	-	-	-	-	7
18:00		18:15	-	1	-	4	-	-	-	-	-	-	-	-	-	5
18:15	-	18:30	-	-	6	2	-	-	-	-	-	-	-	-	-	8
18:30	-	18:45	-	-	1	1	-	-	-	-	-	-	-	-	-	2
18:45		19:00	1	-	1	4	-	-	-	-	-	-	-	-	-	6
19:00	-	19:15	4	-	4	3	-	-	-	-	-	-	-	-	-	11
19:15	-	19:30	1	-	4	4	-	-	-	-	-	-	-	-	-	9
19:30		19:45	2	-	3	7	-	-	-	-	-	-	-	-	-	12
19:45	-	20:00	1	-	3	2	-	-	-	-	-	-	-	-	-	6
20:00	-	20:15	-	-	2	4	-	-	-	-	-	-	-	-	-	6
20:15		20:30	3	-	2	3	-	-	-	-	-	-	-	-	-	8
20:30	-	20:45	2	-	2	4	-	-	-	-	-	-	-	-	-	8
20:45	-	21:00	2	-	3	6	-	-	-	-	-	-	-	-	-	11
Total			32	2	64	97	-	-	-	-	-	-	1	-	-	196

Hourly Summary																
8:00	-	9:00	3	1	13	12	-	-	-	-	-	-	-	-	-	28
9:00	-	10:00	3	-	7	9	-	-	-	-	-	-	-	-	-	19
10:00	-	11:00	6	1	8	12	-	-	-	-	-	-	-	-	-	27
17:00	-	18:00	4	1	5	20	-	-	-	-	-	-	1	-	-	30
18:00	-	19:00	1	1	8	11	-	-	-	-	-	-	-	-	-	21
19:00	-	20:00	8	1	14	16	-	-	-	-	-	-	-	-	-	38
20:00	-	21:00	7	-	9	17	-	-	-	-	-	-	-	-	-	33
Total			32	5	64	97	-	-	-	-	-	-	1	-	-	196

Mid-Block Count (TMC) For Metro Address Tower Karachi
Classified Traffic Volume Counts Surveys

Survey Location: [Name & ID]: Junction 2 (Lilly Bridge)	Direction: Aamir Khosa Rd, to Lilly Bridge	Day: 15-April-2026	Enumerator:	Shift Supervisor:

Time of the Day			Private Cars [Including Jeeps & Station Wagons]	Taxies [Yellow & Black Cabs, Yellow Cabs & Radio Cabs]	3 Seator Rickshaws	Motorcycles & Scooters	6 Seator Rickshaws	MINI BUS	Peoples Bus	large Bus/ Contract carriage	Intercity Bus	Coaster HIACE	Light Freight Vehicles [Pickups, Shehzoor, etc]	Freight Transport: Single Unit Trucks [2 & 3 Axle]	Freight Transport: Trailers	Total
8:00	-	8:15	35	-	10	190	-	-	-	-	-	-	1	-	-	236
8:15	-	8:30	57	-	17	283	-	-	-	-	-	-	2	-	-	359
8:30	-	8:45	72	-	19	324	-	-	-	-	-	-	2	-	-	417
8:45	-	9:00	69	-	17	291	-	-	-	-	-	-	1	-	-	378
9:00	-	9:15	85	-	15	271	-	-	-	-	-	-	-	-	-	371
9:15	-	9:30	63	-	21	258	-	-	-	-	-	-	5	-	-	347
9:30	-	9:45	41	-	24	282	-	-	-	-	-	-	4	-	-	351
9:45	-	10:00	53	-	15	295	-	-	-	-	-	-	-	-	-	363
10:00	-	10:15	52	-	19	280	-	-	-	-	-	-	1	-	-	352
10:15	-	10:30	35	-	21	243	-	-	-	-	-	-	5	-	-	304
10:30	-	10:45	43	-	20	237	-	-	-	1	-	-	5	-	-	306
10:45	-	11:00	41	-	18	231	-	-	-	-	-	-	4	-	-	294
17:00	-	17:15	23	-	47	211	-	-	-	-	-	-	4	-	-	285
17:15		17:30	42	-	28	162	-	-	-	-	-	-	3	-	-	235
17:30	-	17:45	52	-	26	172	-	-	-	-	-	-	3	-	-	253
17:45	-	18:00	55	-	23	200	-	-	-	-	-	-	-	-	-	278
18:00		18:15	54	-	21	160	-	-	-	-	-	-	1	-	-	236
18:15	-	18:30	41	-	14	178	-	-	-	-	-	-	3	-	-	236
18:30	-	18:45	43	-	16	162	-	-	-	-	-	-	-	-	-	221
18:45		19:00	49	-	10	152	-	-	-	-	-	1	-	-	-	212
19:00	-	19:15	36	-	26	161	-	-	-	-	-	-	4	-	-	227
19:15	-	19:30	41	-	13	121	-	-	-	-	-	1	2	-	-	178
19:30		19:45	28	-	7	141	-	-	-	-	-	-	2	-	-	178
19:45	-	20:00	26	-	12	138	-	-	-	-	-	-	3	-	-	179
20:00	-	20:15	38	-	15	147	-	-	-	-	-	-	2	-	-	202
20:15		20:30	38	-	17	155	-	-	-	-	-	-	4	-	-	214
20:30	-	20:45	26	-	13	135	-	-	-	-	-	-	4	-	-	178
20:45	-	21:00	21	-	18	140	-	-	-	-	-	-	1	-	-	180
Total			1,259	-	522	5,720	-	-	-	1	-	2	66	-	-	7,570

Hourly Summary																
8:00	-	9:00	233	-	63	1,088	-	-	-	-	-	-	6	-	-	1,390
9:00	-	10:00	242	-	75	1,106	-	-	-	-	-	-	9	-	-	1,432
10:00	-	11:00	171	-	78	991	-	-	-	1	-	-	15	-	-	1,256
17:00	-	18:00	172	-	124	745	-	-	-	-	-	-	10	-	-	1,051
18:00	-	19:00	187	-	61	652	-	-	-	-	-	1	4	-	-	905
19:00	-	20:00	131	-	58	561	-	-	-	-	-	1	11	-	-	762
20:00	-	21:00	123	-	63	577	-	-	-	-	-	-	11	-	-	774
Total			1,259	-	522	5,720	-	-	-	1	-	2	66	-	-	7,570

Mid-Block Count (TMC) For Metro Address Tower Karachi
Classified Traffic Volume Counts Surveys

Survey Location: [Name & ID]: Junction 2 (Lilly Bridge)	Direction: Aamir Khosa Rd, to Fatima Jinnah Rd	Day: 15-April-2026	Enumerator:	Shift Supervisor:

Time of the Day			Private Cars [Including Jeeps & Station Wagons]	Taxies [Yellow & Black Cabs, Yellow Cabs & Radio Cabs]	3 Seator Rickshaws	Motorcycles & Scooters	6 Seator Rickshaws	MINI BUS	Peoples Bus	large Bus/ Contract carriage	Intercity Bus	Coaster HIACE	Light Freight Vehicles [Pickups, Shehzoor, etc]	Freight Transport: Single Unit Trucks [2 & 3 Axle]	Freight Transport: Trailers	Total
8:00	-	8:15	3	-	-	10	-	-	-	-	-	-	-	-	-	13
8:15	-	8:30	4	-	3	11	-	-	-	-	-	-	1	-	-	19
8:30	-	8:45	8	-	-	8	-	-	-	-	-	-	-	-	-	16
8:45	-	9:00	12	-	2	10	-	-	-	-	-	-	-	-	-	24
9:00	-	9:15	9	-	2	8	-	-	-	-	-	-	-	-	-	19
9:15	-	9:30	7	1	1	4	-	-	-	-	-	-	-	-	-	13
9:30	-	9:45	7	-	2	8	-	-	-	-	-	-	-	-	-	17
9:45	-	10:00	5	-	3	8	-	-	-	-	-	-	-	-	-	16
10:00	-	10:15	6	-	2	5	-	-	-	-	-	-	-	-	-	13
10:15	-	10:30	6	-	2	8	-	-	-	-	-	-	-	-	-	16
10:30	-	10:45	4	-	1	4	-	-	-	-	-	-	-	-	-	9
10:45	-	11:00	7	-	1	5	-	-	-	-	-	-	-	-	-	13
17:00	-	17:15	12	-	6	8	-	-	-	-	-	-	-	-	-	26
17:15		17:30	13	-	3	7	-	-	-	-	-	-	-	-	-	23
17:30	-	17:45	12	-	4	6	-	-	-	-	-	-	-	-	-	22
17:45	-	18:00	13	-	1	9	-	-	-	-	-	-	-	-	-	23
18:00		18:15	6	-	2	8	-	-	-	-	-	-	-	-	-	16
18:15	-	18:30	5	-	1	9	-	-	-	-	-	-	-	-	-	15
18:30	-	18:45	6	-	1	6	-	-	-	-	-	-	-	-	-	13
18:45		19:00	4	-	2	7	-	-	-	-	-	-	-	-	-	13
19:00	-	19:15	6	-	3	9	-	-	-	-	-	-	2	-	-	20
19:15	-	19:30	11	-	1	3	-	-	-	-	-	-	-	-	-	15
19:30		19:45	6	-	1	7	-	-	-	-	-	-	-	-	-	14
19:45	-	20:00	6	-	1	6	-	-	-	-	-	-	-	-	-	13
20:00	-	20:15	5	-	-	5	-	-	-	-	-	-	-	-	-	10
20:15		20:30	7	-	2	2	-	-	-	-	-	-	-	-	-	11
20:30	-	20:45	8	-	2	4	-	-	-	-	-	-	-	-	-	14
20:45	-	21:00	6	-	-	6	-	-	-	-	-	-	-	-	-	12
Total			204	1	49	191	-	-	-	-	-	-	3	-	-	448

Hourly Summary

8:00	-	9:00	27	1	5	39	-	-	-	-	-	-	1	-	-	72
9:00	-	10:00	28	-	8	28	-	-	-	-	-	-	-	-	-	65
10:00	-	11:00	23	-	6	22	-	-	-	-	-	-	-	-	-	51
17:00	-	18:00	50	-	14	30	-	-	-	-	-	-	-	-	-	94
18:00	-	19:00	21	-	6	30	-	-	-	-	-	-	-	-	-	57
19:00	-	20:00	29	-	6	25	-	-	-	-	-	-	2	-	-	62
20:00	-	21:00	26	-	4	17	-	-	-	-	-	-	-	-	-	47
Total			204	1	49	191	-	-	-	-	-	-	3	-	-	448

Mid-Block Count (TMC) For Metro Address Tower Karachi
Classified Traffic Volume Counts Surveys

Survey Location: [Name & ID]: Junction 2 (Lilly Bridge)	Direction: Lilly Bridge to Cantt. Station Rd	Day: 15-April-2026	Enumerator:	Shift Supervisor:

Time of the Day			Private Cars [Including Jeeps & Station Wagons]	Taxies [Yellow & Black Cabs, Yellow Cabs & Radio Cabs]	3 Seator Rickshaws	Motorcycles & Scooters	6 Seator Rickshaws	MINI BUS	Peoples Bus	large Bus/ Contract carriage	Intercity Bus	Coaster HIACE	Light Freight Vehicles [Pickups, Shehzoor, etc]	Freight Transport: Single Unit Trucks [2 & 3 Axle]	Freight Transport: Trailers	Total
8:00	-	8:15	74	1	25	71	-	3	-	1	-	-	3	-	-	178
8:15	-	8:30	55	-	20	94	-	6	-	-	-	1	3	-	-	179
8:30	-	8:45	102	1	24	95	-	4	-	2	-	1	2	1	-	232
8:45	-	9:00	82	1	29	84	-	3	-	1	-	-	1	1	-	202
9:00	-	9:15	84	1	33	93	-	3	-	1	-	1	1	-	-	217
9:15	-	9:30	70	-	33	106	-	2	-	-	-	1	3	-	-	215
9:30	-	9:45	53	-	27	84	-	5	-	-	-	-	2	1	-	172
9:45	-	10:00	70	-	42	104	-	6	-	2	-	1	2	-	-	227
10:00	-	10:15	62	3	28	101	-	8	-	2	-	-	4	1	-	209
10:15	-	10:30	58	-	28	82	-	7	-	3	-	-	2	1	-	181
10:30	-	10:45	52	2	24	87	-	4	-	3	-	-	6	-	-	178
10:45	-	11:00	54	1	27	85	-	2	-	2	-	-	5	-	-	176
17:00	-	17:15	82	-	29	212	-	9	-	3	-	2	2	-	-	339
17:15		17:30	87	-	31	173	-	5	-	2	-	1	5	1	-	305
17:30	-	17:45	123	-	32	289	-	9	-	3	-	2	9	-	-	467
17:45	-	18:00	106	-	37	284	-	9	-	3	-	5	6	1	-	451
18:00		18:15	81	-	23	239	-	5	-	2	-	2	3	-	-	355
18:15	-	18:30	96	-	21	214	-	8	-	3	-	3	3	-	-	348
18:30	-	18:45	105	-	25	274	-	5	-	4	-	1	2	-	-	416
18:45		19:00	77	-	11	258	-	6	-	4	-	2	4	-	-	362
19:00	-	19:15	63	-	19	216	-	3	-	4	-	-	2	-	-	307
19:15	-	19:30	65	-	27	228	-	3	-	2	-	1	6	-	-	332
19:30		19:45	61	-	21	209	-	1	-	-	-	1	4	-	-	297
19:45	-	20:00	56	-	24	203	-	2	-	1	-	2	2	-	-	290
20:00	-	20:15	47	-	25	182	-	4	-	1	-	-	6	-	-	265
20:15		20:30	85	-	15	207	-	3	-	2	-	-	3	-	-	315
20:30	-	20:45	51	-	20	183	-	2	-	1	-	-	-	-	-	257
20:45	-	21:00	60	-	22	158	-	5	-	1	-	-	2	2	-	250
Total			2,061	10	722	4,615	-	132	-	53	-	27	93	9	-	7,722

Hourly Summary																
8:00	-	9:00	313	10	98	344	-	16	-	4	-	2	9	2	-	791
9:00	-	10:00	277	-	135	387	-	16	-	3	-	3	8	1	-	831
10:00	-	11:00	226	-	107	355	-	21	-	10	-	-	17	2	-	744
17:00	-	18:00	398	-	129	958	-	32	-	11	-	10	22	2	-	1,562
18:00	-	19:00	359	-	80	985	-	24	-	13	-	8	12	-	-	1,481
19:00	-	20:00	245	-	91	856	-	9	-	7	-	4	14	-	-	1,226
20:00	-	21:00	243	-	82	730	-	14	-	5	-	-	11	2	-	1,087
Total			2,061	10	722	4,615	-	132	-	53	-	27	93	9	-	7,722

Mid-Block Count (TMC) For Metro Address Tower Karachi
Classified Traffic Volume Counts Surveys

Survey Location: [Name & ID]: Junction 2 (Lilly Bridge)	Direction:Lilly Bridge to Aamir Khosa Rd	Day: 15-April-2026	Enumerator:	Shift Supervisor:

Time of the Day			Private Cars [Including Jeeps & Station Wagons]	Taxies [Yellow & Black Cabs, Yellow Cabs & Radio Cabs]	3 Seator Rickshaws	Motorcycles & Scooters	6 Seator Rickshaws	MINI BUS	Peoples Bus	large Bus/ Contract carriage	Intercity Bus	Coaster HIACE	Light Freight Vehicles [Pickups, Shehzoor, etc]	Freight Transport: Single Unit Trucks [2 & 3 Axle]	Freight Transport: Trailers	Total
8:00	-	8:15	1	-	1	36	-	-	-	-	-	-	-	-	-	38
8:15	-	8:30	-	-	1	33	-	-	-	-	-	-	-	-	-	34
8:30	-	8:45	3	-	-	37	-	-	-	-	-	-	-	-	-	40
8:45	-	9:00	-	-	-	30	-	-	-	-	-	-	-	-	-	30
9:00	-	9:15	-	-	-	27	-	-	-	-	-	-	-	-	-	27
9:15	-	9:30	-	-	-	37	-	-	-	-	-	-	-	-	-	37
9:30	-	9:45	-	-	2	36	-	-	-	-	-	-	-	-	-	38
9:45	-	10:00	-	-	-	33	-	-	-	-	-	-	-	-	-	33
10:00	-	10:15	-	-	-	32	-	-	-	-	-	-	-	-	-	32
10:15	-	10:30	-	-	-	36	-	-	-	-	-	-	-	-	-	36
10:30	-	10:45	-	-	-	44	-	-	-	-	-	-	-	-	-	44
10:45	-	11:00	-	-	-	31	-	-	-	-	-	-	-	-	-	31
17:00	-	17:15	-	-	-	21	-	-	-	-	-	-	-	-	-	21
17:15		17:30	-	-	-	15	-	-	-	-	-	-	-	-	-	15
17:30	-	17:45	-	-	-	14	-	-	-	-	-	-	-	-	-	14
17:45	-	18:00	-	-	-	16	-	-	-	-	-	-	-	-	-	16
18:00		18:15	-	-	-	15	-	-	-	-	-	-	-	-	-	15
18:15	-	18:30	-	-	-	37	-	-	-	-	-	-	-	-	-	37
18:30	-	18:45	-	-	1	43	-	-	-	-	-	-	-	-	-	44
18:45		19:00	-	-	-	52	-	-	-	-	-	-	-	-	-	52
19:00	-	19:15	-	-	-	49	-	-	-	-	-	-	-	-	-	49
19:15	-	19:30	-	-	-	38	-	-	-	-	-	-	-	-	-	38
19:30		19:45	-	-	-	43	-	-	-	-	-	-	-	-	-	43
19:45	-	20:00	-	-	1	78	-	-	-	-	-	-	-	-	-	79
20:00	-	20:15	-	-	1	67	-	-	-	-	-	-	-	-	-	68
20:15		20:30	-	-	-	62	-	-	-	-	-	-	-	-	-	62
20:30	-	20:45	-	-	-	74	-	-	-	-	-	-	-	-	-	74
20:45	-	21:00	-	-	-	67	-	-	-	-	-	-	-	-	-	67
Total			4	-	7	1,103	-	-	-	-	-	-	-	-	-	1,114

Hourly Summary

8:00	-	9:00	4	-	2	136	-	-	-	-	-	-	-	-	-	142
9:00	-	10:00	-	-	2	133	-	-	-	-	-	-	-	-	-	135
10:00	-	11:00	-	-	-	143	-	-	-	-	-	-	-	-	-	143
17:00	-	18:00	-	-	-	66	-	-	-	-	-	-	-	-	-	66
18:00	-	19:00	-	-	1	147	-	-	-	-	-	-	-	-	-	148
19:00	-	20:00	-	-	1	208	-	-	-	-	-	-	-	-	-	209
20:00	-	21:00	-	-	1	270	-	-	-	-	-	-	-	-	-	271
Total			4	-	7	1,103	-	-	-	-	-	-	-	-	-	1,114

Mid-Block Count (TMC) For Metro Address Tower Karachi
Classified Traffic Volume Counts Surveys

Survey Location: [Name & ID]: Junction 2 (Lilly Bridge)	Direction: Lilly Bridge to Fatima Jinnah Rd	Day: 15-April-2026	Enumerator:	Shift Supervisor:

Time of the Day			Private Cars [Including Jeeps & Station Wagons]	Taxies [Yellow & Black Cabs, Yellow Cabs & Radio Cabs]	3 Seator Rickshaws	Motorcycles & Scooters							Freight Transport		Total
							6 Seator Rickshaws	MINI BUS	Peoples Bus	large Bus/ Contract carriage	Intercity Bus	Coaster HIACE	Light Freight Vehicles [Pickups, Shehzoor, etc]	Single Unit Trucks [2 & 3 Axle]	Trailers	
8:00	-	8:15	64	-	16	54	-	3	-	-	-	2	-	-	-	139
8:15	-	8:30	46	-	9	43	-	2	-	-	-	-	2	-	-	102
8:30	-	8:45	49	-	14	51	-	2	-	-	-	-	1	-	-	117
8:45	-	9:00	64	-	15	59	-	3	-	-	-	-	-	-	-	141
9:00	-	9:15	61	-	10	62	-	3	-	-	-	-	1	-	-	137
9:15	-	9:30	60	-	11	60	-	2	-	-	-	-	-	-	-	133
9:30	-	9:45	53	1	16	51	-	3	-	-	-	1	1	-	-	126
9:45	-	10:00	51	-	17	38	-	2	-	-	-	-	3	-	-	111
10:00	-	10:15	50	-	16	39	-	2	-	-	-	-	1	-	-	108
10:15	-	10:30	67	1	10	54	-	3	-	-	-	-	1	-	-	136
10:30	-	10:45	65	-	11	51	-	2	-	-	-	-	1	-	-	130
10:45	-	11:00	49	-	15	58	-	3	-	-	-	-	1	-	-	126
17:00	-	17:15	62	-	14	178	-	2	-	-	-	-	5	-	-	261
17:15		17:30	66	-	24	200	-	2	-	-	-	-	4	-	-	296
17:30	-	17:45	80	-	23	274	-	2	-	-	-	-	2	-	-	381
17:45	-	18:00	89	-	27	259	-	2	-	-	-	-	5	-	-	382
18:00		18:15	61	-	10	204	-	2	-	-	-	1	1	-	-	279
18:15	-	18:30	88	1	22	271	-	2	-	-	-	-	2	-	-	386
18:30	-	18:45	85	-	17	221	-	3	-	-	-	-	1	-	-	327
18:45		19:00	71	-	20	190	-	1	-	-	-	-	3	-	-	285
19:00	-	19:15	81	-	15	162	-	3	-	-	-	-	2	-	-	263
19:15	-	19:30	50	-	9	171	-	1	-	-	-	-	2	-	-	233
19:30		19:45	71	-	10	150	-	2	-	-	-	-	1	-	-	234
19:45	-	20:00	84	-	11	163	-	2	-	-	-	-	-	-	-	260
20:00	-	20:15	64	-	10	150	-	2	-	-	-	-	-	-	-	226
20:15		20:30	75	-	12	128	-	1	-	-	-	-	1	-	-	217
20:30	-	20:45	53	-	8	116	-	-	-	-	-	-	1	-	-	178
20:45	-	21:00	52	-	9	114	-	2	-	-	-	-	-	-	-	177
Total			1,811	3	401	3,571	-	59	-	-	-	4	42	-	-	5,891

Hourly Summary																
8:00	-	9:00	223	2	54	207	-	10	-	-	-	2	3	-	-	499
9:00	-	10:00	225	-	54	211	-	10	-	-	-	1	5	-	-	507
10:00	-	11:00	231	-	52	202	-	10	-	-	-	-	4	-	-	500
17:00	-	18:00	297	1	88	911	-	8	-	-	-	-	16	-	-	1,320
18:00	-	19:00	305	1	69	886	-	8	-	-	-	1	7	-	-	1,277
19:00	-	20:00	286	1	45	646	-	8	-	-	-	-	5	-	-	990
20:00	-	21:00	244	1	39	508	-	5	-	-	-	-	2	-	-	798
Total			1,811	6	401	3,571	-	59	-	-	-	4	42	-	-	5,891

Mid-Block Count (TMC) For Metro Address Tower Karachi
Classified Traffic Volume Counts Surveys

Survey Location: [Name & ID]: Junction 2 (Lilly Bridge)	Direction: Fatima Jinnah Rd to Cantt. Station Rd	Day: 15-April-2026	Enumerator:	Shift Supervisor:

Time of the Day			Private Cars [Including Jeeps & Station Wagons]	Taxies [Yellow & Black Cabs, Yellow Cabs & Radio Cabs]	3 Seator Rickshaws	Motorcycles & Scooters	6 Seator Rickshaws	MINI BUS	Peoples Bus	large Bus/ Contract carriage	Intercity Bus	Coaster HIACE	Light Freight Vehicles [Pickups, Shehzoor, etc]	Freight Transport: Single Unit Trucks [2 & 3 Axle]	Freight Transport: Trailers	Total
8:00	-	8:15	2	-	7	11	-	2	-	-	-	-	-	-	-	22
8:15	-	8:30	4	-	3	19	-	2	-	-	-	-	2	-	-	30
8:30	-	8:45	11	-	3	19	-	2	-	-	-	-	-	-	-	35
8:45	-	9:00	7	2	3	11	-	2	-	-	-	-	-	-	-	25
9:00	-	9:15	7	-	6	12	-	1	-	-	-	-	1	-	-	27
9:15	-	9:30	5	-	5	11	-	1	-	-	-	-	1	-	-	23
9:30	-	9:45	7	-	4	15	-	2	-	-	-	-	-	-	-	28
9:45	-	10:00	8	1	6	12	-	2	-	-	-	-	1	-	-	30
10:00	-	10:15	7	1	3	15	-	2	-	-	-	-	2	-	-	30
10:15	-	10:30	4	2	8	22	-	2	-	-	-	-	2	-	-	40
10:30	-	10:45	3	2	8	27	-	2	-	-	-	-	3	-	-	45
10:45	-	11:00	3	3	11	20	-	2	-	-	-	-	2	-	-	41
17:00	-	17:15	10	-	12	33	-	1	-	-	-	-	5	-	-	61
17:15		17:30	11	-	12	26	-	3	-	-	-	-	3	-	-	55
17:30	-	17:45	16	-	9	25	-	2	-	-	-	-	2	-	-	54
17:45	-	18:00	13	-	9	22	-	1	-	-	-	-	6	-	-	51
18:00		18:15	9	1	4	21	-	-	-	-	-	-	4	-	-	39
18:15	-	18:30	9	-	9	29	-	-	-	-	-	-	2	-	-	49
18:30	-	18:45	5	-	5	23	-	-	-	-	-	-	3	-	-	36
18:45		19:00	7	-	3	23	-	1	-	-	-	-	2	-	-	36
19:00	-	19:15	5	-	5	26	-	-	-	-	-	-	3	-	-	39
19:15	-	19:30	5	-	5	21	-	1	-	-	-	-	1	-	-	33
19:30		19:45	3	-	3	18	-	1	-	-	-	-	1	-	-	26
19:45	-	20:00	6	-	6	21	-	-	-	-	-	-	1	-	-	34
20:00	-	20:15	12	-	8	35	-	-	-	-	-	-	2	-	-	57
20:15		20:30	12	-	11	22	-	-	-	-	-	-	7	-	-	52
20:30	-	20:45	12	-	12	19	-	-	-	-	-	-	5	-	-	48
20:45	-	21:00	16	-	11	20	-	-	-	-	-	-	4	-	-	51
Total			219	12	191	578	-	32	-	-	-	-	65	-	-	1,097

Hourly Summary																
8:00	-	9:00	24	11	16	60	-	8	-	-	-	-	2	-	-	112
9:00	-	10:00	27	-	21	50	-	6	-	-	-	-	3	-	-	108
10:00	-	11:00	17	1	30	84	-	8	-	-	-	-	9	-	-	156
17:00	-	18:00	50	1	42	106	-	7	-	-	-	-	16	-	-	221
18:00	-	19:00	30	1	21	96	-	1	-	-	-	-	11	-	-	160
19:00	-	20:00	19	1	19	86	-	2	-	-	-	-	6	-	-	132
20:00	-	21:00	52	-	42	96	-	-	-	-	-	-	18	-	-	208
Total			219	15	191	578	-	32	-	-	-	-	65	-	-	1,097

Mid-Block Count (TMC) For Metro Address Tower Karachi
Classified Traffic Volume Counts Surveys

Survey Location: [Name & ID]: Junction 2 (Lilly Bridge)	Direction: Fatima Jinnah Rd to Cantt. Station Rd	Day: 15-April-2026	Enumerator:	Shift Supervisor:

Time of the Day			Private Cars [Including Jeeps & Station Wagons]	Taxies [Yellow & Black Cabs, Yellow Cabs & Radio Cabs]	3 Seator Rickshaws	Motorcycles & Scooters	6 Seator Rickshaws	MINI BUS	Peoples Bus	large Bus/ Contract carriage	Intercity Bus	Coaster HIACE	Light Freight Vehicles [Pickups, Shehzoor, etc]	Freight Transport: Single Unit Trucks [2 & 3 Axle]	Freight Transport: Trailers	Total
8:00	-	8:15	2	-	7	11	-	2	-	-	-	-	-	-	-	22
8:15	-	8:30	4	-	3	19	-	2	-	-	-	-	2	-	-	30
8:30	-	8:45	11	-	3	19	-	2	-	-	-	-	-	-	-	35
8:45	-	9:00	7	2	3	11	-	2	-	-	-	-	-	-	-	25
9:00	-	9:15	7	-	6	12	-	1	-	-	-	-	1	-	-	27
9:15	-	9:30	5	-	5	11	-	1	-	-	-	-	1	-	-	23
9:30	-	9:45	7	-	4	15	-	2	-	-	-	-	-	-	-	28
9:45	-	10:00	8	1	6	12	-	2	-	-	-	-	1	-	-	30
10:00	-	10:15	7	1	3	15	-	2	-	-	-	-	2	-	-	30
10:15	-	10:30	4	2	8	22	-	2	-	-	-	-	2	-	-	40
10:30	-	10:45	3	2	8	27	-	2	-	-	-	-	3	-	-	45
10:45	-	11:00	3	3	11	20	-	2	-	-	-	-	2	-	-	41
17:00	-	17:15	10	-	12	33	-	1	-	-	-	-	5	-	-	61
17:15		17:30	11	-	12	26	-	3	-	-	-	-	3	-	-	55
17:30	-	17:45	16	-	9	25	-	2	-	-	-	-	2	-	-	54
17:45	-	18:00	13	-	9	22	-	1	-	-	-	-	6	-	-	51
18:00		18:15	9	1	4	21	-	-	-	-	-	-	4	-	-	39
18:15	-	18:30	9	-	9	29	-	-	-	-	-	-	2	-	-	49
18:30	-	18:45	5	-	5	23	-	-	-	-	-	-	3	-	-	36
18:45		19:00	7	-	3	23	-	1	-	-	-	-	2	-	-	36
19:00	-	19:15	5	-	5	26	-	-	-	-	-	-	3	-	-	39
19:15	-	19:30	5	-	5	21	-	1	-	-	-	-	1	-	-	33
19:30		19:45	3	-	3	18	-	1	-	-	-	-	1	-	-	26
19:45	-	20:00	6	-	6	21	-	-	-	-	-	-	1	-	-	34
20:00	-	20:15	12	-	8	35	-	-	-	-	-	-	2	-	-	57
20:15		20:30	12	-	11	22	-	-	-	-	-	-	7	-	-	52
20:30	-	20:45	12	-	12	19	-	-	-	-	-	-	5	-	-	48
20:45	-	21:00	16	-	11	20	-	-	-	-	-	-	4	-	-	51
Total			219	12	191	578	-	32	-	-	-	-	65	-	-	1,097

Hourly Summary																
8:00	-	9:00	24	11	16	60	-	8	-	-	-	-	2	-	-	112
9:00	-	10:00	27	-	21	50	-	6	-	-	-	-	3	-	-	108
10:00	-	11:00	17	1	30	84	-	8	-	-	-	-	9	-	-	156
17:00	-	18:00	50	1	42	106	-	7	-	-	-	-	16	-	-	221
18:00	-	19:00	30	1	21	96	-	1	-	-	-	-	11	-	-	160
19:00	-	20:00	19	1	19	86	-	2	-	-	-	-	6	-	-	132
20:00	-	21:00	52	-	42	96	-	-	-	-	-	-	18	-	-	208
Total			219	15	191	578	-	32	-	-	-	-	65	-	-	1,097

Mid-Block Count (TMC) For Metro Address Tower Karachi
Classified Traffic Volume Counts Surveys

Survey Location: [Name & ID]: Junction 2 (Lilly Bridge)	Direction:Fatima Jinnah Rd to Lilly Bridge	Day: 15-April-2026	Enumerator:	Shift Supervisor:

Time of the Day			Private Cars [Including Jeeps & Station Wagons]	Taxies [Yellow & Black Cabs, Yellow Cabs & Radio Cabs]	3 Seator Rickshaws	Motorcycles & Scooters	6 Seator Rickshaws	MINI BUS	Peoples Bus	large Bus/ Contract carriage	Intercity Bus	Coaster HIACE	Light Freight Vehicles [Pickups, Shehzoor, etc]	Freight Transport: Single Unit Trucks [2 & 3 Axle]	Freight Transport: Trailers	Total
8:00	-	8:15	61	-	18	57	-	2	-	-	-	-	-	-	-	138
8:15	-	8:30	79	-	20	94	-	2	-	-	-	-	3	-	-	198
8:30	-	8:45	76	-	19	90	-	2	-	-	-	-	2	-	-	189
8:45	-	9:00	59	-	10	89	-	3	-	-	-	-	1	-	-	162
9:00	-	9:15	57	-	16	81	-	2	-	-	-	-	1	-	-	157
9:15	-	9:30	57	-	16	69	-	1	-	-	-	-	2	-	-	145
9:30	-	9:45	62	-	19	106	-	5	-	-	-	-	2	-	-	194
9:45	-	10:00	66	-	21	103	-	3	-	-	-	-	9	-	-	202
10:00	-	10:15	60	-	14	83	-	3	-	-	-	-	3	-	-	163
10:15	-	10:30	56	1	16	74	-	2	-	-	-	-	4	-	-	153
10:30	-	10:45	53	-	22	83	-	1	-	-	-	-	8	-	-	167
10:45	-	11:00	64	-	25	95	-	-	-	-	-	-	8	-	-	192
17:00	-	17:15	101	-	12	94	-	1	-	-	-	-	2	-	-	210
17:15		17:30	83	-	22	78	-	-	-	-	-	-	3	-	-	186
17:30	-	17:45	114	-	22	102	-	3	-	-	-	-	2	-	-	243
17:45	-	18:00	122	-	14	91	-	1	-	-	-	-	1	-	-	229
18:00		18:15	79	-	17	101	-	2	-	-	-	-	1	-	-	200
18:15	-	18:30	104	-	14	132	-	2	-	-	-	2	3	-	-	257
18:30	-	18:45	85	-	14	113	-	2	-	-	-	-	-	-	-	214
18:45		19:00	93	-	12	118	-	1	-	-	-	-	7	-	-	231
19:00	-	19:15	91	-	20	124	-	2	-	-	-	1	4	-	-	242
19:15	-	19:30	99	-	16	126	-	2	-	-	-	-	4	-	-	247
19:30		19:45	76	-	17	120	-	1	-	-	-	-	1	-	-	215
19:45	-	20:00	81	-	18	127	-	2	-	-	-	-	2	-	-	230
20:00	-	20:15	69	-	20	118	-	2	-	-	-	1	-	-	-	210
20:15		20:30	63	-	12	104	-	1	-	-	-	-	3	-	-	183
20:30	-	20:45	65	-	11	108	-	4	-	-	-	-	3	-	-	191
20:45	-	21:00	77	-	7	103	-	2	-	-	-	-	-	-	-	189
Total			2,152	1	464	2,783	-	54	-	-	-	4	79	-	-	5,537

Hourly Summary

8:00	-	9:00	275	1	67	330	-	9	-	-	-	-	6	-	-	687
9:00	-	10:00	242	-	72	359	-	11	-	-	-	-	14	-	-	698
10:00	-	11:00	233	-	77	335	-	6	-	-	-	-	23	-	-	675
17:00	-	18:00	420	-	70	365	-	5	-	-	-	-	8	-	-	868
18:00	-	19:00	361	-	57	464	-	7	-	-	-	2	11	-	-	902
19:00	-	20:00	347	-	71	497	-	7	-	-	-	1	11	-	-	934
20:00	-	21:00	274	-	50	433	-	9	-	-	-	1	6	-	-	773
Total			2,152	1	464	2,783	-	54	-	-	-	4	79	-	-	5,537