Almas Builders and Developers

May 2022



ENVIRONMENTAL IMPACT ASSESSMENT

BLUE SKY RESIDENCY

RESIDENTIAL-CUM-COMMERCIAL BUILDING PROJECT

EMC Pakistan
Private Limited

Almas Builders and Developers

Environmental Impact Assessment (EIA)

Blue Sky Residency

Residential-cum-Commercial Building Project

May 2022
Ref: EIA/27/05/22

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Executive Summary

This Environmental Impact Assessment (EIA) report presents the assessment of environmental aspects that may arise due to the development of proposed "**Blue Sky Residency**" Residential-cum-Commercial Building Project, Karachi, having total covered area of about 515,155.22 SQ FT and will be developed by **M/s Almas Builders and Developers**.

This document has been prepared in compliance with the mandatory requirement of the Section 17 of Sindh Environmental Protection Act (SEPA) 2014. As per Sindh Environmental Protection Agency (Environmental Assessment) Regulations 2021, the project falls in 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.

The Project falls in to the appropriate category that permits the designated land-use by the relevant authority. Siting of the proposed project at Plot No. NC-21, (02 acres), Sector 34-A, Deh Dozan, Tappo Gujro, Scheme 33, Karachi, by M/s Almas Builders and Developers is duly authorized.

The plot area of the project is about 9680.00 SQ YD, comprises Basement-2 Plan (ARS + Project Parking + Services) + Basement-1 Plan (Visitor Parking + Services) + Ground Floor Plan (Project Parking + Shops + Services) + 1st Floor Plan (Tower A, B and C Flats + Recreation) + 2nd to 18th Floor Plan (Tower A, B and C Flats) + 19th Floor Plan (Tower B Flats) + Roof Plan (Solar Panels).

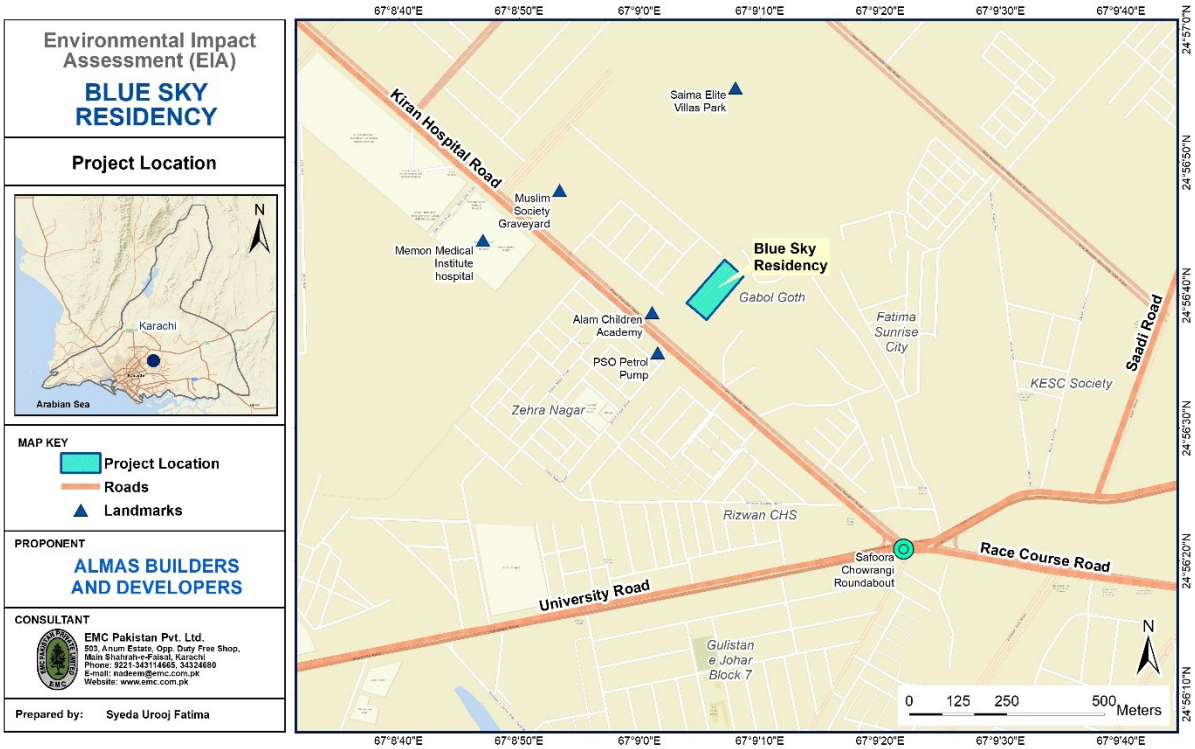


Figure ES.1: Location of the Project

The project is planned in the environs of Gabol Goth near Safoora Chowrangi Roundabout. The project site is accessible by University of Karachi, Kiran Hospital Road and other primary roads.

Multiple housing societies are present in the surrounding of proposed area including Fatima Sunrise City, KESC Society, Saima Elite Villas Park, Zehra Nagar, Rizwan Cooperative Housing Society (CHS), and others.

All the infrastructure facilities will be provided at the site as per the applicable national and international standards and codes. Facilities like energy efficient lighting, drainage system and hour security system has been carefully incorporated into the project design for providing comfortable and healthy living environment. The project is featured by CCTV Camera Monitoring, High Speed Lifts in buildings, Audacious Parking Space, Global Standard Fixtures and Finishing, Recreational Area and Community Hall.

The environmental conditions, ambient air quality in the area is satisfactory at the project site and complies with SEQS limits. The microenvironment has no sensitive areas such as protected sites including wildlife sanctuaries, game reserves or national parks, or any archaeological, historical or cultural heritage in its immediate neighborhood; as such its siting would have no sensitivity in this regard. No significant flora and fauna will be disturbed.

The proposed project will have back-up power generation, water supply supplemented by filtration system and sewage disposal system through septic tanks, in addition to provision of parking space. Option for recycling of the wastewater and regeneration of the potable water from groundwater resources by adequate treatment may also have to be explored in case of absence of reliable water supply from authorities.

Realizing that the city has overgrown its sustainability limits, it is imperative that the proponent takes 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 EIA it is concluded that the environmental impacts of the construction and operation of the 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 study therefore recommends that the Environmental Impact Assessment (EIA) report should be approved with the provision that the suggested mitigation measures will be adopted and the Environmental Management Plan will be followed in letter and spirit.

Table of Contents

Executive Summary i

Chapter 1 Introduction 1

1.1. General 1
1.2. Overview of Project and Proponent 1
1.2.1. The Proponent: Almas Builders and Developers 1
1.2.2. Overview of Project 1
1.2.3. Objectives of the Project 2
1.3. Location of the Project 2
1.4. Project Categorization 4
1.5. Objectives of Environmental Assessment 4
1.6. Methodology for Environmental Assessment 4
1.6.1. Scoping 5
1.6.2. Acquiring Project Specific Data 5
1.6.3. Literature Review 5
1.6.4. Reconnaissance and Detailed Surveys 5
1.6.5. Aspects Identification 6
1.6.6. Impact Assessment and Mitigation Measures 6
1.6.7. Environmental Management and Monitoring Plan 6
1.6.8. Documentation Review and Conclusion 6
1.7. Structure of EIA Report 7
1.8. EIA Study Team 7

Chapter 2 Regulatory Framework 8

2.1. Administrative and Statutory Framework 8
2.1.1. Sindh Environmental Protection Act, 2014 9
2.1.2. Sindh Environmental Protection Agency (Environmental Assessment) Regulations 2021 11
2.1.3. Sindh Environmental Quality Standards (SEQS) 12
2.2. Other Relevant Laws & Regulations 16
2.2.1. Sindh Prohibition of Child Employment Act, 2017 16
2.2.2. The Sindh Occupational Safety and Health Act, 2017 16
2.2.3. Pakistan Penal Code 1860 17
2.2.4. Sindh Solid Waste Management Board Act, 2014 17
2.2.5. Disaster Management Act, 2010 17
2.2.6. Sindh Drinking Water Policy, 2017 17
2.2.7. Sindh Sanitation Policy, 2017 19
2.2.8. Archaeological Relics 20
2.2.9. Laws and Regulations on Urban Development 20
2.2.10. Building Code of Pakistan, Fire Safety Provisions 2016 21
2.3. National Environmental Guidelines 23
2.3.1. Pakistan Environmental Assessment Procedures 23

2.4. International Environmental Guidelines 24
2.4.1. IFC General EHS Guidelines 24

Chapter 3 Project Description 25

3.1. The Project 25
3.2. Project Details 25
3.3. Construction & Commissioning 28
3.3.1. Construction Schedule 28
3.3.2. Pre-Construction/Design Phase 28
3.3.3. Construction Activities 28
3.4. Utilities 30
3.4.1. Plumbing System 30
3.4.2. Water Supply 31
3.4.3. Fire Detection & Protection Systems 32
3.4.4. Electrical & Allied Works 33
3.5. Solid Waste Generation 33

Chapter 4 Description Of Environment 34

4.1. Project Location and Surroundings 34
4.2. Geology 34
4.2.1. Geotechnical (Soil) Investigation at project site 34
4.3. Geomorphology 35
4.4. Seismicity 37
4.4.1. Earthquakes 39
4.4.2. Seismicity of the Site 39
4.4.3. Liquefaction Features Caused by Earthquake 40
4.5. Hydrology 41
4.5.1. Surface Water Resources 41
4.5.2. Water Quality 41
4.5.3. Water Supply, Demand and Sewerage System 42
4.6. Basic Characteristics of Climate and Meteorology 44
4.6.1. Temperature 44
4.6.2. Precipitation 45
4.6.3. Humidity 46
4.6.4. Wind Speed & Direction 46
4.7. Ambient Air Quality and Noise 48
4.8. Ecological Baseline 48
4.9. Socioeconomic Environment 49
4.10. Macro Environment 50
4.10.1. Administrative Context 50
4.10.2. Demography 50
4.10.3. Urban Migration 51
4.10.4. Education Facilities 52
4.10.5. Transportation 53

4.10.6. Health Facilities 54
4.11. Description of Microenvironment 55
4.11.1. Land Use 55
4.11.2. Education Facilities 56
4.11.3. Healthcare Facilities 56
4.11.4. Utilities 56
4.11.5. Road and Traffic Condition 56

Chapter 5 Information Disclosure, Consultation & Participation 57

5.1. Stakeholder Mapping 57
5.2. Primary and Secondary Stakeholders 58
5.3. Consultation Approach & Methodology 59
5.3.1. Consultation with Primary Stakeholders 59
5.4. Consultation Feedback 60

Chapter 6 Screening of Potential Environmental and Social Impacts and Appropriate Mitigation Measures 63

6.1. Screening of Environmental Aspects related to Siting of Project 64
6.2. Assessment of Impacts at the Construction and Operation stages of the Project 64
6.2.1. Demolition of Structure(s) 64
6.2.2. Structural Stability 64
6.2.3. Erosion of Soil 64
6.2.4. Excavation 65
6.2.5. Construction Waste 65
6.2.6. Topography and Geology 66
6.2.7. Air Quality 66
6.2.8. Construction Noise 67
6.2.9. Water Sourcing 68
6.2.10. Soil Contamination 69
6.2.11. Wastewater Generation & Disposal 69
6.2.12. Solid Waste Generation and Management 70
6.2.13. Operation of Vehicular Traffic 71
6.2.14. Seismic Hazards 72
6.2.15. Fire Hazards and Life Safety 72
6.2.16. Energy use 73
6.2.17. Materials Selection 73
6.2.18. Disturbance to Wildlife 74
6.2.19. Potential Impacts on Socio-economic Environment 74
6.2.20. Cultural Resources 76
6.2.21. Land-use and Aesthetics 76
6.2.22. Impacts Rating 76

Chapter 7 Environmental Management Plan 78

7.1. Introduction 78
7.1.1. General 78
7.1.2. Objectives 78
7.2. Structure of the EMP 79
7.3. Legislation and Guidelines 79
7.4. Organizational Structure and Roles and Responsibilities 79
7.4.1. Organizational Structure 79
7.4.2. Roles and Responsibilities 79
7.5. Maintenance of the EMP 82
7.6. Environmental Health and Safety Management System 82
7.6.1. Health and Safety during Construction Phase 82
7.6.2. Health and Safety during Operation Phase 83
7.7. Emergency Response Plan 83
7.7.1. Objectives 83
7.7.2. Emergency Response Manuals 83
7.8. Environmental Compliance Reporting, Documentation and Trainings 84
7.9. Mitigation Management Matrix 84
7.10. Environmental Monitoring Programme 85
7.10.1. Compliance Monitoring 85
7.10.2. Effects Monitoring 85
7.10.3. Environmental Reporting 86
7.11. Change Management Plan 86
7.11.1. Changes to the EMP 86
7.11.2. Changes to the Operation 87
7.12. Training Programme 87
7.12.1. Objectives 87
7.12.2. Roles and Responsibilities 87
7.12.3. Training Programme 88

Chapter 8 Conclusion 101

List of Tables

Table 1.1: Contact Details 1
Table 1.2: List of EIA Team Members 7
Table 2.1: Sindh Environmental Quality Standard for Ambient Air 13
Table 2.2: The Motor Vehicle Noise 13
Table 2.3: Sindh Environmental Quality Standard for Noise 13
Table 2.4: Sindh Environmental Quality Standard for Municipal & Liquid Industrial Effluents 14
Table 2.5: Sindh Environmental Quality Standards for Drinking Waters (mg/l) 15
Table 2.6: Sindh Environmental Quality Standards for Selected Gaseous Pollutants from Industrial Sources 15
Table 3.1: Salient Features of the Project 25
Table 4.1: Mean Monthly Maximum Temperature °C 44
Table 4.2: Mean Monthly Minimum Temperature °C 45
Table 4.3: Monthly Amount of Precipitation (mm) at Karachi Airport 46
Table 4.4: Mean Monthly Relative Humidity (Mean) at 1200 UTC (%) 46
Table 4.5: Wind Speed (m/s) at 12:00 UTS 47
Table 4.6: Wind Direction at 12:00 UTS 47
Table 4.7: Covered Area of District & Sub-Division 50
Table 4.8: Demographic Change (1998-2017) 50
Table 4.9: Karachi, Population Growth (1941-2017) 52
Table 4.10: District Wise Number of Schools, Enrollment and Staff for Karachi (2016-17) 52
Table 4.11: District wise Basic and Advance Facilities in Karachi (2016-17) 53
Table 4.12: District wise Government Medical and Paramedical Personnel in Karachi 2017 54
Table 4.13: District wise Government Health Facilities with Bed Capacity in Karachi 2017 55
Table 5.1: Primary Stakeholders for Blue Sky Residency 59
Table 5.2: Consultations with Primary Stakeholders 60
Table 6.1: Nature and Degree of Positive Socioeconomic Impacts 75
Table 6.2: Potential Environmental Impact during Different Stages of the Project and Mitigation Measures 76
Table 7.1: Environmental Management Plan (EMP) 89
Table 7.2: Environmental Monitoring Plan 98
Table 7.3: EMP Implementation Cost 100

List of Figures

Figure ES.1: Location of the Project i
Figure 1.1: Project Location 3
Figure 2.1: Land Holdings by Agency in Karachi 21
Figure 3.1: Conceptual View of the Proposed Project 26
Figure 3.2: Site Plan of the Project 26
Figure 3.3: Project Location Map 27
Figure 4.1: Project Location 36
Figure 4.2: Geomorphological Zones of Karachi Region 37
Figure 4.3: Tectonic setting of Karachi 38
Figure 4.4: Earthquake recorded (1950–2019) in the Arabian Sea and its surroundings 39
Figure 4.5: Seismic Zones in Karachi 40
Figure 4.6: Water Resources in Karachi 43
Figure 4.7: Vegetation Trends in Karachi 49
Figure 4.8: District wise Population according to the 1998 and 2017 Census 51

List of Annexures

Annex I: NOCs / Approvals 103
Annex II: Site Plan 104
Annex III: Submission Drawings 105
Annex IV: Monitoring Reports 106
Annex V: Land Documents 107
Annex VI: Geotechnical (Soil) Investigation Report 108

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 "**Blue Sky Residency**", Residential-cum-Commercial Building Project which will be developed by M/s **Almas Builders and Developers**. This document has been prepared in compliance with the mandatory requirement of the Section 17 of Sindh Environmental Protection Act (SEPA) 2014, 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".

M/s EMC Pakistan Private Limited has been commissioned by M/s Almas Builders and 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.

1.2. Overview of Project and Proponent

1.2.1. The Proponent: Almas Builders and Developers

Almas Builders and Developers is known of pioneering industry standard for performance and technical innovation in construction projects. The company possesses a reputation built on the high-quality performance and endow with the most modern and inventive solutions on the widest range of versatile and high-profile projects. Almas Builders and Developers is focused on building and maintaining quality infrastructure for everyday life.

Table 1.1: Contact Details

Project Proponent	EIA Consultant
M/s Almas Builders and Developers Contact Person: Mr. Muhammad Afzal Contact: 0334-3888947 Address: Head Office, 181 Mezzanine Gulfway Tower, Plot H-1, Block-8, Main Clifton Road, Near Teen Talwar, Karachi.	**EMC Pakistan Private Limited** Suite # 503, Anum Estate, Opp. Duty Free Shop, Main Shahrah-e-Faisal, Karachi Tel: (+) 92 21 34382860 Fax: (+) 92 21 34311467 Email: mail@emc.com.pk Website: http://emc.com.pk/

1.2.2. Overview of Project

The plot area of the project is about 9680.00 SQ YD, comprising total covered area of about 515,155.22 SQ FT, with following features:

- Basement-2 Plan (ARS + Project Parking + Services)
- Basement-1 Plan (Visitor Parking + Services)

- Ground Floor Plan (Project Parking + Shops + Services)
- 1st Floor Plan (Tower A, B and C Flats + Recreation)
- 2nd to 18th Floor Plan (Tower A, B and C Flats)
- 19th Floor Plan (Tower B Flats)
- Roof Plan (Solar Panels)

A detailed overview of the submission plan other details along with dimensions are provided in annexures of this report.

1.2.3. Objectives of the 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 buildings infrastructure which at present is among the worthwhile contributors to the growth of GDP; and
- To meet the increasing demand of residential and commercial accommodation in urban Karachi.

1.3. Location of the Project

The Project falls in to the appropriate category that permits the designated land-use by the relevant authority. Siting of the proposed project at Plot No. NC-21, (02 acres), Sector 34-A, Deh Dozan, Tappo Gujro, Scheme 33, Karachi, by M/s Almas Builders and Developers is duly authorized. Land approvals for the proposed project site are attached in the annexures.

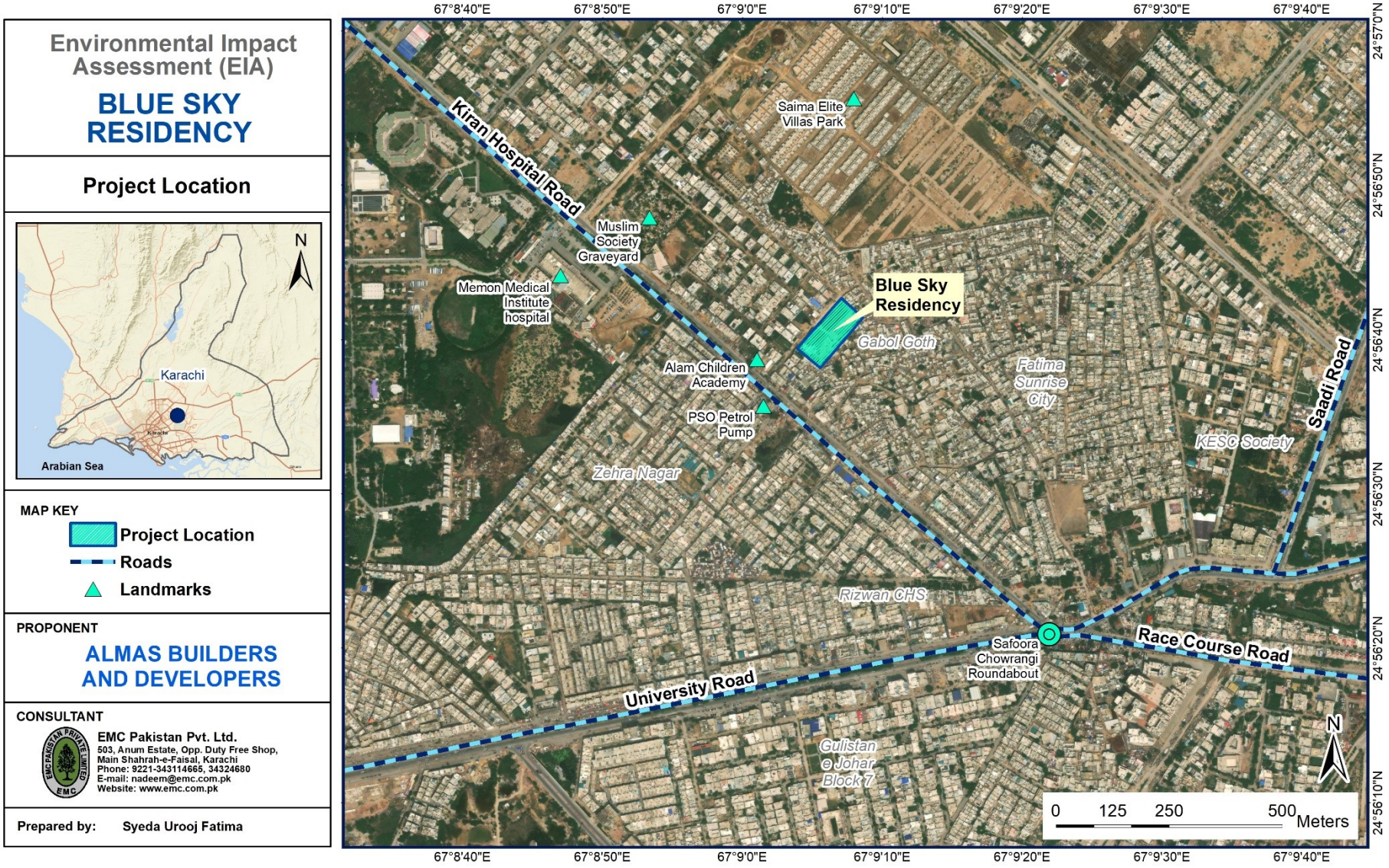


Figure 1.1: Project Location

1.4. Project Categorization

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.

1.5. Objectives of Environmental Assessment

This EIA study is conducted in the preliminary stage of the project in order to acquire approval for initiating project construction works. The main objective of EIA is to identify the environmental and socio-economic impacts both positive and negative that may result from the location of the project. This EIA provides recommendations to mitigate negative impacts and maximize benefits on all aspects of the surrounding environment (physical, biological and social). The objectives outlined for this EIA study are given below:

- To identify and describe elements of community and environment likely to be affected by the proposed developments and / or likely to cause adverse impacts to the project, including natural and man – made environment;
- Develop a baseline of its current environmental scenario as well as socioeconomic conditions;
- Identify potential impacts that may arise;
- To identify any potential losses or damage to flora, fauna and natural habitats;
- To identify any damage to land and water drainage patterns present on the site;
- Determine social aspects and environmental resources which are particularly sensitive to impacts and categorize impacts on the basis of their severity;
- Evaluate impacts due to construction and operation activities of the project with the relevant environmental regulations of Pakistan;
- Evaluation of impacts severity / degree and providing necessary mitigation measures;
- Provide recommendations and suggestions for the environmental monitoring and management of social and physical environment in the surroundings of project area; and
- Ensure that all the impacts of the project have been taken care and all the relevant stakeholders are aware of the impacts.

1.6. Methodology for Environmental Assessment

This environmental assessment (examination and evaluation) is based on comparative evaluation of the environmental quality before and after establishment of the project. For this purpose, the baseline of the profile project area was developed by collecting data, records and information on

physical, ecological as well as socioeconomic environment, in particular the surrounding areas in its neighborhood. An assessment of impact at the different phases of the project, i.e., pre-construction, construction and operation stages. The changes anticipated in the critical environmental aspects e.g., in the ambient environmental parameters that may be significant have been identified. This leads to identification of significant impact, for which necessary mitigation measures have been proposed.

1.6.1. Scoping

A scoping exercise was undertaken to identify the potential issues that are to be considered in the EIA. 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 & 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.

1.6.2. Acquiring Project Specific Data

This was the very first step to embark on the study initiated through meetings held with the officials of the proponent. In the meetings, discussions were made to clarify the nature and location of project in environmental perspectives. Basic information on the form of raw input received from the proponent was analyzed by the experts to comprehend the project and to assess its influence on the environment.

1.6.3. Literature Review

While the project details were being acquired, desktop study was also initiated simultaneously to draft environmental baseline information of the project area. The desktop study comprised of literature review, collection of updated authenticated published/printed data on the physical and social environment related to the focused area. The same was also used to delineate the scope of surveys.

1.6.4. Reconnaissance and Detailed Surveys

Preliminary surveys of project location were organized by EMC in which experts visited the area and assessed the physical scenario for the EIA stage. The relevant surveys were carried out under

the supervision of environmental experts. Preliminary socio-economic evaluation was also undertaken.

Detailed and comprehensive surveys will be conducted in detailed EIA study stage to investigate various domains of environment and socio-economic sector to highlight various issues, and concerns that may lead to the identification of aspects and subsequent assessment of impacts.

For having an over view of the project area and to assess the existing infrastructure and socio-economic activities, a detailed groundwork investigation was carried out around the microenvironment of project area.

1.6.5. Aspects Identification

The EIA process requires development of an inventory of all possible environmental and socio-economic aspects of the project, which provide the basis of categorization and evaluation of impacts and their likelihood to occur due to the materialization of the project. Aspects are those which are the causes of positive or negative impacts.

Those aspects are primarily associated with activities performed during construction and operation phases of the Project.

1.6.6. Impact Assessment and Mitigation Measures

Based on the developed aspects inventory, experts analyzed the aspects for their logical outcome as potential impacts on the physical and social environment. These impacts have been identified, assessed and weighed for different activities during construction, commissioning and operational phases of the Project.

Mitigation and control measures were also proposed for various activities of Project in order to minimize the potential impacts during the life span of the Project.

1.6.7. Environmental Management and Monitoring Plan

In the light of impacts identified and mitigations proposed an Environmental Management Plan (EMP) has been developed which has a pivotal role in assigning tasks to personnel for the environmental management and implementation of mitigation measures as well as to monitor its effectiveness throughout the life cycle of the project. It also provided monitoring plans/procedures to be followed for checking and compliance maintenance of environmental quality and legal requirements through suggested mitigation measures.

1.6.8. Documentation Review and Conclusion

This is the final step to complete the environmental assessment and compile all the work done in shape of an EIA report. Report writing started just after the initiation of environmental assessment.

The report has been written by experts of EMC and compiled by the office staff in coordination with the experts. At the end of the study, the entire report is reviewed by the team leader followed by recommendations and conclusion in the light of the assessment.

1.7. Structure of EIA Report

The EIA report has been structured on the standard format, prescribed by the EPA. The Report has been presented in the following sections:

- **Chapter 1:** Provides an introduction and overview of the project
- **Chapter 2:** Gives an overview of policy and legislation along with international guidelines relevant to the project
- **Chapter 3:** Includes the project description, its objective, location of the project area and construction /operation related details
- **Chapter 4:** Provides description of the microenvironment and macro environment of the project area. This chapter contains description of the Physical, Biological and built environment of the Site.
- **Chapter 5:** Describes the involvement of major stakeholders and consultation with the primary and secondary stakeholders.
- **Chapter 6:** Describes screening of environmental and social impacts and appropriate mitigation measures.
- **Chapter 7:** Presents the Environmental Management Plan and Monitoring Program for the project
- **Chapter 8:** Summarizes the report and presents its conclusions.

The main text of the report is supported by a series of Annexures which provide auxiliary information including.

1.8. EIA Study Team

This EIA report has been prepared by EMC Pakistan organized and coordinated with the team of experts mentioned in table below for the purpose of conducting environmental assessment and preparation of the report:

Table 1.2: List of EIA Team Members

S#	Name	Position in EIA Study Team
1.	Mr. Syed Nadeem Arif	Project Manager / Team Leader
2.	Mr. Muhammad Haseeb	Project Coordinator/Sr. Environmental Specialist
3.	Mr. Ahmed Zohair Siddiqui	Environmental Engineer
4.	Mr. Tanveer Arif	Head of Social Department
5.	Mr. Syed Muhammad Omar Arif	Environmental Engineer
6.	Ms. Syeda Urooj Fatima	Environmental Scientist
7.	Mr. Fahad Afzal	Environmental Scientist
8.	Mr. Ehtisham Ahmed	Sociologist

Chapter 2 Regulatory Framework

This section provides synopsis of policies, legislation, and guidelines that may have relevance to the proposed Project and describes the current legal responsibilities of the Proponent in the context of the environment and sustainable development, and the institutions that exist in the province that may influence the environmental management of the Project.

The constitution of Pakistan contains provision for environmental protection and resource conservation. The constitution mentions environmental pollution and the ecology as a subject in the concurrent legislative list, meaning that both the provincial and federal government may initiate and make legislation for the purpose.

Legislative assembly of Sindh province of Pakistan passed the bill on 24th February 2014 to enact Sindh Environmental Protection Act 2014. The Act envisages protection, improvement, conservation and 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 ecosystem by avoiding all types of environmental hazards.

A detailed review of these legislations and guidelines will be made part of the EIA study. Below is the list of the applicable legislations / guidelines:

2.1. Administrative and Statutory Framework

The constitution of Pakistan contains provision for environmental protection and resource conservation. The constitution mentions environmental pollution and the ecology as a subject in the concurrent legislative list, meaning that both the provincial and federal government may initiate and make legislation for the purpose. Article 9 of the Constitution defines the right to life as a "fundamental right" in these words "No person shall be deprived of life or liberty save in accordance with law". The Supreme Court of Pakistan in its judgment in the case Shehla Zia and others vs WAPDA (1994) declared that the right to a clean environment is part of the fundamental constitutional right to life.

Several laws exist for the protection of the environment. Some of these laws are Federal and the rest Provincial in character. The promulgation of the Environmental Protection Ordinance 1983 was the first codifying legislation on the issue of environmental protection. This was indeed a consolidated enactment to plug the gaps and remove defects/deficiencies in the legislation. The promulgation of this ordinance was followed, in 1984, by the establishment of the Pakistan Environmental Protection Agency, the primary government institution dealing with environmental issues. Significant work on developing environmental policy was carried out in the late 1980s, which culminated in the drafting of the Pakistan National Conservation Strategy. Provincial environmental protection agencies were also established at about the same time. The National Environmental Quality Standards were established in 1993.

Prior to the 18th Amendment to the Constitution of Pakistan in 2010, the legislative powers were distributed between the federal and provincial governments through two 'lists' attached to the

Constitution as Schedules. The Federal list covered the subjects over which the federal government had exclusive legislative power, while the 'Concurrent List' contained subjects regarding which both the federal and provincial governments could enact laws. The subject of 'environmental pollution and ecology' was included in the Concurrent List and hence allowed both the national and provincial governments to enact laws on the subject.

However, as a result of the 18th Amendment this subject is now in the exclusive domain of the provincial government. The main consequences of this change are as follows: i) The Ministry of Environment at the federal level has been abolished. Its functions related to the national environmental management haves been transferred to the provinces. The international obligations in the context of environment will be managed by various ministries and departments of the federal government, ii) The Pakistan Environmental Protection Act 1997 (PEPA 1997) is technically no longer applicable to the provinces. The provinces are required to enact their own legislation for environmental protection.

The Provincial Environmental Protection Agencies are formed by the respective Provincial Governments. A Director General who exercises powers delegated to him by the Provincial Government heads each Provincial EPA. IEEs and EIAs are submitted to provincial EPAs for approval.

The Government of Sindh (GOS) has designated its Ministry of Environment Climate Change & Coastal Development, to administer matters related to the environment in Sindh. The Sindh Environmental Protection Agency (SEPA) is directly under the Ministry of Environment Climate Change & Coastal Development.

2.1.1. Sindh Environmental Protection Act, 2014

Legislative assembly of Sindh province of Pakistan passed the bill on 24th February 2014 to enact Sindh Environmental Protection Act 2014. The Act envisages protection, improvement, conservation and 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.

Environmental Protection Council (EPC): It has been formed consisting of Chief Minister as Chairman with Minister in charge of Environment Protection Department, Addl. Chief Secretary, Planning & Development Department, Government of Sindh and Secretaries of Environment, Finance, Public Health Engineering, Irrigation, Health, Agriculture, Local Government, Industries, Livestock & Fisheries Forest & Wildlife, Energy, Education Departments Government of Sindh and Divisional Commissioners of Sindh. Non-official members are also included (i.e. representatives of Chamber of Commerce & Industry and from medical or legal professions etc.) along with DG, EPA & two Members of Provincial Assembly also form part of EPC.

The functions and powers of EPC include coordination & supervision of provisions of Act, approving provincial environmental & sustainable development policies & SEQS, provide

guidance for protection & conservation, consider annual Sindh Environmental Report, deal with interprovincial and federal provincial issues, provide guidance for bio safety and assist Federal Government in implementation of various provisions of UN Convention on laws on Seas (UNCLOS).

Sindh Environmental Protection Agency (SEPA): SEPA would be headed by Director General (DG) with the aim to exercise the powers and perform the functions assigned to it under the provisions of this Act and the rules and regulations made there under. The Agency shall have technical and legal staff and may form advisory committees.

The Agency shall administer and implement the provisions of this Act and rules and regulations. It shall also prepare environmental policies, take measures for implementation of environmental policies, prepare Sindh Environment Report and prepare or revise Sindh Environmental Quality Standards. SEPA shall also establish systems and procedures for surveys, surveillance, monitoring, measurement, examination, investigation research, inspection and audit to prevent and control pollution and to estimate the costs of cleaning up pollution and rehabilitating the environment and sustainable development. SEPA would also take measures for protection of environment such as to promote research; issues licenses for dealing with hazardous substances, certify laboratories, identify need for or initiate legislation, specify safeguards etc. SEPA would also encourage public awareness and education regarding environmental issues.

SEPA would have powers to enter or inspect under a search warrant issued by Environmental Protection Tribunal or a Court search at any time, any land or building etc. where there are reasonable grounds to believe that an offence under this Act has been or is being or likely to be committed. SEPA may also take samples, arrange for testing or confiscate any article in discharge of their duties.

This act has also provided for Sindh Sustainable Fund derived from various sources such as voluntary contributions or fees generated etc. This fund is utilized for protection, conservation or improvement of environment.

Salient Features of the Sindh Environmental Protection Act

Section-11: No person shall discharge or emit or allow the discharge or emission of any effluent waste, pollutant, noise or adverse environmental effects in an amount, concentration or level which is in excess to that specified in Sindh Environmental Quality Standards.

Section-12 & 13: No person shall import hazardous waste into Sindh province and handle hazardous substances except under licenses etc.

Section 14: No person shall undertake any action which adversely affects environment or which lead to pollute or impairment of or damage to biodiversity, ecosystem, aesthetics or any damage to environment etc.

Section 15: This section deals with regulation of motor vehicles banning emission of air or noise pollutants being emitted from them in excess of allowable standards.

Section 17: This section states that 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 Agency approval in respect thereof. SEPA shall review the IEE & EIA and accord approval subject to such terms and conditions as it may prescribe or require. The agency shall communicate within four (04) months its approval or otherwise from the date EIA is filed failing which the EIA shall deemed to have been approved.

Section 21: Where agency is satisfied that the discharge or emission has occurred in violation of any provision of this act or rules etc. then it may, after giving an opportunity to person responsible, by order direct such person to take such measures within specified period. The agency under this section has been empowered to immediately stop, prevent or minimize emission, disposal etc. for remedying adverse environmental effects.

Section 22: The person who fails to comply with section 11, 17, 18 and 21 shall be punishable with a fine which may extend to five million rupees, to the damage caused to environment and in the case of a continuing contravention or failure, with an additional fine which may extend to one hundred thousand rupees for every day during which such contravention or failure continues. And, where a person convicted under sub-sections 1&2 had been previously convicted for any contravention of this Act, the Environmental Protection Tribunal (EPT) may, in addition to punishment, award imprisonment for a term that may extend up to three years, or order confiscation or closure of facility etc.

Section 23: Where any violation of this Act has been committed by any of employee of any corporate body, then, that employee shall be considered to be guilty of environmental pollution.

Section 25: This section allows for establishment of Environmental Protection Tribunals.

2.1.2. Sindh Environmental Protection Agency (Environmental Assessment) 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: A 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: A 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.

2.1.3. Sindh Environmental Quality Standards (SEQS)

With the SEPA Act, 2014 the Sindh EPA revised the Environmental Quality Standards (EQS) with full consultation of the private sector, industrialist, trade and business associations and NGOs and approval of Sindh Environmental Protection Council has developed Sindh Environmental Industrial Wastewater, Effluent, Domestic Sewerage, Industrial Air Emission, Ambient Air, Noise for vehicles, Air Emissions for Vehicles and Drinking Water Quality Standards 2015 vide Notification No.EPA/TECH/739/2014.

This Project will comply with SEQS 2016. A monitoring plan is attached with the EIA study which will monitor the compliance of SEQS for any pollutant streams. Concerns of unchecked fuel, oil & lubricant spills in soil & waterways cannot be ruled out. Drifts of such spills may become dangerous to the eco-system. Safe practices and proper disposal of waste petrochemicals will be proposed in the EMP. Project Proponent and all Contractor are committed to comply with the applicable Sindh-EQS in letter and spirit.

The Tables are of SEQS are presented below:

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*	80µgm^3	Ultraviolet Fluorescence Method
	24 hours**	120µgm^3	
Oxides of Nitrogen as (NO)	Annual Average*	40µgm^3	Gas Phase Chemiluminescence
	24 hours**	40µgm^3	
Oxides of Nitrogen as (NO_2)	Annual Average*	40µgm^3	Gas Phase Chemiluminescence
	24 hours**	80µgm^3	
O_3	1 hour	130µgm^3	Non dispersive UV absorption method
Suspended Particulate Matter (SPM)	Annual Average*	360µgm^3	High volume Sampling, (Average flow rate not less than 1.1m^3/minute)
	24 hours**	500µgm^3	
Respirable Particulate Matter (PM10)	Annual Average*	120µgm^3	B Ray absorption method
	24 hours**	150µgm^3	
Respirable Particulate Matter (PM2.5)	Annual Average*	40µgm^3	B Ray absorption method
	24 hours**	75µgm^3	
Lead (Pb)	Annual Average*	1µgm^3	ASS Method after sampling using EPM 2000 or equivalent Filter paper
	24 hours**	1.5µgm^3	
Carbon Monoxide (CO)	8hours**	5mg/m^3	Non Dispersive Infra Red (NDIR) method
	1hours	10mg/m^3	
*Annual arithmetic mean 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.			

Table 2.2 shows the standards for motor vehicle noise.

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

Table 2.3 shows the SEQS for noise.

Table 2.3: Sindh Environmental Quality Standard for Noise					
S. No.	**Category of Area / Zone**	**Effective from 1st January, 2015**		**Effective from 1st January, 2015**	
		Limit it in dB(A) Leq*			
		Day Time	Night Time	Day Time	Night Time
1	Residential area (A)	65	50	55	45
2	Commercial area (B)	70	60	65	55
3	Industrial area (C)	80	75	75	65
4	Silence Zone (D)	55	45	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 6.00 p. 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	^oC
2	pH value (H^+)	6-9	6-9	6-9	
3	Biological Oxygen Demand $(BOD)_5$ at 20^oC	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 quality 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)		
			3	Aluminum (Al) mg/l	≤ 0.2
			4	Antimony (Sb)	≤ 0.005
2	Treated water entering the distribution system (E. coli or thermo tolerant coliform and total coliform bacteria)	Must not be detectable in any 100 ml sample	5	Arsenic (As)	≤ 0.05
			6	Barium (Ba)	0.7
			7	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.	8	Cadmium (Cd)	0.01
			9	Chloride (Cl-)	< 250
			10	Chromium (Cr)	≤ 0.05
			11	Copper (Cu)	2
			Organic (mg/L)		
			12	Phenolic compounds	<0.0002
			Toxic Inorganics (mg/liter)		
			13	Cyanide (CN)-	≤ 0.05
			14	Fluoride (F)	≤ 1.5
			15	Lead (Pb)	≤ 0.05
			16	Manganese (Mn)	≤ 0.5
Physical			17	Mercury (Hg)	≤ 0.001
4	Color	< 15 TCU	18	Nickel (Ni)	≤ 0.02
5	Taste	Non objectionable/ Acceptable	19	Nitrate (NO_3)-	≤ 50
6	Odor	Non objectionable/ Acceptable	20	Nitrite (NO2)-	≤ 3
7	Turbidity	< 5 NTU	21	Selenium (Se)	≤ 0.01
8	Total Hardness as $CaCO_3$	< 500 mg/l	22	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	23	Zinc (Zn)	5.0
12	Beta emitters	1			

The SEQS for industrial gaseous emissions are shown in Table 2.6.

Table 2.6: Sindh Environmental Quality Standards for Selected Gaseous Pollutants from Industrial Sources (1)			
S. No.	**Parameter**	**Sources of Emission**	**Standards** (mg/Nm^3 unless defined otherwise)
1	Smoke	Smoke opacity not to exceed	40% or 2 on Ringelmann Scale

2	Particulate Matters [2]	Boilers and furnaces:	
		Oil fired	300
		Coal fired	500
3	Hydrogen Chloride	Any	400
4	Chlorine	Any	150
5	Hydrogen Fluoride	Any	150
6	Hydrogen Sulfide	Any	10
7	Sulphur Oxides [3]	Sulphuric acid / sulphonic acid plants	1700
8	Carbon Monoxide	Any	800
9	Lead	Any	50
10	Mercury	Any	10
11	Cadmium	Any	20
12	Arsenic	Any	20
13	Copper	Any	50
14	Antimony	Any	20
15	Zinc	Any	200
16	Oxides of Nitrogen [4]	Gas fired	400
		Oil fired	600
		Coal fired	1200

Notes:
[1] All values are in mg/Nm^3, unless otherwise defined
[2] Based on the assumption that the size of the particulate is 10 microns or more.
[3] Based on 1% Sulphur content in fuel oil. Higher content of Sulphur will cause standards to be pro-rated
[4] In respect of emission sulfur dioxide and nitrogen dioxide. The power plants operation on oil and coal as fuel shall comply with the following Standards:

2.2. Other Relevant Laws & Regulations

2.2.1. 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.

2.2.2. 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.

2.2.3. Pakistan Penal Code 1860

The Pakistan Penal Code deals with offences where public or private property and/or human lives are affected due to the intentional or accidental misconduct of an individual or body of people. In the context of environment, the Penal Code empowers the local authorities to control noise, noxious emissions and disposal of effluents. The NEQS enforced by the EPAs supersede the application of this legislation on industries and municipalities. The Penal Code, however, can provide a basis for the client to coordinate its activities with the local authorities to ensure that its construction activities do not become a cause of public nuisance or inconvenience.

2.2.4. Sindh Solid Waste Management Board Act, 2014

The 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.

The solid waste and wastewater generation during the construction and operation phase of the project will be managed and safety measures will be implemented accordingly as defined in the Environmental Management Plan.

2.2.5. 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.

2.2.6. 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: 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.

- ✧ 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.

2.2.7. 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 Suthee Sindh’ (Neat and Clean Sindh).

The key targets of this policy are:

- 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.
- 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.

- 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.
- To create and develop wastewater treatment mechanisms to cover 75% of urban areas and 40% rural areas by 2025.
- To implement integrated solid waste management with 100% coverage in urban area and 60% in rural areas by 2025.

2.2.8. 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. The second is The Sindh Cultural Heritage (Preservation) Act, 1994, which is the provincial law for the protection of cultural assets. Its objectives are similar to those of the Antiquity Act. Heritage Foundation has catalogued 600 historic buildings declared heritage sites under the Sindh Cultural Heritage (Preservation) Act, 1994.

No such sites exist in the vicinity of project.

2.2.9. Laws and Regulations on Urban Development

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

- Buildings Control Ordinance, 1979
- Karachi Building Control Licensing Regulations, 1982
- 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.

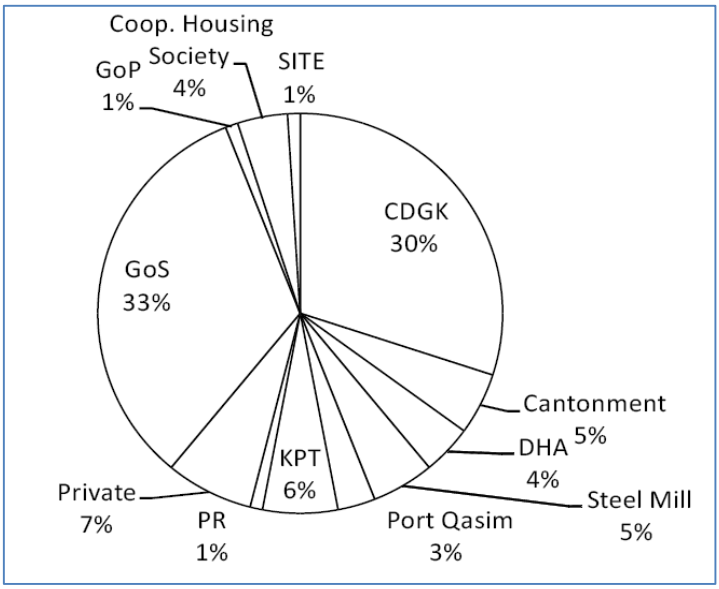


Figure 2.1: Land Holdings by Agency in Karachi
(Source: KMP 2020)

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

2.2.10. 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:

- Building Control, Housing and Development Authorities
- District Administration
- Tehsil or Town Administration
- Municipal Administration
- Station Headquarters (Army, Air Force and Navy)
- Cantonment Administration
- Union Council Administration
- Autonomous Bodies
- Industrial Estates
- Directorates of Civil Defense
- Export Processing Zones
- 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.

- buildings permitted for construction after the adoption of these Provisions shall comply with the provisions stated herein for new buildings forthwith.
- 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
- 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.

2.3. National Environmental Guidelines

2.3.1. Pakistan Environmental Assessment Procedures

The Federal EPA has prepared a set of guidelines for conducting environmental and social assessments. The guidelines derive from much of the existing work done by international donor agencies and NGOs. The package of regulations, of which the environmental and social guidelines form a part, includes the PEPA 1997 and the NEQS. These guidelines are listed below followed by comments on their relevance to proposed project:

Policy and Procedures for Filing, Review & Approval of Environmental Assessments, Pakistan Environmental Protection Agency, September 1997: These guidelines define the policy context and the administrative procedures that govern the environmental assessment process from the project pre-feasibility stage to the approval of the environmental report. The section on administrative procedures has been superseded by the Sindh IEE/EIA Regulations 2014. The package of regulations prepared by PEPA with relevance to this EIA includes:

- Policy and Procedures for Filing, Review and Approval of Environmental Assessments;
- Guidelines for the Preparation and Review of Environmental Reports;
- Guidelines for Public Consultation

Policy and procedures for filing, review and approval of environmental assessments: These guidelines define the policy context and the administrative procedures that will govern the environmental assessment process, from the project pre-feasibility stage, to the approval of the environmental report. According to the procedures laid out in the policy guidelines, IEE's or EIA's are to be filed with the EPA of the province where the project is to be implemented. The PEPA has, however, been given the right to review any environmental report at any time and the power to revoke the decision of the provincial EPA, if it deems this to be necessary. Projects have been classified in the policy guidelines by expected degree of adverse environmental impacts.

Those projects having potential environmental impacts are listed in Schedule-II. Projects which have comparatively small environmental issues and can be managed by less extensive analysis are included in Schedule-I.

Guidelines for the preparation and review of environmental reports: It requires proponents to prepare terms of reference for the environmental assessment reports. It requires that all studies should contain baseline data on the area and must contain an assessment of the potential environmental impacts and the recommended mitigation measures.

Guidelines for public consultation: These guidelines are intended to provide assistance throughout the environmental assessment of project by involving the public which can lead to better and more acceptable decision-making. Public involvement, undertaken in a positive manner and supported by a real desire to use the information gained to improve the proposal, will lead to better outcomes, and lay the basis for ongoing positive relationships between the participants.

The guidelines define the "objectives of consultation" as follows: Public involvement is a feature of environmental assessment and can lead to better and more acceptable decision-making. It can

be time consuming and demanding, yet without it, proposals are seldom soundly based, and there is likely to be antagonism from affected people, Public involvement, undertaken in a positive manner and supported by a real desire to use the information gained to improve the proposal, will lead to better outcomes, and lay the basis for ongoing positive relationships between the participants.

The Guidelines for Public Consultation introduces effective ways to inform the contents of the project to the general public during the planning stage & that eventually consensus building toward the implementation of project is reached.

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.

2.4. International Environmental Guidelines

2.4.1. 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 "**Blue Sky Residency**", Residential-cum Commercial Building Project, is proposed by M/s Almas Builders and Developers. The Project will present a vibrant commercial atmosphere with a safe and nutritious ambience. The project would reflecting "best practices" in urban and regional development which will provide optimum environment for visitors while respecting and incorporating traditional Pakistani values.

3.2. Project Details

Salient Features of the Project are provided below:

Table 3.1: Salient Features of the Project

Project Name	Blue Sky Residency			
Project Nature	Residential-cum-Commercial Building Project			
Proponent	M/s Almas Builders and Developers			
Plot Area	9680.00 SQ YD			
Total Covered Area	515,155.22 SQ FT			
Storeys	2B+G+19			
Location	Plot No. NC-21, (02 acres), Sector 34-A, Deh Dozan, Tappo Gujro, Scheme 33, Karachi			
Basement-2 Plan (ARS + Project Parking + Services)	Parking (205 cars)	Air Raid Shelter, Underground Water Tank for Potable, Non-Potable, Fire Fighting and Septic, and other services.		
Basement-1 Plan (Visitor Parking + Services)	Parking (199 cars)			
Ground Floor Plan (Project Parking + Shops + Services)	Parking (157 cars), 02 Shops, Fire Escape Staircase, Generator Room, Garbage Collectors, Electric and Gas meters, Sub-station and other services			
	Tower A	Tower B	Tower C	Total Flats
1st Floor Plan (Flats + Recreation)	10 flats	Recreational area and 03 flats	10 flats	23
2nd to 14th Floor Plan (Flats)	130 (10x13) flats	156 (12x13) flats	130 (10x13) flats	416 (32x13)
15th Floor Plan (Flats)	07 flats	09 flats	07 flats	23
16th to 18th Floor Plan (Flats)	21 (07x3) flats	27 (09x3) flats	21 (07x3) flats	69 (23x3)
19th Floor Plan (Flats)	-	09 flats	-	09
Roof Plan (Solar Panels)	Solar Panels, Overhead Water Tank for Potable, Non-Potable and Fire Fighting, Battery and Machine Room, and other services			
Totals Flats	Total 540 Flats			
Total Shops	02 Shops			



Figure 3.1: Conceptual View of the Proposed Project

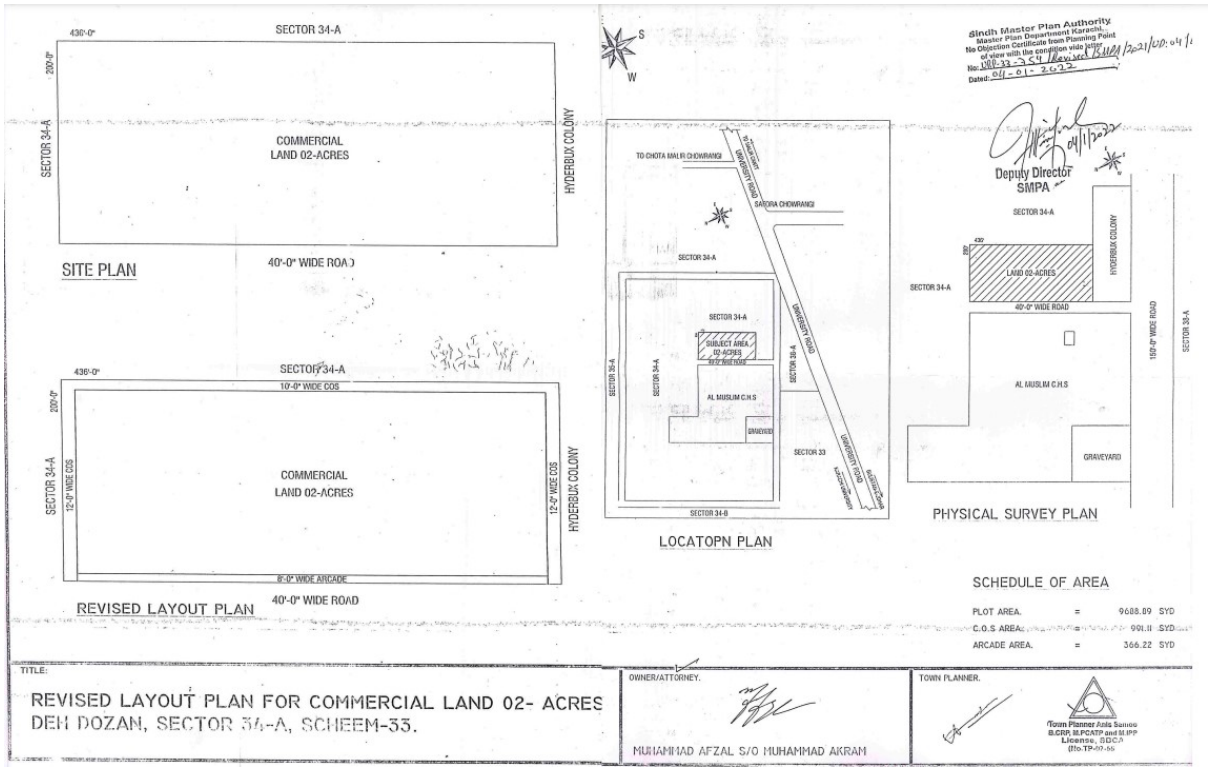


Figure 3.2: Site Plan of the Project

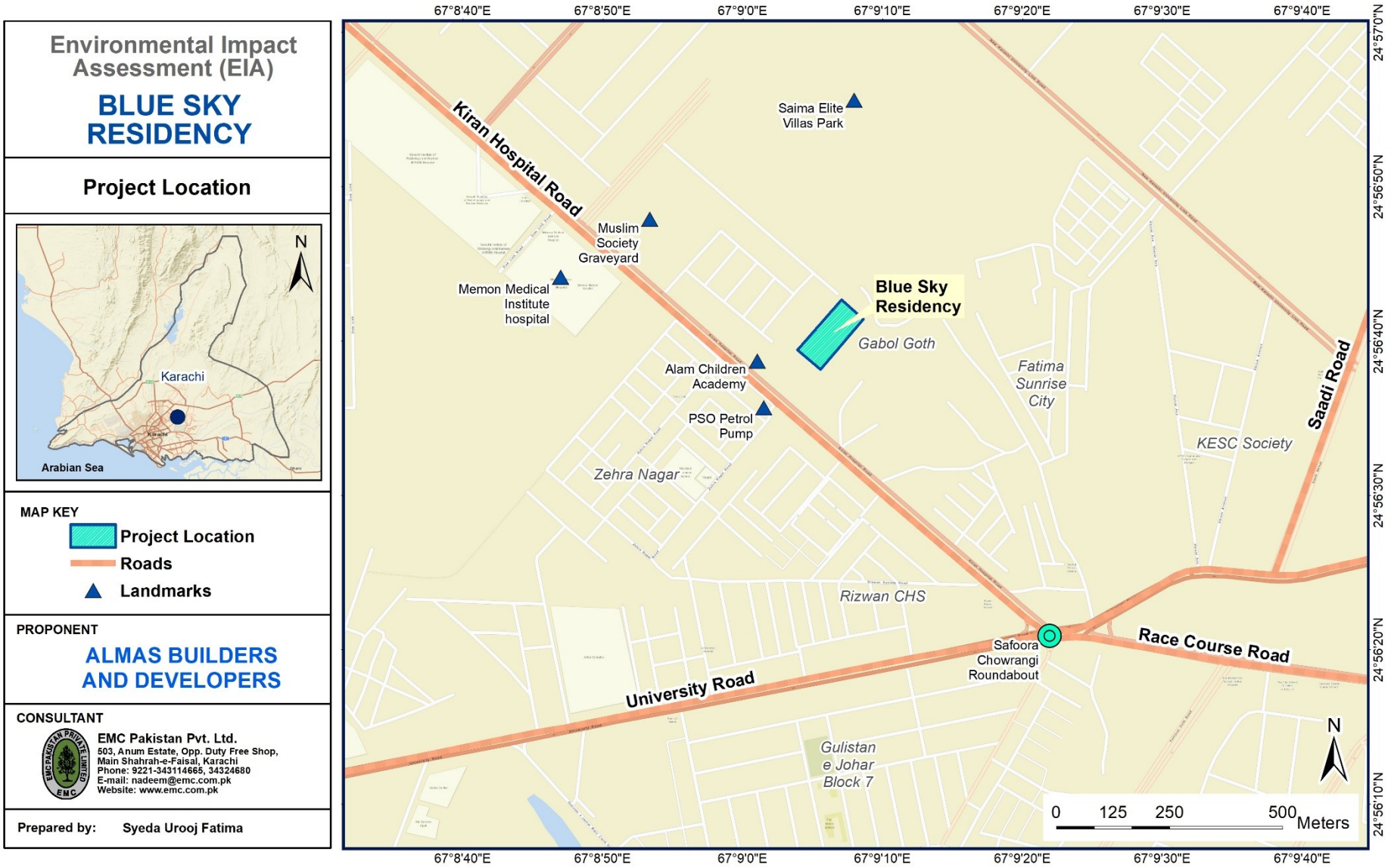


Figure 3.3: Project Location Map

3.3. Construction & Commissioning

3.3.1. 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

3.3.2. 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.

3.3.3. 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.

3.3.3.1. 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 with Sewer line
- Provision of signage for each activity center

3.3.3.2. 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.

3.3.3.3. 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.

3.3.3.4. 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

3.3.3.5. 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.

3.3.3.6. 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 bowzers, material hoist, passenger hoist, concrete placement booms & power generators.

3.3.3.7. 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.

3.3.3.8. 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.

3.4. Utilities

3.4.1. Plumbing System

3.4.1.1. 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.

3.4.1.2. Plumbing Fixtures Requirements:

The plumbing system has been designed to meet the minimum plumbing fixture requirements for space occupancy as per International Plumbing Code.

3.4.1.3. 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

3.4.2. Water Supply

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

3.4.2.1. Source of Water

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

3.4.2.2. Design of Water Supply System

- Pipe material used for water shall be of PPRc for internal plumbing works & G.I for external water 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 pipe are adopted from National Plumbing Code USA.
- Conversion of plumbing fixture unit's ratings applicable to building units is adopted from Fundamental of Plumbing Design Volume.

3.4.2.3. Water Requirement

The estimated water demand for the entire project is 94,710 Gallons/day.

Water consumption				
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 540 Nos.	35	5	94,500
For Commercial Unit				
2	Shop 2 Nos.	15	2	60
For Recreational Area				
3	Recreational Area (Community Hall / others)	15	10	150
Total				**94,710**

3.4.2.4. Sewerage System:

Estimated sewage water generation from project is 80,500 Gallons/day.

- ✧ Two-Stack drainage system.
- ✧ Separate soil stack– direct to main sewer after septic tank.
- ✧ Separate waste stack – to in-house treatment plant for re-cycling.
- ✧ Separate drainage lines for kitchen.

3.4.2.5. 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.

3.4.3. 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.

3.4.3.1. 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.

3.4.3.2. Fire Protection Systems:

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

3.4.3.3. 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

3.4.4. 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.

3.4.4.1. 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

3.5. Solid Waste Generation

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.

Chapter 4 Description Of Environment

This section details the natural and socioeconomic environment conditions of the micro- and macro environment of the Project area as defined in figure below. Discussion on the natural environment covers the physical areas including geography, geology, seismology, climate conditions, water resources and air quality and noise. Overview of vegetation and natural habitats are included in the ecological section. Discussion on the socioeconomic environment presents the data on administrative divisions falling within the project area, socioeconomic conditions of the communities living near the project area and built-up infrastructure present in the locality.

4.1. Project Location and Surroundings

The project is located at Plot No. NC-21, (02 acres), Sector 34-A, Deh Dozan, Tappo Gujro, Scheme 33, Karachi. The project is planned in the environs of Gabol Goth near Safoora Chowrangi Roundabout. The project site is accessible by University of Karachi, Kiran Hospital Road and other primary roads. Multiple housing societies are present in the surrounding of proposed area including Fatima Sunrise City, KESC Society, Saima Elite Villas Park, Zehra Nagar, Rizwan Cooperative Housing Society (CHS), and others.

4.2. Geology

Karachi and adjoining areas have plains, hills, rivers, valleys and coasts as diversified physical features. Rocks ranging in age from Eocene to recent, deposited under shallow marine to deltaic conditions are exposed. Karachi is a part of major synclinorium stretching from Ranpathani River in the east to Cape Monze in the west. Mehar and Mol mountains lie in the north. Within the synclinorium a number of structures such as Pipri, Gulistan-e-Jauhar, PirMangho and Cape Monze are exposed. The presence of concealed structures under the Malir River Valley, Gadap and Mauripur plains can fairly be deduced. The geology of Karachi consists of sedimentary rocks having two ranges known as Kirthar range and Pub range. The soil of Karachi city are classified into two types, the loamy sandy and gravelly soils of river valleys and alluvial cones near the coast line and shallow loamy gravelly soils and rock outcrops plateau.

4.2.1. Geotechnical (Soil) Investigation at project site

The program of subsurface investigation at the project site consisted of drilling nine boreholes. 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	60.0
BH-4	60.0
BH-5	60.0
BH-6	60.0
BH-7	60.0
BH-8	60.0
BH-9	100.0

Subsurface investigation has revealed that top 10.0-17.0 feet consist of very dense, fine to coarse SAND, fragmented SANDSTONE and very stiff to hard, clayey SILT deposits. This is followed by medium hard, SILTSTONE and SANDSTONE which continues up to the investigated depth of 100.0 feet.

Major subsurface deposits can be described as follows:

- Brown, very dense, fine to coarse SAND
- Brown, fragmented SANDSTONE
- Brownish gray, very stiff to hard, clayey SILT
- Brown/ Gray, medium hard, SILTSTONE
- Gray, medium hard, SANDSTONE.

Ground Water Table was encountered at the depth of about 3.0 feet below the existing ground level. Taking into account the subsoil conditions and anticipated structural loads, it is recommended that proposed structure be supported on raft foundation placed at 18.0 feet depth below the existing ground level. Geotecnical (soil) investigation study is appended to this report.

4.3. Geomorphology

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. 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).

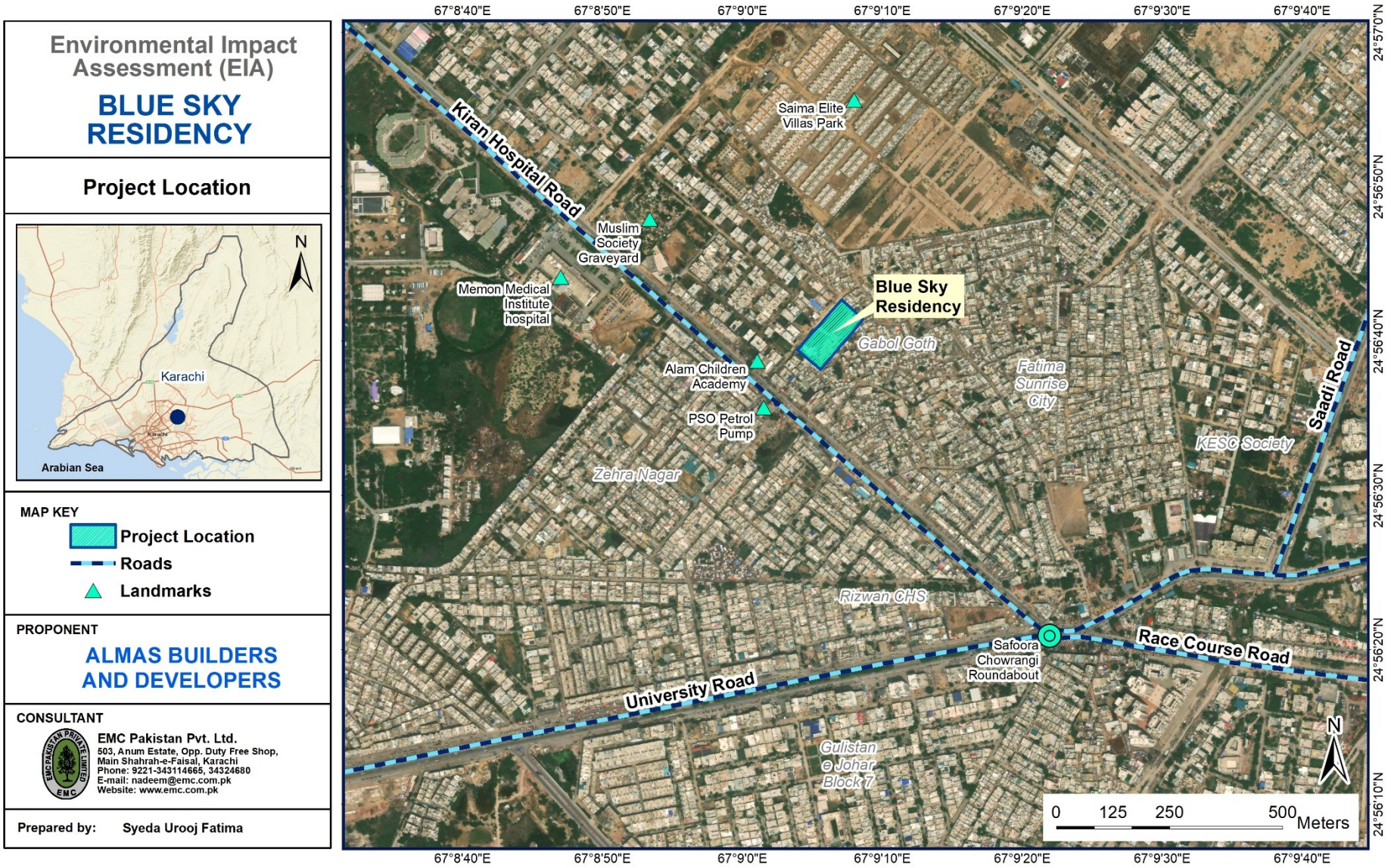


Figure 4.1: Project Location

Figure below the geomorphological features of the Project surroundings and macroenvironment.

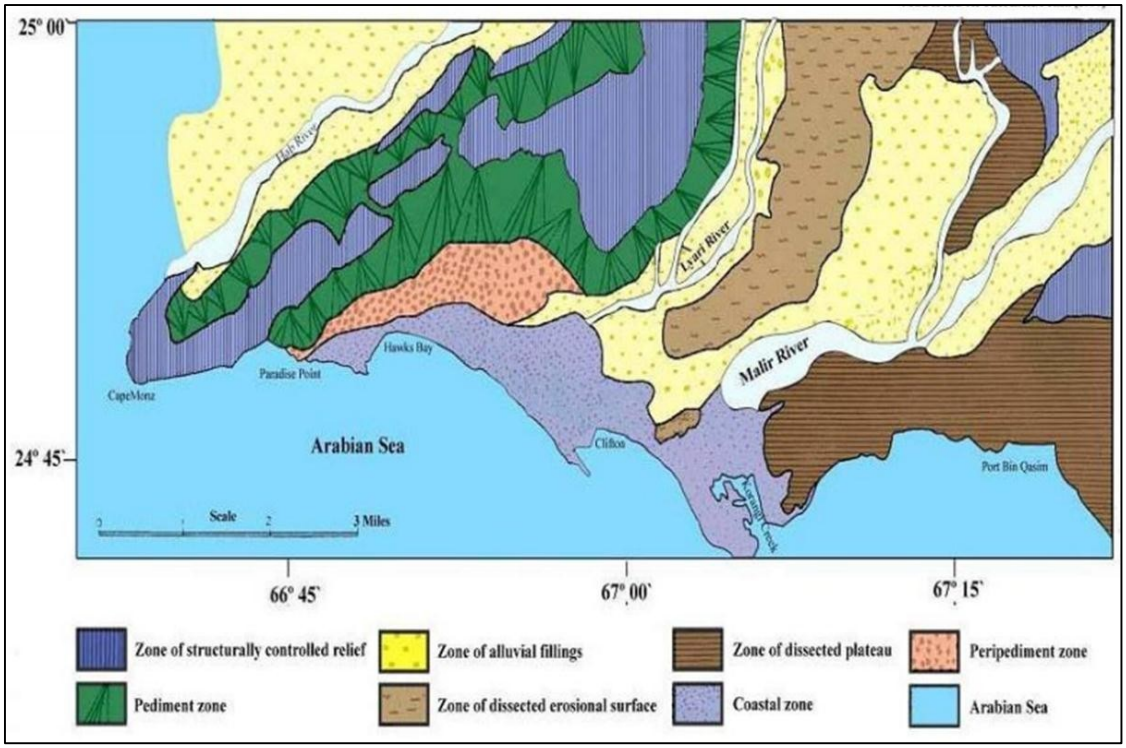


Figure 4.2: Geomorphological Zones of Karachi Region
(Source: Hamid et al., 2019[1])

4.4. 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). Recent assessment adopted in 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*"[2], 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

[1] Hamid et al. (2019). Soil Classification as a Tool for Evaluating Soil Behavior as Foundation Materials. International Journal of Economic and Environmental Geology, 41-46.
[2] 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.

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.

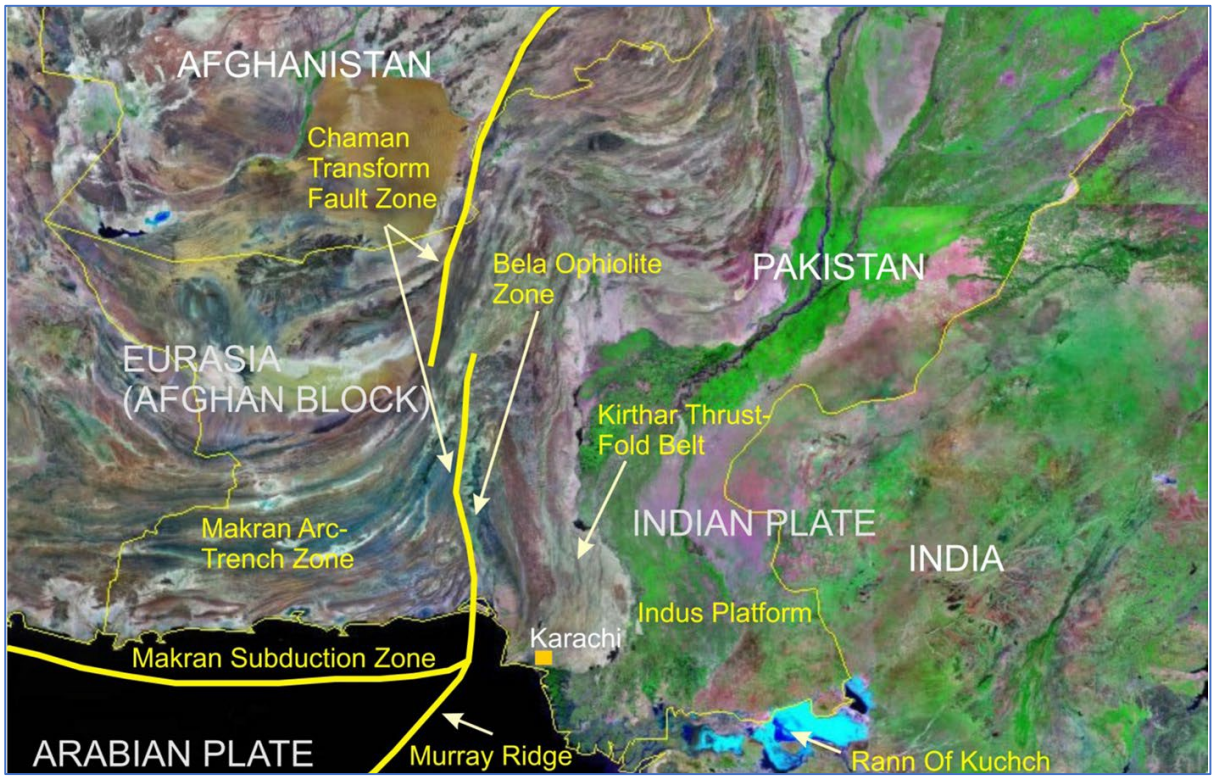


Figure 4.3: Tectonic setting of Karachi

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.[3]

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 basinward and landward.

4.4.1. 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:

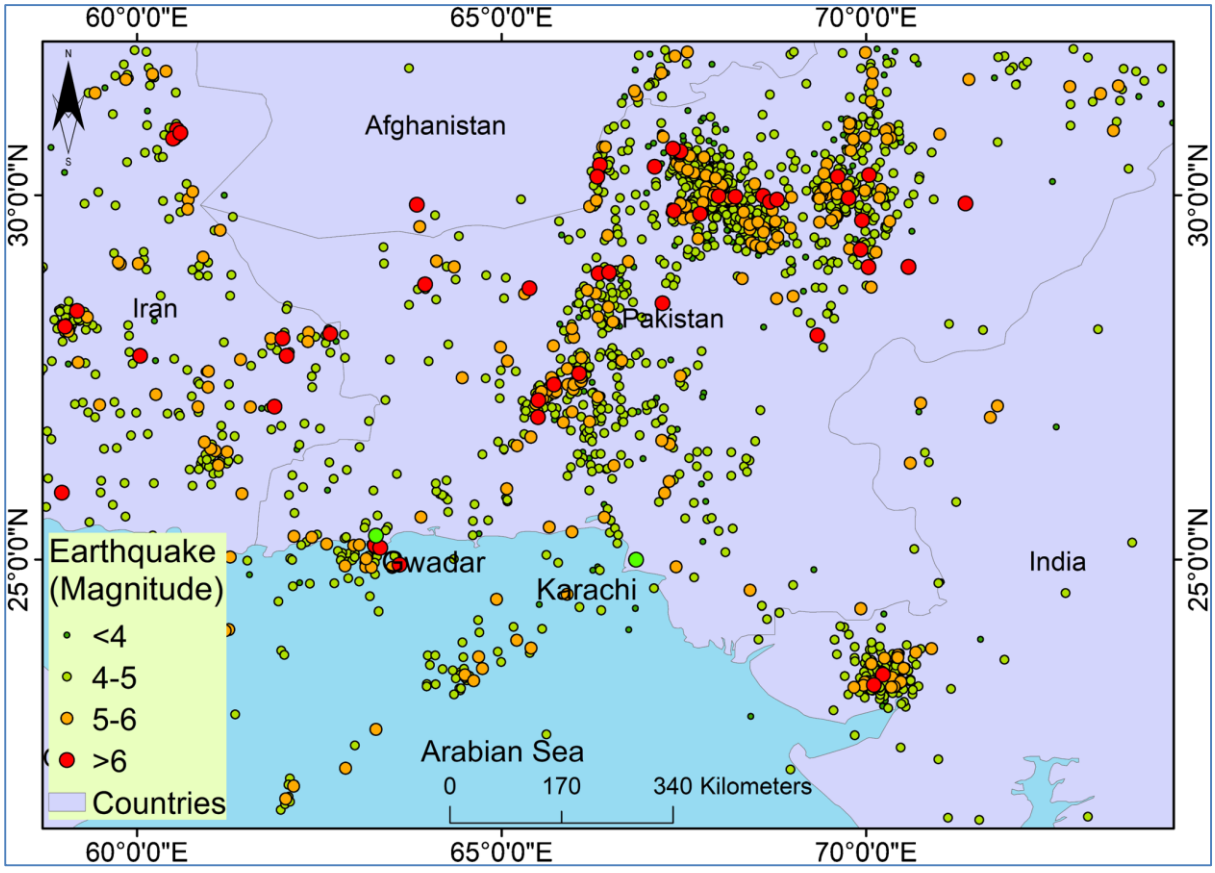


Figure 4.4: Earthquake recorded (1950–2019) in the Arabian Sea and its surroundings[4]

4.4.2. Seismicity of the Site

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

[3] (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).
[4] 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.

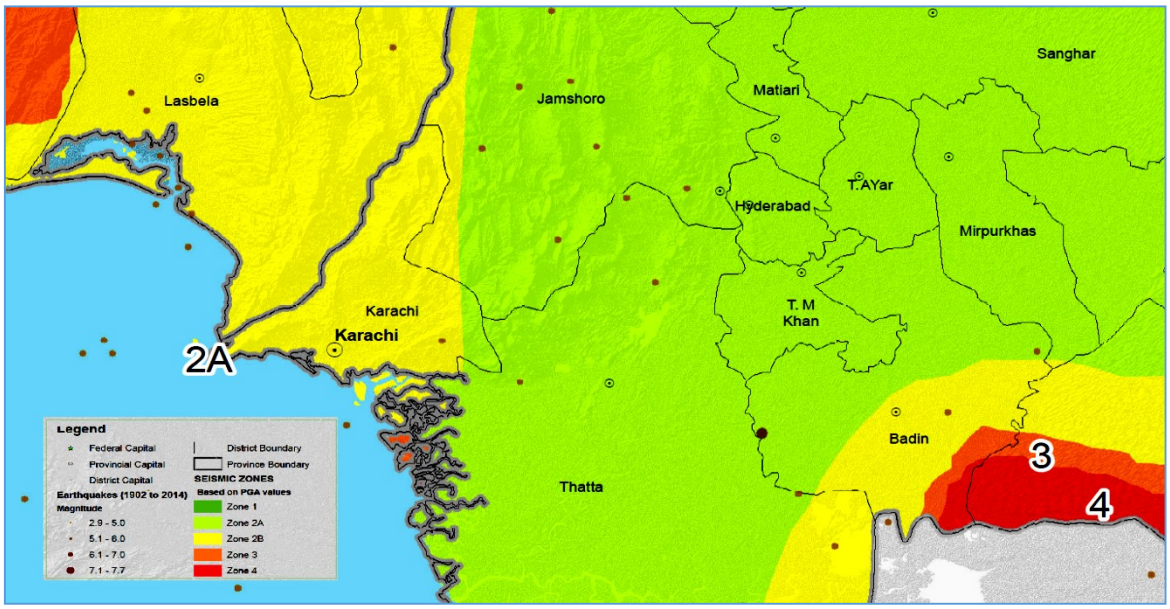


Figure 4.5: Seismic Zones in Karachi[5]

4.4.3. 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[6]. 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[7]. 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[8]. A study investigated the "sinking" of a water tower in 2006 near Clifton area and speculated about liquefaction due to mild earthquakes[9].

[5] Map data source(s): PMD, GSP, Pakistan Engineering Council – Prepared by Al Hasan Systems Private Ltd.
[6] Waltham, T. (2009). *Foundations of engineering geology*. CRC Press.
[7] 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.
[8] Olson, S. M., & Stark, T. D. (2002). Liquefied strength ratio from liquefaction flow failure case histories. *Canadian Geotechnical Journal*, *39*(3), 629-647.
[9] 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.

4.5. Hydrology

4.5.1. Surface Water Resources

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 Hub River lies on the western frontier of Sindh and for some distance the boundary between Sindh and the Baluchistan provinces. It located about 30 km to the west of Karachi, along the Karachi- Lasbela boundary. It falls into the Arabian Sea near Cape Monze, with a total drainage course length of 336 km.

During the past several years, a number of pumping wells have been installed to meet requirements for the irrigation-water supply (to raise vegetables, fruits, dairy and poultry) and drinking-water supply for Karachi. Excessive pumping of groundwater and continuous lowering of water-table is likely to result in intrusion of seawater into the Malir Basin under natural seepage conditions and under artificially induced conditions of recharge of saline seawater in the coastal aquifer(s) of Karachi.

Five possible water-sources are contributing to the groundwater recharge in Karachi. The first possible source is the rainfall. As the city of Karachi suffers from deficit of precipitation (only rainfall), the contribution to shallow groundwater storage from rain is very little. However, rainfall in the hinterlands and other areas surrounding Karachi may significantly contribute to the groundwater flow-system. The two freshwater sources are the Hub Lake/Hub Dam and the Indus River. Water from Hub Dam and the Indus River, through Keenjhar Lake, is piped to various residential zones in Karachi for drinking and irrigation purposes. The spring water discharges into Malir River and Lyari River and the municipal/industrial waste effluents added to these rivers are also contributing to groundwater storage as a fourth recharge source. Seawater intrusion along Karachi coast is the fifth possible source.

4.5.2. 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[10]. 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 2015-2016 to assess of the water quality of cities of Pakistan revealed that out of 28 samples collected from surface and groundwater of Karachi, 24 were found contaminated with *E. coli*. This constitutes almost 86 per cent of the total water sources of Karachi

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

rendering it unfit for consumption[11]. The most probable source of bacterial contamination is the sewerage discharge, which is usually flowing in pipelines parallel to that of drinking and household water and poor maintenance and breakages in pipelines lead to the mixing of water supply with the sewerage water[12]. Also, no significant improvement in the water quality was observed from the year 2002-2015[11].

Another study analyzed the surface and groundwater samples of Karachi and found that almost 88 percent of the samples/sources had led higher than the WHO recommended guidelines[13]. According to a World Bank study conducted in Karachi, blood lead levels greater than WHO guideline were found in 89 per cent of the samples. Increased lead levels have been related to learning disabilities in children resulting in reduced income in later life[14].

Because of unsafe and insufficient water supply and low sanitation coverage, as well as people's poor hygiene habits, around 60 percent of children suffer from diarrhea that is fatal if not treated in time. Concerns have been raised by various quarters about contamination in drinking water supply in the distribution network and possible linkages with water borne diseases in the city.

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. Water Supply, Demand and Sewerage System

Recent studies suggest that population will grow by 30 per cent from 2017 to 2030 in Karachi. This will translate in an increased water demand which will in turn put pressure on the already scarce water resources. The Water supply provided by Karachi Water and Sewerage Board (KWSB) is approximately 665 MGD against a demand of 820-1200 MGD resulting in a shortfall of 155-535 MGD. Unfortunately, an estimated 35 per cent (232 MGD) of the supplied water is lost during transmission thus decreasing the water availability to a mere 433 MGD[15].

The water supplied to Karachi fails to meet the water demand of the city. Therefore, the use of groundwater has increased for certain domestic and industrial purposes within the city. The available groundwater resources are mostly saline in nature as the city is located near coastal belt and excessive extraction of groundwater has resulted in seawater intrusion into the available water

[11] PCRWR (2016). Water Quality Status of Major Cities of Pakistan (2015-2016)
[12] Muhammad, Syed & Nadeem, Syed & Saeed, Rehana. (2014). Determination of water quality parameters of water supply in different areas of Karachi city. European Academic Research. 12.
[13] N. Ul-Haq, M.A. Arain, N. Badar, M. Rasheed & Z. Haque. (2011). Drinking water: a major source of lead exposure in Karachi, Pakistan. Eastern Mediterranean Health Journal
[14] World Bank Group. (2018). Transforming Karachi into a Livable and competitive Megacity
[15] WWF. (2019). Situational Analysis of Water Resources in Karachi. https://d2ouvy59p0dg6k.cloudfront.net/downloads/report___situational_analysis_of_water_resources_of_karachi.pdf

aquifers located in the areas near the sea[16]. The table below shows water supply and demand gap till the year 2017.

Table 4.8: Water Supply and Demand Gap till the Year 2017				
Year	Population (Million)	Demand (MGD)	Supply (MGD)	Gap (MGD)
1998	11.3	567	410	157
2017	16.02	820	650	170
Source: WWF (2019)[15]				

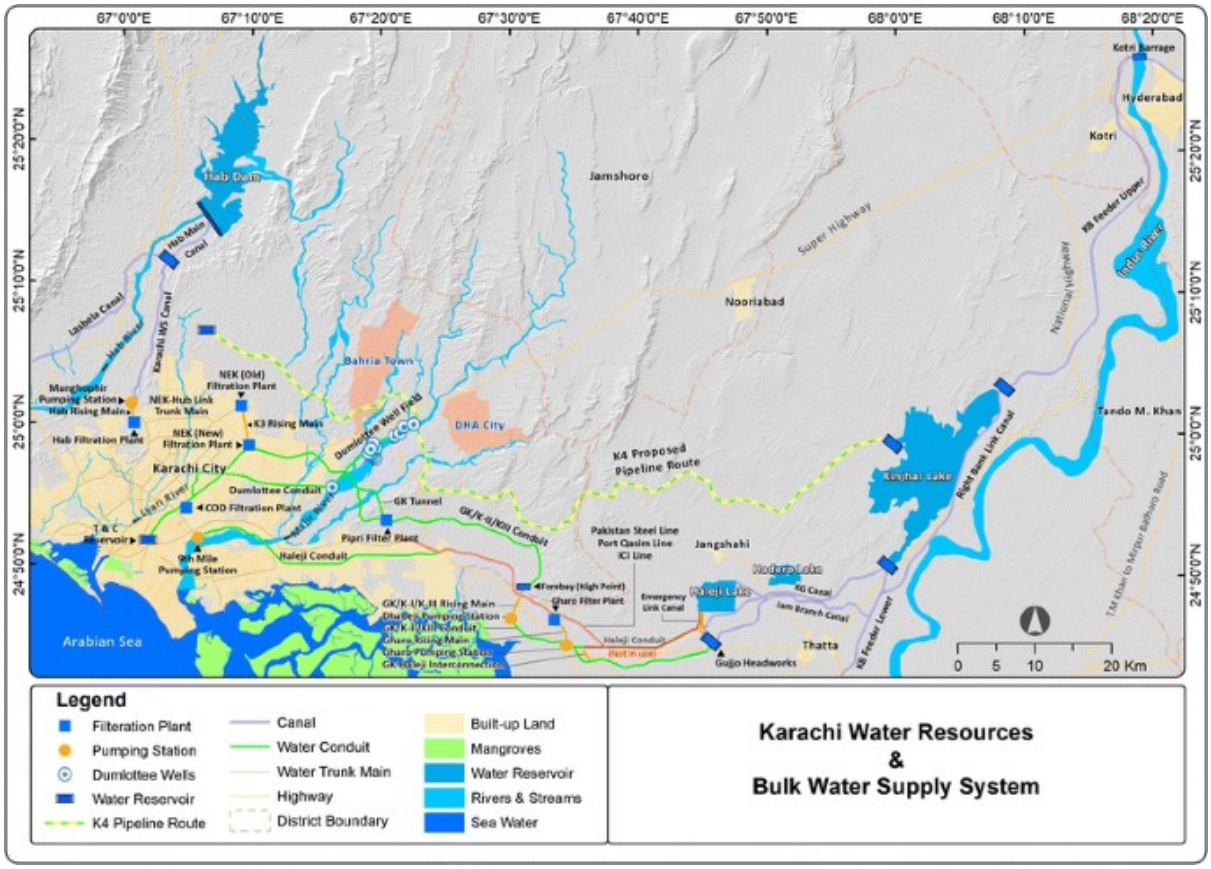


Figure 4.6: Water Resources in Karachi
(Source: Ihsanullah, 2009[17])

Karachi generates an estimated 1.8 million cubic meters per day of sewage[18] (KWSB 2018). This amount indicates high system losses given that typically less than 10 percent of urban water supplied is consumed. There are three wastewater treatment plants (combined capacity of 0.6 million cubic meters per day), of which two are functional (treating 0.2 million cubic meters per day). Thus, around 1.6 million cubic meters per day of wastewater is discharged untreated into

[16] Khattak, M. I., & Khattak, M. I. (2013). Ground water analysis of Karachi with reference to adverse effect on human health and its comparison with other cities of Pakistan. *Journal of Environmental Science and Water Resources*, 2(11), 410-418.
[17] Ihsanullah (2009) Evaluation and prospects of scientific management of water resources in Karachi city: A GIS perspective. Department of Geography, University of Karachi, Karachi, Karachi
[18] *"Young, William J.; Anwar, Arif; Bhatti, Tousif; Borgomeo, Edoardo; Davies, Stephen; Garthwaite III, William R.; Gilmont, E. Michael; Leb, Christina; Lytton, Lucy; Makin, Ian; Saeed, Basharat. 2019. Pakistan: Getting More from Water. World Bank, Washington, DC. © World Bank. https://openknowledge.worldbank.org/handle/10986/31160 License: CC BY 3.0 IGO."* https://openknowledge.worldbank.org/handle/10986/31160

the Arabian Sea or freshwaters close to Karachi. The Karachi sewerage system is extensive, with 5,670 kilometers of sewers, six major pumping stations, and 32 minor pumping stations (KWSB 2018). However, the system is in very poor condition. Inadequate stormwater drains are clogged with solid waste and overloaded with sewage and industrial effluent, undermining their capacity to drain stormwater from flood-prone areas (World Bank 2018).

4.6. Basic Characteristics of Climate and Meteorology

The climate of the macroenvironment can be characterized by dry, hot and humid conditions and in general terms it is moderate, sunny and humid. Climatic conditions of the whole region are influenced in summer by the monsoon winds from the West and in winter by winds from North (Quetta). 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 average annual rainfall is about 160 mm, of which 70% to 80% falls during the monsoon months of July, August and September. The annual maximum rainfall varies from 2.5 mm to 487 mm. The maximum rainfall recorded in one day is 205 mm in July 2009 and maximum annual rainfall is 487 mm in 1994. The summer temperatures are high, rising to over 46°C on some days. The winters are mild, although the night temperatures are quite low (up to 1.3°C) when the northern winds invade the area. The mean sea level (MSL) average atmospheric pressure during June to August is around 1000 mbar. From Nov to Feb average MSL pressure rises up to 1018 mbar. The relative humidity ranges from about 90% in the morning during May-September to 24% in the evening during December-January.

4.6.1. Temperature

The air temperature in Karachi Division is 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 the last 21 years in Karachi to describe the weather conditions are shown in Table below respectively. The Tables indicate that the mean monthly maximum temperature in Karachi ranged between 32°C to 33.6°C during the 2001-2021 periods, while the mean monthly minimum temperature ranged between 21.5ºC to 22.5°C.

Table 4.1: 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	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
Source: Pakistan Meteorological Department													

Table 4.2: 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
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	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
Source: Pakistan Meteorological Department													

4.6.2. 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 record for rainfall of PMD at Karachi Airport (2001-2021) suggests that July and August are the wettest months and that the maximum rainfall recorded in Karachi during 2001-2021 period was 366.8 mm during the month of August 2020, and the maximum annual rainfall was 474.2 mm during the same year 2020.

Table 4.3: 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	0.0	0.0	0.0	0.0	0.0	10.6	73.6	16.2	Trace	0.0	0.0	0.0	33.46
2019	0.0	2.4	0.0	0.0	0.0	Trace	N/A	52.2	Trace	0.0	0.5	0.4	13.87
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	0.0	0.0	0.0	Trace	45.4	Trace	88.3	17.2	0.0	16.9	167.8
Source: Pakistan Meteorological Department													

4.6.3. 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 4.4: 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
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	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
Source: Pakistan Meteorological Department													

4.6.4. 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. The wind velocity record (2001-2021) indicates that the velocity varies and ranges between 1.0 m/s to 13.4 m/s. The Tables below show the wind speed and the direction.

Table 4.5: Wind Speed (m/s) at 12:00 UTS													
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	3.2	3.6	4.9	5.2	5.6	5.7	6.3	6.4	6.3	4.5	3.1	3.5	4.8
2019	3.4	4.6	5.2	6.0	6.2	6.0	7.0	4.7	4.4	4.1	3.5	3.8	4.9
2020	4.6	4.8	4.6	5.4	6.8	5.6	5.2	4.6	4.8	3.8	3.2	2.8	4.7
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
Source: Pakistan Meteorological Department													

Table 4.6: Wind Direction at 12:00 UTS												
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	S54W	S43W	S42W	S45W	S46W	S45W	N52W	S59W	S44W	N56W	S45W	S06W
2019	S67W	S52W	S51W	S55W	S51W	S42W	S54W	S45W	S48W	S56W	N54W	S41W
2020	N31E	S12W	S52W	S55W	S49W	S44W	S47W	S55W	S47W	S38W	S4E	N35W
2021	S21W	S38W	S44W	S42W	S52W	S53W	S55W	S48W	S40W	S41W	S22E	S40E
Source: Pakistan Meteorological Department												

4.7. Ambient Air Quality and Noise

The ambient air quality and noise monitoring was conducted at the project site and monitoring reports are attached in the annexures of this EIA Study. The monitoring results depict that ambient air quality and noise levels at the project site are satisfactory and following the guidelines prescribed in SEQS.

Table 4.8: Ambient Air Quality

Date	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 ($\mu g/m^3$)
Minimum	-	9.8	10.9	13.6	15	20	218
Maximum	-	18.4	44.3	55.4	144	66	291
Average	0.217	13.9	23.8	33.7	93.8	38.1	252.1
SEQS	**5**	**40**	**80**	**120**	**150**	**75**	**500**

Table 4.9: Noise Level Test Results

#	Location/Source	SEQs Limits 65 dB (A) Leq		
		Min	**Max**	**Average**
1	Front side Right Corner of the project Area	51.2	58.9	55.0
2	Front side Near Left Corner project Area	50.4	58.7	54.5
3	Back side Right corner Area	49.8	60.0	54.9
4	Back side Left Corner Area	52.3	57.8	55.0

SEQS = Sindh Environmental Quality Standards (Outside Noise Level)
dB (A) Leq = Time weighted average of the level of sound in decibel on scale which is relatable to human hearing.

4.8. Ecological Baseline

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 urbanization. This has degraded the physical environment & the biological environment. 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.

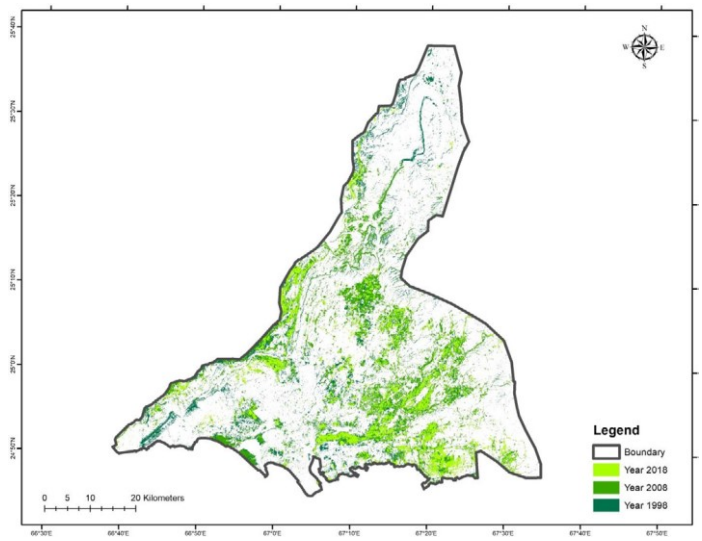


Figure 4.7: Vegetation Trends in Karachi[19]

4.9. Socioeconomic 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 public utilities and social services (education and health facilities) in the area.

International best practice for EIA studies demands an alignment of the proposed project components with the Sustainable Development Goals (SDGs) defined by the UN. In 2017, the global indicator framework was developed and agreed upon by the Inter-Agency and Expert Group on SDG Indicators (IAEG-SDGs). Indicator 11.3 of Goal 11 of UN Sustainable Development Goals (SDGs) focuses on achieving sustainable development of cities through improvement in urban planning and management in participatory and inclusive ways by 2030. For the sustainable development of Karachi, integrating the project design of the proposed Blue Sky Residency to ensure alignment with relevant aspects of SDG Goal 11 is essential to ensure development that is socially acceptable and environmentally sound.

This chapter is divided into the macro and micro environment of the project area. Macro environment encompasses Karachi District East which is the larger administrative area of the project. The macro environment covers administrative setup, demography, education and health profile of the area. The immediate neighborhood of the project has been defined as the micro environment of the project. The micro environment covers land use, education, health and utilities profile of the area.

[19] Change detection map of Karachi Division vegetation for the years 1998, 2008 and 2018. Adapted from "Raza, D., Karim, R. B., Nasir, A., Khan, S. U., & Zubair, M. H. (2019). Satellite Based Surveillance of LULC with Deliberation on Urban Land Surface Temperature and Precipitation Pattern Changes of Karachi. *Pakistan. J Geogr Nat Disast*, *9*(237), 2167-0587".

4.10. Macro Environment

4.10.1. Administrative Context

The Karachi Division was abolished in 2000 and five districts of Karachi were merged in City District Karachi. The City District Karachi was divided into 18 Towns and 178 union councils. On 11 July 2011, Sindh Government restored 5 districts of Karachi division and abolished City District Government Karachi. In November 2013, a new District Korangi was formed by splitting District Karachi East. Furthermore, on 04 September 2020, a new district (7th) was formed by splitting District West. Now Karachi Division has District Central, District East, District Malir, District South, District Korangi, District West and District Keamari. These districts form the Karachi Division now. There are also six military cantonments, which are administered by the Pakistan Army.

The proposed project is planned for development on Plot No. NC-21, Sector 34-A, Deh Dozan Tappo Gujro, Gulzar-e-Hijri, Scheme 33, Karachi, which falls under the jurisdiction of District East Karachi. District East comprises of 4 sub-divisions namely, Jamshed Quarters sub-division, Ferozabad sub-division, Gulshan-e-Iqbal sub-division and Gulzar-e-Hijri sub-division. The District East covers a total area of 139 sq. km while Gulzar-e-Hijri sub-division covers an area of 79 sq. km. District East is managed by the District Municipal Corporation East and is headed by the Chairman, DMC East.

Table 4.7: Covered Area of District & Sub-Division

District East	Gulzar-e-Hijri Sub-Division
139 Sq. km	79 sq. km

4.10.2. Demography

After the latest delimitation in July 2018, District East has lost many of its areas to District Korangi. However, the district's area remains a complex mixture of posh and slum areas. This is third-largest district in Karachi according to population and number of registered voters. A large portion of the district consists of posh areas such as, KDA Overseas, six blocks of Gulshan-e-Iqbal, KDA Officers Housing Society, Askari Cantt, Darul Aman Society, Delhi Mercantile Society, Sindhi Muslim Society, Teen Hatti, Jamshed Road, Binori Town, Soldier Bazaar and Tariq Road. However, illegal encroachments, Katchi abadis and low-income neighborhoods can also be found in the district.

Table 4.8: Demographic Change (1998-2017)

1998 census population	2017 census population	Change (%)
Distric East		
1,447,529	2,875, 315	98
Gulzar-e-Hijri Sub-Division		
130,066	792,451	509
Source: Pakistan Bureau of Statistics 2017 (PBS)		

According to the 1998 census, the total population of District East was 1,447,529 which increased to 2,875,315 in 2017 census, showing an increase of 98% or an average annual growth rate of 3.7% between the 2 censuses (nearly 2 decades). On the contrary, the total population of Gulzar-e-Hijri Sub Division was 130,066 according to the 1998 census and rose significantly to 792,451 according to the 2017 census, showing an increase of 509% or an average annual growth rate of 10%. It is assumed that urbanization, launching of new projects, rise in the income, visible attraction in the estate property and overseas investment made this unbelievable increase in population in this sub-division.

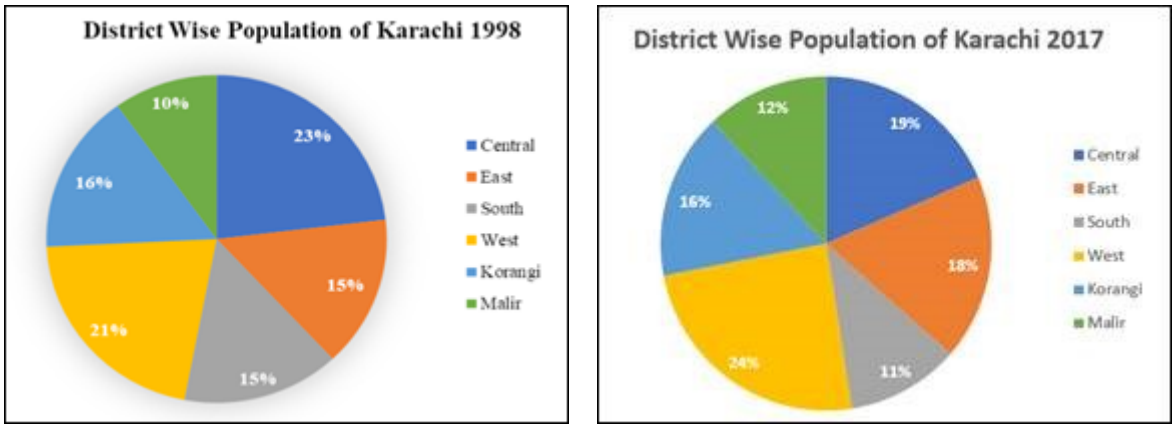


Figure 4.8: District wise Population according to the 1998 and 2017 Census

The above figure illustrates the relative distribution of population in Karachi districts based on 1998 and 2017 final census results. According to the 1998 census, District East comprised 15% of the entire city population, whereas according to the latest census the population of District East is comprised 18% of Karachi population making it the less populated district in comparison with District West and Central. The population of District East is expected to increase in the coming years because there are many high-rise projects being planned in the area. Over time, many low-income settlements in the district that are now home to large pockets of residential and commercial establishments thriving with people who have migrated from other parts of Sindh and the rest of Pakistan. These people made Karachi their second home and live in Gulzar-e-Hijri, Gulshan-e-Iqbal and Gulistan-e-Johar.

4.10.3. Urban Migration

Karachi has proliferated in the last few decades, and the metropolitan area has more than 23 million people, with a population density of over 24,000 people per square kilometer, or 63,000 per square mile. This means Karachi is denser than any other "megacity" with an urban population of more than 10 million except Dhaka and Mumbai. Regional and internal migration have also contributed to the substantial increase in the pace and scope of urbanization in Karachi. These population movements have brought rapid transformations in the social, economic and political fabric of Karachi. Urban migration has played a significant role in the rapid population growth of Karachi.

Table 4.9: Karachi, Population Growth (1941-2017)					
Year	Population	Increase / Decrease Over Previous Census / Survey	No. of Years Between Surveys	Increase/ Decrease (%)	Average Annual Growth Rate (%)
1941	435,887	135,108	10	44.90	3.70
1951	1,137,667	701,780	10	161.00	11.50
1961	2,044,044	906,377	10	79.70	6.05
1972	3,606,746	1,562,702	11	76.50	5.00
1981	5,437,984	1,831,238	9	50.8	4.96
1998	9,856,318	4,418,334	17	44.8	3.52
2017	16,024,894	6,168,576	19	38.5	2.59
Source: Census Reports, Government of Pakistan					

4.10.4. Education Facilities

The educational infrastructure in Karachi East is physically well developed. The government is providing the maximum possible educational facilities to the people of the district to enhance their human capital. There are a number of schools, colleges and institutes in the district. Dubbed as the hub of education, District East is host to some of the city's biggest public sector universities and higher educational institutions, such as the University of Karachi, NED University and Federal Urdu University of Arts, Science and Technology.

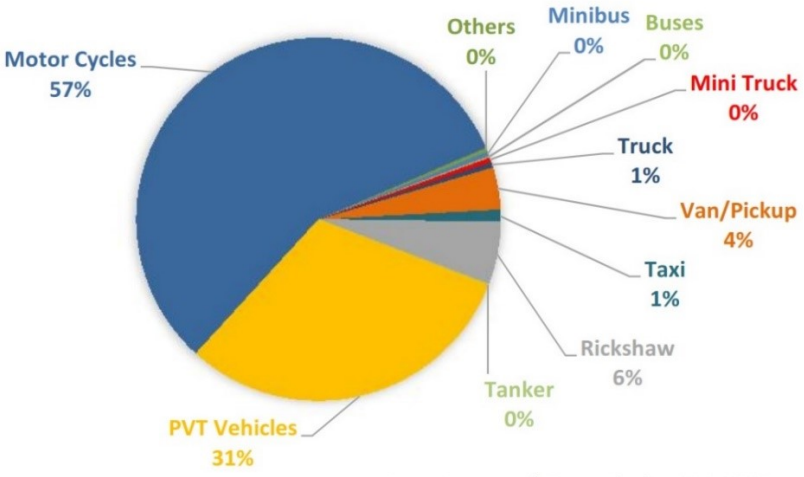
Table 4.10: District Wise Number of Schools, Enrollment and Staff for Karachi (2016-17)										
District Name	**No. of Schools**				**Enrollment**			**Teacher**		
	Boys	**Girls**	**Mixed**	**Total**	**Boys**	**Girls**	**Total**	**Male**	**Female**	**Total**
Central	117	141	348	606	44,822	58,510	103,332	1,803	4,996	6,799
East	51	64	163	278	23,022	29,106	52,128	870	2,271	3,141
South	70	87	173	330	26,122	35,824	61,946	1,079	2,496	3,575
West	128	101	340	569	38,562	45,454	84,016	1,443	1,909	3,352
Malir	136	113	414	663	34,548	32,333	66,881	1,540	1,148	2,688
Korangi	97	94	220	411	35,192	46,918	82,110	1,025	3,082	4,107
Sindh Education Management Information System (SEMIS),2016-2017										

The number of schools, enrollment and teachers shows the active involvement of the residents of the District East in the education sector. The following table illustrates that according to School Education Statistics 2016-17, District East Karachi has a large number of schools with electricity, washrooms, drinking water and boundary facilities. The data also shows that people of District East are more educated and well aware about the importance of education and are prepared to pay exorbitant school and college fees for the education of their children.

Table 4.11: District wise Basic and Advance Facilities in Karachi (2016-17)							
District	**Schools**	**Electricity**	**Washroom**	**Drinking Water**	**Boundary Wall**	**Lab/Science Lab**	**Library**
Central	607	447	484	507	529	121	56
East	264	223	241	219	238	59	25
South	482	383	426	356	432	49	49
West	363	232	301	256	340	82	27
Korangi	550	397	431	391	509	46	37
Malir	591	240	398	302	479	56	21
Sindh Education Management Information System (SEMIS), 2016-17							

4.10.5. Transportation

As the cities grow, the requirement of civic facilities also increases requiring continuous development, technological advancement and efficient management. Karachi city is among the fastest-growing mega port cities with a very high rate of urbanization where the need for transport infrastructure and services is growing rapidly. Massive traffic jams on the roads have become a common feature of Karachi while the situation is getting worse day by day. It has turned into an alarming situation which if not handled on priority basis would soon turn in to a deadlock, severely disrupting the economic activities in the city. The mushroom growth of vehicles is also a result of the failure of the government in providing sufficient low-cost public transport facilities. Currently, there are more than 4 million registered vehicles on Karachi roads. The number of vehicles registered in Karachi has increased by 1.13Mn or 38% since 2013 with rickshaws rising sharply by 76% to 229,826, motorcycles by 50% to whopping 2.34Mn and private vehicles by 18% to 1.28Mn in 2016[20]. According to the Research Report of KCCI, August 2017, the ratio of the registered motorcycles is highest (57 %) and private vehicles are 31 %. The following graph shows the share of vehicles which have been registered in Karachi in 2017.



Registered Vehicles in Karachi by Vehicle-Type in 2017

Source: Transport & Communication, KDA; KCCI Research Report 2017

[20] Research & Development Department, KCCI, August 2017: *Karachi Traffic Chaos, Jamming the wheels of Economy INFOANALYSIS*

The impact of the transport crisis on people's lives is enormous. Travelling in environmentally degraded conditions for long hour's results in physical and mental health problems. This effects family and social life and limits people's choice of livelihoods (especially for women) since they wish to work in areas that they can easily access through the existing transport system. Increasingly, transport availability and quality are also determining where they would like to live. The district has an adequate communication network having metaled road. The increasing numbers of motorcycles, private vehicles put a lot of pressure on the roads of District East.

4.10.6. Health Facilities

District East provides health facilities not only for its own inhabitants but also for the resident of its adjoining districts. Adding to the significance of the district is the presence of two major hospitals - the Aga Khan University Hospital, Liaquat National Hospital and Medical College, Kiran Hospital, Memon Medical Institute Hospital and Dow University Hospital. In addition to this, number of dispensaries is also functioning at different places in the district under the supervision and administrative control of K.M.C / D.M.C East.

Apart from the Government run health institutions, dozens of private hospitals like Ashfaq Memorial Hospital, Rab Medical Centre, Samdani Hospital, Al-Mustafa Medical Centre, Patel Hospital, Hill Park General Hospital, Adamjee Eye Hospital and Ibn-e-Seena Hospital are few to be mentioned here along with many private clinics are also functioning in the district.

Table 4.12: District wise Government Medical and Paramedical Personnel in Karachi 2017

District	Doctors	Nurses	L.H. V	Dispensers/Dressers	X-Ray Technicians	Lab Technicians	O.T Technicians	X-Ray Assistants	Lab. Assistants	O.T. Assistants	Midwives
Central	579	207	15	82	12	17	25	0	3	12	26
South	324	115	4	51	14	23	33	0	8	8	2
East	245	18	22	26	4	0	3	0	4	1	6
West	356	83	19	67	12	14	22	5	12	15	19
Malir	234	25	14	53	9	4	6	0	10	5	18
Korangi	252	90	38	-	-	-	-	0	8	8	25

Source: BOS, Government of Sindh (Development Statistics of Sindh-2018).

Table 4.13: District wise Government Health Facilities with Bed Capacity in Karachi 2017

District	Hospital		Hospital Beds		Dispensaries		R.H Centers		T.B. Centre		B.H. Units		M.C.H.C	
	Teaching	Civil, Specialized & Taluka	Teaching	Civil, Specialized & Taluka	No.	Beds	No.	Beds	No.	Beds	No.	Beds	No.	Beds
Central	-	-	3,150	-	5	-	-	-	8	-	2	-	3	6
South	2	4	-	960	5	-	-	-	10	5	-	-	-	-
East	-	-	361	-	5	-	-	-	5	97	4	-	4	-
West	1	1	-	248	14	15	4	20	8	-	7	14	5	6
Malir	-	1	-	48	7	-	2	8	4	-	14	22	6	-
Korangi	-	7	-	724	8	-	-	-	7	-	8	16	4	41

Source: BOS, Government of Sindh (Development Statistics of Sindh-2018).

The public health facilities in Karachi are highly centralized in a few locations and cannot cater to a large part of the population. The above-mentioned public health facilities data is not updated in the government records thus subject to some shortcomings. The health care facilities of district East Karachi are better than other districts of Karachi division because there are number of existing good government and private hospitals

4.11. Description of Microenvironment

The proposed project “Blue Sky Residency” is planned to be constructed on Plot No. NC-21, Sector 34-A, Deh Dozan, Scheme-33, Karachi. The project activities involve the construction of three towers of eighteen and nineteen storeys residential cum commercial buildings. The project is surrounded by a number of existing residential and commercial developments. The major residential developments nearby are Al-Muslim Cooperative Housing Society Phase-II, Sector 34/A Gulzar-e-Hijri, Gabol Goth, Baryo Goth and Ali Goth. The commercial activities in the vicinity are Subhan Allah Autos, Pak Dry Cleaners, Data General Store and MashaAllah Milk Shop.

4.11.1. Land Use

The project is accessible from Super Highway, Karachi Hyderabad Motorway (M-9) through Kiran Hospital Road at a road distance of about 100 meters. The project site has an easy and straightway access towards the Main University Road which connects to main commercial centers of the city. The residential area constitutes of small and medium size bungalows as well as apartment buildings. The commercial activities in the area include restaurants, automobile repair shops, clothing and shoes stores, mobile shops and building material stores.

4.11.2. Education Facilities

The area residents have access to excellent education facilities including primary and secondary level schools as well as intermediate colleges and universities. Gabol Goth has their own school named Haji Ramzan Gabol School, Ghazi Foundation School is located close by Al-Muslim Cooperative Housing Society (Phase II), Bridge Water Institute (Software training institute) is located on the Main Kiran Hospital Road, Memon Medical Institute and Pakistan Institute of Professional Science & Technology (PIPS-TECH) are also located on the same Kiran Hospital Road and Metropolitan University Karachi is located at an approximate distance of 500m from the proposed project's site near Safoorah Chowk.

4.11.3. Healthcare Facilities

The health facilities in the vicinity of project include Kiran Hospital, it is a cancer hospital. This hospital has in-patient and out-patient facilities for cancer patients. It offers emergency service to cancer affected patients; more than hundred qualified oncologists are available at Kiran Hospital. They are well-reputed doctors who are experienced and well-qualified in their fields. The Dow University Hospital is situated near to the proposed location which was founded in 2009. The Dow Hospital is a 5-story building with a capacity for 1000 beds, a fully equipped emergency room, large common rooms, semi-private rooms, private rooms, an operating room and treatment rooms. There are other private health services available in the area including Rehman Memorial Hospital, Riffat Memorial Hospital, Memon Medical Institute Hospital, Kaneez Fatima Gynaecologist Hospital, Dr. Mumtaz Poly Clinic, Ashfaq Clinic, Shan Homeo Clinic and ZMT Clinic - Safoora Goth, all of these facilities are located under 500m radius from the project.

4.11.4. Utilities

The water supply in the area falls under the jurisdiction of Karachi Water and Sewerage Board (KWSB) and line water is available in the area. The residents of the neighborhood are quite satisfied with the water supply in their area. The condition of solid waste in the project area is unsatisfactory. There is no proper infrastructure for solid waste management. The respondents said that every society hires private workers to collect their domestic waste on a daily basis and these workers dispose of it through vehicles to other places. The area residents were mostly satisfied with the electricity supply in the area as load shedding is infrequent in the area. Gas is available in the neighborhood including Gabol Goth and others, but it came to the knowledge of the consultation team that in some areas of Gulzar-e-Hijri Scheme 33 gas facility is still not available.

4.11.5. Road and Traffic Condition

Gabol Goth Road at which the Blue Sky Residency is located is a 10 meter wide newly paved road, carpeted by the Government of Sindh along with the road new sewerage line has also been installed. Gabol road has access to Main Kiran Hospital road which is approximately a 100 feet wide double road having decent parking space. Kiran Hospital Road has direct access to Super Highway (M9) at one end and Main University Road on the other. The traffic flow in the area is nominal but it has been prophesied by the residents of the neighborhood that in next four-five years the population and the traffic volume will get doubled.

Chapter 5 Information Disclosure, Consultation & Participation

The participation of project stakeholders in project planning, design and implementation is now universally recognized as an integral part of environmental & social impacts assessment. Local communities, their representatives, government departments, national and international NGOs and the civil society at large may all be able to contribute to and benefits from, the dialogue directed at identified and resolving key project-related issues. Stakeholder consultation has become an important requirement of the EIA study after the enactment of the guidelines for public consultation under the Pakistan Environmental Protection Act (PEPA) 1997. After the 18th Amendment to the constitution, the Government of Sindh passed the Sindh Environmental Protection Act 2014, which also stresses the important of engaging with the concerned primary and secondary stakeholders during the EIA Study.

The proposed project "Blue Sky Residency" will be a modern residential cum commercial building to be constructed on Plot No. NC-21, Sector 34-A, Deh Dozan, Tappo Gujro, Scheme 33, Karachi which falls under the jurisdiction of Gulzar-e-Hijri Sub-Division of District East, Karachi. The proposed project activities involve the construction of residential cum commercial buildings up to eighteen and nineteen storeys.

While in the short-term, the impacts might be felt only in the microenvironment of the project, in the long-term, the impacts may also spread to other nearby neighborhoods and activities including traffic management, the swift passageway for fire tenders and ambulance and stress on existing utilities. Instead of these perceived impacts, meaningful engagement with the project stakeholders has been carried out to identify the potential positive and negative impacts, assess the magnitude of these impacts from a social perspective and prescribe solutions that identify for the construction and operations phase of the proposed project.

5.1. Stakeholder Mapping

In order to better understand several stakeholder groups for this project, a stakeholder mapping exercise has been carried out whereby different stakeholder clusters and their interests in the project are discussed in this section:

Local People/Neighborhood: Individuals or groups in the local of the project site are apprised about the project background and context. Due to their proximity to the project site, they are often utmost vulnerable stakeholders, and thus, consultations with these stakeholders are directed throughout the project phase. The consultation exercise provides an opportunity to appraise the stakeholders regarding the consultation process, identify likely project impacts, and record concerns of local communities. Moreover, intensive stakeholder engagement during the planning stage of the project provides a basis for reducing the trust deficit and encourages confidence-building.

Proponents: The main aim of the project proponent "M/s Almas Builders & Developers" is to accomplish the objectives of the project through cost-effective and sustainable project activities. To this end, the project proponent has to recognize that strong associations and responsive

relations with stakeholders would go a long way to achieve the project objectives. Therefore, the proponent has to strive to engage stakeholders at all levels from the outset; inform them regarding project goals, design, and alternatives. Moreover, they have to keep trying to create public understanding and acceptance of the proposal through a commitment to implement the promised objectives. They have to accomplish the project through general acceptance of the design and keep improving through the use of public inputs on alternatives and mitigation measures.

Government Agencies: The government agencies involved in the EIA (Environmental Impact Assessment) process is mandated to have their policy and regulatory responsibilities addressed in impact analysis and mitigation consideration. For the competent authority, an effective public involvement program will have to be ensured regarding project proposal that effectively incorporates environmental and social concerns. Moreover, in line with international standards, SEPA (Sindh Environmental Protection Act) stresses the proponent for evidence of CSR (Corporate Social Responsibilities) activities in the past and proposals for CSR activities in the project vicinity. All through the EIA review primary concern for SEPA is a transparent public consultation process and an efficient stakeholder engagement plan that can address the concerns and suggestions of all stakeholders.

NGOs/Interest groups: Comments from NGOs and specific interest groups often provide a useful policy perspective on the project's methodology and implementation mechanisms. For example, due to the vast exposure of certain NGOs and interest groups, alternative measures for reaching the project goals may be advised that are more eco-friendly and socially acceptable. Their insights are also helpful in developing CSR activities and later in monitoring and evaluations.

5.2. Primary and Secondary Stakeholders

Primary stakeholders are those who have a direct interest in the project which includes residents, commercial entities, and institutions falling in the immediate environs of the project area. Secondary stakeholders include the relevant government agencies and public interest groups which may indirectly influence or be influenced by the project. The concerns and input from both primary and secondary stakeholders are important to identify the issues arising from the construction and/or operation phase of the project and propose mitigation measures that minimize the negative project impacts and enhance the positive ones.

Within the project vicinity, the primary stakeholders are the residents of Al-Muslim Cooperative Housing Society Phase-II, Sector 34/A Gulzar-e-Hijri, Gabol Goth, Baryo Goth & Ali Goth. The commercial interests in the locale include Data General Store, MashAllah Milk Shop, Pak Dry Cleaners and Subhan Allah Autos. The secondary stakeholders for this project include the utility companies that provide gas; electricity and water in the area including K-Electric, SSGC, and KWSB. Furthermore, the regulatory authorities mandated to ensure environmental protection in the city that falls under the remit of SEPA and compliance with building and construction laws which is looked after by SBCA. The complete list of the primary and secondary stakeholders for Blue Sky Residency has been stated in the table below:

Table 5.1: Primary Stakeholders for Blue Sky Residency	
Neighborhood	**Residential Interests** • Al-Muslim Cooperative Housing Society Phase-II • Sector 34/A Gulzar-e-Hijri • Gabol Goth • Baryo Goth • Ali Goth **Commercial Interests** • Data General Store • MashAllah Milk Shop • Pak Dry Cleaners • Subhan Allah Autos
Proponent	M/S Almas Builders and Developers
Government Agencies & Other Service Providers	• Sindh Environmental Protection Agency (SEPA) • Karachi Water & Sewerage Board (KWSB) • K-Electric • Sui Sothern Gas Company (SSGC) • District Municipal Corporation, East • Sindh Building & Control Authority (SBCA)
NGOs/Interest groups	• Shehri-CBE • National Forum for Environment & Health (NFEH) • Citizens for Environment (NGO)

5.3. Consultation Approach & Methodology

5.3.1. Consultation with Primary Stakeholders

A Neighbourhood Survey was conducted to identify residential and commercial interests in the surrounding that may face direct impacts from the proposed development. The survey was conducted in two stages. In the first stage, several site visits were made to identify all stakeholders that either reside or work in the project environs and conducted an initial identification of potential positive and negative effects. Relevant public service institutions directly involved in service provision in the ranges were also identified.

During the second stage, a social survey field team from EMC Pakistan used a pre-designed semi-structured template to engage the residents, commercial interests, and public service institutions. Those stakeholders, who were not available at the first attempt, were re-visited on the same day or followed-up for their comments during the next few days. During each meeting, the project team introduced the project to the stakeholders, recorded their concerns, and provided contact details to enable stakeholders to share further comments over email or in writing. A 'Project Brief' providing the salient features of the project were also handed over to the available stakeholders as part of the information disclosure process.

Moreover, the team inquired about the current situation of the area such as the status of utilities, security and law and order situation in the project area from the residents near the project site. Several open-ended questions were also included in the questionnaire to ensure that the respondents could openly share their opinions and suggestions relevant to the study. The following table shows the stakeholders that were approached during the neighbourhood survey.

Table 5.2: Consultations with Primary Stakeholders

S. No	Respondents	Stakeholder	Stakeholder Type	Date
1	Mr. Ghulam Mustafa Somro (Resident)	Al-Muslim Cooperative Housing Society Phase-II	Residential	10-05-2022
2	Mr. Abdul Jabbar (Resident)	Al-Muslim Cooperative Housing Society Phase-II		
3	Mr. Fakhar Ud Din (Resident)	House 20, Sector 34/A Gulzar-e-Hijri		
4	Mr. Murad Ali Gabol (Resident)	Gabol Goth		
5	Mr. Nawaz (Resident)	Ali Goth		
6	Mr. Juman Khan (Resident)	Baryo Goth		
7	Mr. Manoch Kumar (Owner)	Data General Store	Commercial	10-05-2022
8	Mr. Gul Sher (Owner)	MashAllah Milk Shop		
9	Mr. Liaqat Ali (Owner)	Pak Dry Cleaners		
10	Mr. Mohammad Azhar (Owner)	Subhan Allah Autos		

5.4. Consultation Feedback

The comments, concerns, and suggestions received from stakeholders during the neighborhood survey have been collated in this section. The comments solicited from stakeholders were helpful in the screening of the potential environmental & social aspects of the project. The social team from EMC initiated consultations in the project area during the second week of May. The following major issues and concerns were raised by the primary stakeholders:

- Mr. Abdul Jabbar, a resident of Al-Muslim Cooperative Housing Society highlighted that the land value of the area was very low in the past but since many new projects are launched the market value of the property has increased.
- The residents of Sector 34/A Gulzar-e-Hijri are satisfied with the development work of sewerage line and road that has been completed in the neighborhood, recently.

- Mr. Murad Ali, a resident of Gabol Goth pointed out the issues of privacy and further development of high-rise building projects in the neighborhood that might cause an effect on the environment.
- Mr. Liaqat Ali the owner of Pak Dry Cleaners and a resident of Gabol Goth highlighted the increase of commercial activities and land value of the area that will affect positively to the residential and commercial stakeholders in the locality with the development of the proposed project.
- The more educated residents of the neighborhood understand the importance of a high rise building in a locality that is within the city but not choking the air or causing massive traffic pollution like some of the other densely populated and congested areas of the city.
- Majority of the residents of the neighborhood described the area as peaceful, safe and cheap having all kinds of facilities including proper hospitals, schools and super markets. Only a single resident complained about the electricity shortage for two hours that has started recently and may stay the same throughout summer season.
- A senior resident of the neighborhood who requested not to mention his name, expressed his concern about the water flooding that may take place in the monsoon which will start from the month of July.

Consultation Pictures with Primary Stakeholders



Handing over project brief to Security Guard, Al Muslim Cooperative Housing Society Phase-II



Consultation with a Resident, Al Muslim Cooperative Housing Society Phase-II





Consultation with Owner, Data General Store



Consultation with Owner, MashAllah Milk Shop



Consultation with Residents, Gabol Goth





Consultation with Owner, Pak Dry Cleaners

Chapter 6 Screening of Potential Environmental and Social Impacts and Appropriate 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 project located at Plot No. NC-21, (02 acres), Sector 34-A, Deh Dozan, Tappo Gujro, Scheme 33, Karachi, is duly authorized. 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
- Vulnerability of site to flooding and storm water drainage 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

6.1. Screening of Environmental Aspects related to Siting of Project

The project is located at Plot No. NC-21, (02 acres), Sector 34-A, Deh Dozan, Tappo Gujro, Scheme 33, Karachi, the site falls in the appropriate category that permits the designated land-use by the relevant authority. The project responds to the need of the segment of population that is seeking home, safety, security and improvement in quality of life. Availability of infrastructure facilities for establishment of residential complex and its location ideally suited the siting of project. Advantage of this aspect has already been taken by other town planner and developers who have gone ahead with the construction of such projects in Karachi and outskirts.

6.2. Assessment of Impacts at the Construction and Operation stages of the Project

6.2.1. Demolition of Structure(s)

The site is an open land with no significant permanent structure at the site. No demolition will therefore be required.

6.2.2. Structural Stability

The seismic zone map of Pakistan has divided the country into 4 seismic zones ranging in term of major, moderate, minor and negligible zones with respect to ground acceleration values. Under this zoning the proposed project site lies in the moderate to high hazard zone with minor to moderate damaging impact.

The recently developed guidelines for earthquake design of house and buildings in Karachi have assigned an expected Peak Ground Acceleration (PGA) value of 0.20.

6.2.2.1. Mitigation Measure

- ✧ During the construction, it will be important to maintain the stability of excavated area.
- ✧ During monsoons it will be essential to protect the excavation walls with shoring/bracing.

6.2.3. Erosion of Soil

Generally, the exposed soil after site clearance, road development and excavation for foundations is vulnerable to erosions and runoff by rains. Such a situation will be of temporary nature and short duration and lasts during construction phase.

6.2.3.1. Mitigation Measure

- ✧ Covering the open soil during the construction phase till such time that the foundations 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.

6.2.4. Excavation

The provision of foundations 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.

6.2.4.1. Mitigation Measure

- Fencing and obscuring the construction site to reduce the perception impact was undertaken.
- It would be advisable to monitor the excavation cuts and if found necessary, shoring/bracing may be employed. It should 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. Sites 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 third-party since it is apprehended that the residents in the immediate neighborhood are likely to be exposed to dust fall hazards.

6.2.5. 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 significant. 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:

6.2.5.1. Mitigation Measure

- Sites will be properly cordoned off by placing curtains all around.

- Unusable wastes will be transported to approved 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.

6.2.6. 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. 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.

6.2.7. 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. The major source of air pollution during the operation phase when the Project is functional will be the pollutant emissions from vehicles and stand-by generators.

Impacts from each source and proposed mitigation measures are likely to be as follows:

6.2.7.1. 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.

6.2.7.1.1. 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.

6.2.7.2. 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.

6.2.7.2.1. Mitigation Measure

- All vehicles, generators and other equipments 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 development of infrastructure and other facilities in town. The mechanical area will be provided with noise abatement devices. Generator's 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).

6.2.8. 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.

6.2.8.1. 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.

6.2.9. Water Sourcing

Water required for the numerous construction activities would not be of such order as to result in its reduced availability for other activities for the living environment. Conservation practices would nevertheless be adopted during the entire course of construction and operation.

Water will generally be obtained from the KWSB water supply system. The availability of ready-mix on commercial scale has greatly resolved the problem of availability of water in the initial stages. The drinking water need will be fulfilled through bottled from a bottled water supplier of repute.

Option for recycling of the wastewater and regeneration of the potable water from groundwater resources by adequate treatment may have to be explored. Water bowsers may also provide be obtained in case of water supply issues.

6.2.9.1. Mitigation Measures

- A complete record of water consumption during the construction and operation 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.

6.2.10. 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:

6.2.10.1. 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 operation stage.

6.2.11. Wastewater Generation & Disposal

6.2.11.1. Construction Phase

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.

6.2.11.1.1. Mitigation Measures

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

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

6.2.11.2. Operation Phase

Small quantities of hazardous wastewater may be produced during the maintenance activities in the project site (such as oily water etc.). The source of wastewater will include toilets, washrooms, laundry and kitchen. This wastewater would comply with the SEQS values provided that other hazardous wastes (i.e., paints etc.) are not mixed with it. The discharges from kitchen, canteen and other sources will be provided grease traps to separate the oily waste that will be disposed of responsibly through EPA approved contractor.

6.2.11.2.1. Mitigation Measures

Following mitigation measures will be adopted for effective management of wastewater during the operation stage of project:

- Sewage water shall be treated into sewage treatment plant, comprising at least of primary and secondary treatment before discharge into allocated drain. Option shall also be explored to reuse the treated water for irrigation purpose within the town.
- Option may also be explored to separate grey and soil water streams.
- 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.

6.2.12. Solid Waste Generation and Management

6.2.12.1. Construction Phase

- 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.

6.2.12.1.1. 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 such as SSWMB.
- 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 approved waste manager/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.

6.2.12.2. Operation Phase

- The project will generate solid waste from residential and commercial units of the project.
- If not properly managed and disposed of this can pose serious environmental threat of pollution not only to the residents and visitors to the complex but also to the surrounding settlements.
- Solid waste management however remains an unresolved problem in Karachi. Several options have been proposed and also implemented but none of them could resolve the problem. The solution perhaps lies now in the attempts that the Sindh Solid Waste Management Board has launched on. The SSWMB has taken a holistic view of the situation and has integrated a number of options that may at least partly alleviate the heavy impact which Karachi is faced with.

6.2.12.2.1. Mitigation Measures

The following measures would reduce the negative impacts of solid waste disposal:

- The solid waste shall be collected through garbage chute at dedicated site.
- All solid waste shall be segregated into organic and recyclable waste at source and then collected, stored, and transported for ultimate safe disposal.
- Handling & disposal of solid waste shall be managed by a dedicated waste management contractor.
- The solid waste management plan developed will be implemented and facilities for collection, storage and transportation will be established and organized.

6.2.13. 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.

6.2.13.1. Mitigation Measures

The following mitigation measures will be adopted to remove the constraints to smooth flow of traffic:

- Heavy traffic during construction; phase will come to the project site during late night hours. Project vehicles shall not be fitted with pressure horns.
- Speed of vehicles will be regulated during construction phase.
- Designated parking areas will be provided for different type of project vehicles within and around the project site.
- Traffic management plan will be introduced to manage smooth flow of vehicular traffic and to avoid traffic jam and long queues.
- Traffic management plan will be implemented and monitored.
- Vehicles will be parked at designated parking areas during operational phase.
- Parking of vehicles alongside the road would be prohibited at all time.

6.2.14. Seismic Hazards

The area presents a moderate to high hazard potential for earthquake activity. The recently developed (after the October 2005 earthquake) seismic zone map of Pakistan has divided the country into 4 seismic zones ranging in term of major, moderate, minor and negligible zones with respect to ground acceleration values. Under this zoning the project site lies in the moderate to high hazard zone with minor to moderate damaging impact.

The recently developed guidelines for earthquake design of house and buildings in Karachi have assigned an expected Peak Ground Acceleration (PGA) value of 0.20g for larger buildings. 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.

6.2.14.1. Mitigation Measures

No specific mitigation measures other than construction of the proposed project in accordance with the UBC Zone 2B are recommended.

6.2.15. Fire Hazards and Life Safety

Fire is one of the major hazards in dwellings and commercial units. Fire can cause loss of life and property. However, at the same time fire have the potential to severely harm the people in the vicinity and affect the living environment.

6.2.15.1. Mitigation Measures

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

- A dedicated fire tender shall be available at Project Site.
- For all engineering designs, NFPA (National Fire Protection Association) codes needs to be followed.
- Standard fire and smoke detection and protection devices such as alarms, fire hoses and hydrants to be provided in all critical areas.
- A detailed emergency and evacuation plan shall be prepared 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 e.g., schools, commercials centers and residential areas within the scheme.
- Regular inspection and servicing of the extinguishers will be undertaken by a reputable service provider and record of such inspections should be maintained.
- Signs such as "NO SMOKING" will be prominently displayed within the premises, especially in parts where fuel storage is involved.

Fire extinguishers and buckets of sand to be provided in the fire-prone area and elsewhere.

6.2.16. Energy use

Electricity during construction phase will be produced from diesel generators, whereas during operation phase, power supply from KE shall be made available.

A back up diesel operated generator will also be installed in case of emergency or suspension of power supply from the mains. Since energy produced from non-renewable resource results in COx, SOx, and NOx emissions, it is important to ensure that energy is used prudently and best management practices are adopted.

6.2.17. 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 facilities in town. The following measures will be adopted to ensure sustainable development of the Project:

6.2.17.1. 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 concrete 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 infrastructure development in town. The residential house and other facilities would be constructed with high level of thermal insulation
- The environmental impacts arising from selection of 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.

6.2.18. Disturbance to Wildlife

The project site does not have any designated wildlife habitat or endangered species. Therefore, no significant impacts are envisaged on the wildlife during the project construction and operation phase.

6.2.19. Potential Impacts on Socio-economic Environment

- Health, Safety and Environment are major components of the Environmental Management Plan (EMP) of which monitoring of the environmental performance is an integral part. The proponent has to ensure strict adherence to the measures and guidelines stated in the EMP and the contractor must be made to follow the Standard Operating Procedures (SOPs) for construction activities.
- 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.
- 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.
- Safety risk assumes substantial proportion in densified areas of urban centers. Under the circumstances there is need for strict compliance with the HSE procedures and accidents incident on non-observation of HSE procedures must be keenly monitored and recorded to ensure the safety of both workers and citizens. For this purpose, the contractor will be required to maintain a record of procedures on Health, Safety and Environmental Management Plan and Standards Operating Procedures in addition to the following:
    - 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;
    - Provide information to the public through media – daily newspapers and local cable television (TV) services about the need and schedule of work, and alternative routes;
    - 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, 07/24;

- Ensuring provision of PPEs (helmet, hand gloves, boots, masks, safety hoists when working at height, etc.) and making sure that all workers do wear them;
- List the code of conduct and standard operating procedures (SOPs) to be followed during different stages of construction;
- Employ an Environmental, Health and Safety (EHS) expert on site;
- Provide on-site Health and Safety Training for all site personnel;
- Report accidents to the authorities promptly, and maintain records on regular basis
- Temporary inconveniences due to construction works will be minimized through planning and coordination with community members and organizations e.g. Traffic Management Authorities.
- Maintain the service roads in good condition to allow smooth traffic movement; provide necessary personnel to guide and control the traffic.

✧ The proposed Project will create employment during its construction and operation phase. The Project will create employment opportunities after completion. This also includes staff directly involved in the operation and management of the facilities that include the project management, the staff engaged by the residential flat owners, shop owners, domestic servants, security personnel, and drivers.

✧ Most of the workforce will consist of local people. The generation of employment is likely to be a major positive impact arising from the proposed development.

✧ The Table presented below illustrates an analysis of the socioeconomic impacts on the two domains of socioeconomic environment viz. macroenvironment and microenvironment. It may be seen from the Table that both domains have impact that are positive. The Project would promote economic uplift and raise the status of the commercial enterprises and social status as well as lifestyle of the community resident in the microenvironment of project area. Creation of jobs and promotion of business and commercial activities is an additional feature of the proposed Project.

Table 6.1: Nature and Degree of Positive Socioeconomic Impacts

Nature of positive impact	Degree of impact	Description
I. Construction Phase:		
Job opportunity	Positive Impact	Generate unskilled, semi-skilled and skilled jobs as construction laborers and other service providers.
Wider economic impact	Positive Impact	Economic impact in terms of generating opportunities for other business-like sourcing of man and material supplies for specialized jobs.
II. Operation Phase		
Job opportunity	Major Positive Impact	Generate large number of jobs in various positions both in managerial, supervisory and subordinate positions.
Improvement in quality of life	Major Positive Impact	Provide safe and secure environment for social, cultural, and commercial activity
Enhancement of quality of environment	Major Positive Impact	Benefit the macroenvironment by adopting Public Park/greenbelt as a social responsibility

6.2.20. Cultural Resources

There are no protected or otherwise cultural or archaeological sites in the microenvironment of the project site and hence no impact of the project will occur on cultural or archaeological resources.

6.2.21. Land-use and Aesthetics

The development of town would affect the change in the existing land use of the area, which is vacant land, however the overall aesthetics of the area will be improved due to the development of the site.

6.2.22. Impacts Rating

The following Checklist for the Project provides the screening of potential environmental impact on different components of ecosystem:

Table 6.2: Potential Environmental Impact during Different Stages of the Project and Mitigation Measures

Actions Affecting Environmental Resources & Values	Damage to Environment	Recommended Mitigation Measures	Significance of Impact			
			None	Small	Medium	Major
Environmental Problems during Construction Phase						
Soil Erosion	Loss of fertile soil	Careful planning of land excavation.		✓		
Contaminated Land	Soil and water pollution	Implementation of Waste management plan and provision of septic / soak pits.		✓		
Construction Waste	Soil contamination, water and air pollution	Implementation of Waste management plan. Adequate monitoring during construction			✓	
Change in Ambient Air Quality	Nuisance due to dust esp. by PM_{10}, spoil property and cause visibility issues.	Water sprinkling. Careful planning to minimize air emissions.		✓		
Wastewater Generation & Disposal	Deterioration of surface and ground water quality, disturbance to flora and fauna as well as contamination of soil surface	Provision of septic / soak pits. Careful monitoring of effluent discharge			✓	
Solid Waste Generation & Disposal	Effect the health of the workers, cause soil and water pollution	Implementation of Waste management plan. Careful planning to minimize the problem.			✓	
Noise & Vibration	Nuisance problem	Careful planning and management of noise producing activities		✓		

Vehicular Traffic	Environmental degradation	Careful planning and management. Implementation of Traffic management plan during construction.		✓		
Occupational Health & Safety	Over exertion, slips and falls as well as site hazards	Implementation of appropriate procedures			✓	
Environmental Hazards during Operation Phase						
Inadequate management and monitoring of operation	Environmental degradation, waste of resources and time	Properly programmed operations and their monitoring		✓		
Wastewater Generation & Disposal	Deterioration of surface and ground water quality, disturbance to flora and fauna as well as contamination of soil surface	Careful monitoring of sewage discharge.		✓		
Solid Waste Generation & Disposal	Effect the health of the workers, cause soil and water pollution	Careful monitoring to minimize the problem. Proper disposal of waste as well as management.		✓		
Energy Consumption	Utilization of natural resources	Careful monitoring to save the natural resources.		✓		
Illumination	Cause of light pollution for the neighbourhood	Careful planning to solve the problem.		✓		
Emergency situation; fire hazard	Occupational hazard, possible environmental degradation	Provision of firefighting system		✓		
Environmental Aesthetics	Loss of environmental aesthetics	Careful planning	✓			

Chapter 7 Environmental Management Plan

7.1. Introduction

7.1.1. General

The Environmental Impact Assessment (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 a level 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 of similar 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 timing for the implementation of the action, 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 aware of 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

A. 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.

B. 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 part of their contractor with the proponent.

C. 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 during the construction and operation phase. He will keep a record of all non-conformances observed and 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 for further 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. major oil 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.

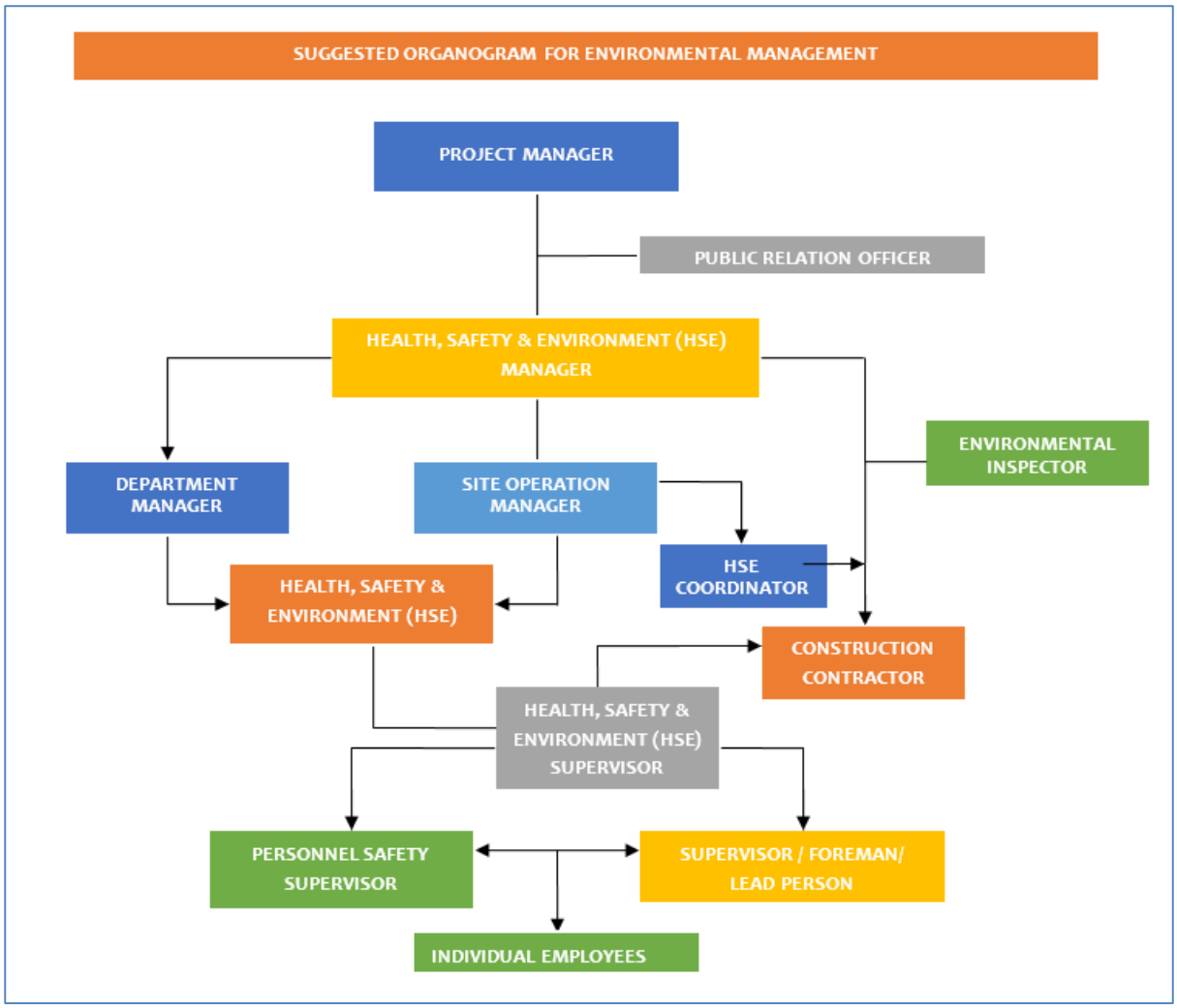
Trainings: The project contractors will be responsible for the selection and training of their staff capable of completing the project activities properly and efficiently. The contractors will be responsible for providing training to their staff members according to the training programme. The training programme is discussed briefly in section 6.7.3.

D. 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 operation or 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.



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 operations is the prime responsibility of proponent. Utilizing expert personnel and the Environment, Health and Safety Management System (EHSMS), the potential health and safety hazards and risks will be 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 minimizing their 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 the project 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 Sindh Environmental Protection Agency (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 Programme

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

- To check compliance of the contractors with the EMP by monitoring activities of the project on 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 programme 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 Reporting

A. Final Monitoring Report (Construction Phase)

After completion of construction phase, a final monitoring report will be prepared by Proponent's site representative. The report will include the following:

- Introduction.
- Details of the Project Activities.
- Natural Resource used during the Project.
- List of Non-compliances recorded.
- Effects of the Project on Communities and Physical Resources.
- Photographic Records
- Approvals provided during the project
- Change managements statements
- Trainings
- Conclusions

B. Annual Environmental Monitoring Reports (Operation Phase)

The project proponent shall prepare annual environmental monitoring reports describing the conduct of the operation phase for project along with details of the effects monitoring conducted annually during the operation phase of the project. The report shall be submitted to the SEPA.

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 at the 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 of proposed 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 reassess 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 Programme

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 Programme

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 provided regarding 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.

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Table 7.1: Environmental Management Plan (EMP)				
S.#	**Impact and Mitigation Measures**	**Responsibilities**	**Monitoring**	**Timing**
1	**Land Use and Soils**			
1.1	The construction activities will be planned to minimize disturbance to soil	Proponent, CC	Monitoring compliance	During construction phase
1.2	To the extent possible, equipment and materials would be staged in areas that have already been disturbed	Proponent, CC	Monitoring compliance	During construction phase
1.3	Movement of construction equipment will be restricted to work areas only to avoid unnecessary disturbance to soil	CC	Monitoring compliance	During construction phase
1.4	Routes of water tankers, dumper trucks and other project vehicles will be monitored for any signs of soil disturbance & road damage	CC	Monitoring compliance	During construction phase
1.5	Area showing signs of unstabilised soil conditions will be compacted and watered	Proponent, CC	Monitoring compliance	During construction phase
1.6	The assessment of settlement within affected zone due to dewatering will be conducted prior to dewatering	CC	Monitoring compliance	During construction phase
1.7	The affected zone of settlement, if identified will be monitored regularly during dewatering activity	Proponent, CC	Monitoring compliance	During construction phase
1.8	Proper drainage will be provided to construction camp, construction site, especially near excavations and around proposed facility	CC	Monitoring compliance	During construction phase
1.9	Vehicle speed will be regulated and monitored to avoid excessive dust emissions	CC	Monitoring compliance	During construction phase
1.10	Total land uptake by the project and associated facilities will be kept to the minimum	Proponent, CC	Monitoring compliance	During construction phase
1.11	Periodic trainings will be provided to drivers on mitigation measures related to off-road travel and speed limits	Proponent, CC	Check training records	During construction phase

1.12	The Project will have a storm water collection system so that the storm water effluent has minimal sediment load	Proponent, CC	Monitoring compliance	During design and construction phase
2	**Air Quality**			
2.1	**Dust Emissions**			
2.1.1	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	CC	Monitoring compliance	During construction phase
2.1.2	Dust emissions from soil piles and aggregate storage stockpiles will be reduced by appropriate measures. These may include: → Keeping the material moist by sprinkling of water at appropriate frequency → Erecting windshield walls on three sides of the piles such that the wall project 0.5m above the pile, or → Covering the pile, for example with tarpaulin or thick plastic sheets, to prevent emissions. → Locating stock piles out of the wind direction	CC	Monitoring compliance	During construction phase
2.1.3	All roads within the proposed Project will be paved as early as possible after the commencement of construction work. Until the roads are paved, they will be sprinkled regularly to prevent dust emission. 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
2.1.4	Project traffic will maintain a maximum speed limit of 20km/hr on all unpaved roads within the proposed site area.	Proponent, CC	Check speed of vehicles	During construction phase

2.1.5	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	During construction phase
2.1.6	The exposure of construction workers to dust will be minimized by provision of dust masks.	CC	Check for dust masks	During construction phase
2.2	**Vehicle Equipment and Exhaust.**			
2.2.1	All vehicles, generators and other equipments 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
2.2.2	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
2.3	**Generator Emissions**			
2.3.1	The option of using natural gas as fuel in the back-up generators should be explored.	Proponent, Generator Vendor	Monitor compliance	During design phase
2.3.2	The generator will be properly tuned and maintained in good working condition in order to minimize exhaust emissions	Proponent	Check maintenance records	During operation phase
2.3.3	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.	Proponent	Monitoring compliance	During operation phase
2.3.4	NOx emission reduction techniques should be employed on a regular basis	Proponent	Monitor NOx emissions	During operation phase
3	**Construction Noise**			
3.1	Reduce equipment noise at source by proper design, maintenance and repair of construction machinery and equipment	Proponent, CC	Check maintenance records	During construction phase
3.2	Minimize noise from vehicles and power generators by use of proper silencers and mufflers.	Proponent, CC	Monitor compliance	During construction phase

3.3	Use noise-abating devices wherever needed and practicable.	Proponent, CC	Monitor compliance	During construction phase
4	**Water Sourcing**			
4.1	A complete record of water consumption during construction and operation phase will be maintained	Proponent, CC	Check water consumption records	During construction and operation phase
4.2	If a new water well is to be installed, it will be designed to abstract water preferably from deep aquifer not being used by local communities	Proponent, CC	Monitor compliance	During construction phase
4.3	Water conservation program will be initiated to prevent wastage of water.	Proponent, CC	Monitor compliance	During construction and operation phase
4.4	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 operation phase
4.5	Recycle grey water for use for toilet flushing	Proponent	Monitor compliance	During operation phase
4.6	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 and operation phase
5	**Soil Contamination**			
5.1	Fuels, lubricants, and chemical will be stored in covered bounded areas, underlain with impervious lining	Proponent, CC	Monitor compliance	During construction phase
5.2	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	During construction phase
5.3	Vehicles will only be washed at designated areas.	CC	Vehicle Inspection record	During construction phase

5.4	Regular inspections will be carried out to detect leakage in construction vehicles and equipment	Proponent, CC	Check inspection / maintenance records	During construction phase
5.5	Appropriate arrangements, including shovels, plastic bags and absorbent materials, will be available near fuel and oil storage areas	CC	Monitor compliance	During construction phase
5.6	Contaminated soil will be removed and properly disposed after treatment such as incineration etc.	Proponent, CC	Monitor compliance	During construction phase
6	**Traffic**			
6.1	Heavy traffic during construction phase will come to the project site during late night hours.	Proponent, CC	Traffic record	During construction phase
6.2	Project vehicles shall not be fitted with pressure horns	CC	Monitor compliance	During construction phase
6.3	During construction, regulate speed of vehicles	Proponent, CC	Monitor compliance	During construction phase
6.4	Designated parking areas will be provided for different type of project vehicles within and around the project site	Proponent, CC	Monitor compliance	During construction phase
6.5	Manage vehicle movement to avoid traffic jam and long queues	Proponent, CC	Monitor compliance	During construction and operation phase
6.6	Prepare, implement and monitor the traffic management plan	Proponent	Monitor compliance	During construction and operation phase
6.7	Vehicles to use designated parking areas during operational phase.	Proponent	Monitor compliance	During operation phase
6.8	Parking of vehicles alongside the road should be prohibited at all time.	Proponent	Monitor compliance	During construction and operation phase
7	**Wastewater Generation**			
7.1	**Wastewater Generation During Construction**			

7.1.1	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
7.1.2	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
7.2	**Wastewater Generation During Operation**			
7.2.1	The grey water will be recycled to be re-used again in toilets and kitchens etc.	Proponent	Monitor compliance	During operation phase
7.2.2	Black water will be temporary stored in septic tanks and will be discharged into a nearby out fall sewer via trunk sewer	Proponent, CC	Monitor compliance	During design, construction & operation phase
7.2.3	Waste segregation measures would be employed to minimize entry of solid waste into the wastewater stream	Proponent	Monitor compliance	During operation phase
7.2.4	Water conservation strategies will be employed to avoid wastage of water	Proponent	Monitor compliance	During operation phase
8	**Solid Waste Generation and Management**			
8.1	**Solid Waste Generation and Management During Construction**			
8.1.1	Separate bins will be placed for different types of wastes- plastics, paper, metal, glass, wood, and cotton.	Proponent, CC	Monitor compliance	During construction phase
8.1.2	Recyclable material will be separated at source. The recyclable waste will be sold to waste contractors for recycling	Proponent, CC	Monitor compliance	During construction phase
8.1.3	Non-hazardous non-recyclable wastes such as construction camp kitchen wastes will be disposed off in landfill site through municipal administration or approved waste contractor.	Proponent, CC	Monitor compliance	During construction phase

8.1.4	No waste will be dumped at any location outside the proposed site boundary.	Proponent, CC	Monitor compliance	During construction phase
8.1.5	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 off through approved waste contractors.	Proponent, CC	Check hazardous waste disposal records	During construction phase
8.1.6	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.	Proponent, CC	Check waste records	During construction phase
8.1.7	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	Proponent, CC	Check waste record register	During construction phase
8.1.8	Training will be provided to personnel for identification, segregation, and management of waste	Proponent, CC	Check training records	During construction phase
8.2	**Solid Waste Generation and Management During Operation**			
8.2.1	Waste generation will be minimized by adopting waste management strategy of reduce, reuse and recycle	Proponent	Monitor compliance	During operation phase
8.2.2	A waste management plan will be prepared, implemented and monitored for the safe collection, storage and treatment/disposal of the waste	Proponent	Monitor compliance	During operation phase
8.2.3	Records of all waste generated will be maintained. Quantities of waste disposed, recycled, or reused will be logged on a Waste Tracking Register	Proponent	Check waste tracking register	During operation phase
8.2.4	Training will be provided to personnel for identification, segregation, and management of waste	Proponent	Check training records	During operation phase

8.2.5	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	During operation phase
8.2.6	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
8.2.7	Various waste containers for waste collection should be placed at appropriate locations in the vicinity	Proponent	Monitor compliance	During operation phase
8.2.8	Waste storage areas should be located within the facility and sized to the quantities of waste generated, with the following design considerations: Hard, impermeable floor with drainage, and designed for cleaning/disinfection with available water supply, Secured by locks with restricted access designed for access and regular cleaning by authorized cleaning staff and vehicles Protected from sun, and inaccessible to animals/Rodents Equipped with appropriate lighting and ventilation Segregated from food supplies and preparation areas Equipped with supplies of protected clothing, and spare bags/containers	Proponent, CC	Monitor compliance	During operation phase
9	**Seismicity**			
9.1	No specific mitigation measures other than to construct the facility in accordance with UBC Zone 2B	Proponent, Structure Design Consultant, CC	Monitor compliance	During project design phase
10	**Sustainability**			
10.1	Best practice of energy efficiency will be incorporated in the town development	Proponent, CC	Monitor compliance	During project design phase
10.2	Houses and other facilities to be constructed with high levels of thermal insulation	Proponent, CC	Monitor compliance	During project design phase

10.3	Ensure that HVAC system, refrigeration equipment and fire suppression equipment do not contain HCFC's or Halons	Proponent, CC	Monitor compliance	During project design phase
11	**Socio-Economic Impacts**			
11.1	Deliveries should be programmed to arrive and routed to minimize disturbance to residential areas, hospitals and offices.	Proponent, CC	Monitor compliance	During construction phase
11.2	Designated parking areas will be provided for different type of project vehicles within and around project site	Proponent, CC	Monitor compliance	During construction & operation phase
11.3	Areas earmarked for amenity and commercial infrastructure will not be used for other purposes after construction	Proponent	Monitor compliance	During construction & operation phase
11.4	Employment preference will be given to residents of the project area	Proponent, CC	Monitor compliance	During construction & operation phase
11.5	Local contractors will be given preference for hiring equipment and machinery during operation	Proponent, CC	Monitor compliance	During construction & operation phase
11.6	Ensure maximum quantity of water to be treated and reused in order to lessen its burden on the existing sewerage system.	Proponent	Monitor compliance	During design, construction & operation phase
11.7	Locals, surrounding business and city government are kept on the same page during all stages of the development of the project.	Proponent	Monitor compliance	During construction phase
11.8	A complaint register will be maintained on site during construction to record complaints of the nearby residents.	Proponent	Provision of complaint register	During construction phase

Table 7.2: Environmental Monitoring Plan

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
Operation	SOx, NOx, CO, O3, PM2.5, PM10 Lead, SPM	At the interface of project site and residential community	Quarterly	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
Operation	Heavy metals, TDS, TSS, pH, Total Coliform, Faecal Coliform	Drinking water sources	Quarterly	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 wastewater treatment plant	Monthly	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	WHO Noise Guidelines

		7 m from the equipment at construction site			
Operation		At the interface of project site & facing road	Quarterly		SEQS for Noise
		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	Waste generation rate, waste composition; recyclables and non-recyclables, hazardous waste	At waste transfer facility of the project site prior to off-site disposal	Quarterly	24-hour sample collected during week days and holidays	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.
Ambient Air (Operation)	(40,000 * 4) = 160,000	Cost for 1-year monitoring at 1 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
Drinking Water Quality (Operation)	(20,000 * 4) = 80,000	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 location @Rs.50,000/location
Wastewater (Operation)	(50,000 * 12) = 600,000	Cost for 1-year monitoring at 1 location @Rs.50,000/location
Noise Levels (Construction)	(1,000 * 4 * 12) = 48,000	Cost for 1-year monitoring at 04 locations @Rs.1,000/location
Noise Levels (Operation)	(1,000 * 4 * 4) = 16,000/-	Cost for 1-year monitoring at 04 location @Rs.1,000/location
Solid Waste (Construction/Operation)	10,000	Estimated cost for 1 year
Gaseous Emissions (Construction)	(1,500 * 1 * 6 * 4) = 36,000	Cost for 1-year monitoring at 1 location for 06 parameters @Rs.1,500/parameter
Gaseous Emissions (Operation)	(1,500 * 2 * 6 * 4) = 72,000	Cost for 1-year monitoring at 2 location for 06 parameters @Rs.1,500/parameter
Mitigation Measures (Construction)	500,000	Initial estimates
Mitigation Measures (Operation)	1,000,000	Initial estimates
Reporting	1,000,000	Initial estimates
Contingencies (5% of EMP cost)	500,000	-
Grand Total	**5,342,000**	-
Grand Total (in words)	**Five Million Three Hundred Forty-Two Thousand**	-

Chapter 8 Conclusion

Realizing that the city has overgrown its sustainability limits, it is imperative that the builders and developers takes 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. Their projects have so far been profit-oriented, now they will have to share the profit with net zero energy and net zero discharge approach in the project design.

Based on the findings of the EIA it is concluded that the environmental impacts of the construction and operation of "**Blue Sky Residency**" 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, water supply supplemented by filtration plant 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.

The study therefore recommends that the Environmental Impact Assessment (EIA) report should be approved with the provision that the suggested mitigation measures will be adopted and the Environmental Management Plan will be followed in letter and spirit.

ANNEXURES

Annex I: NOCs / Approvals

SINDH BUILDING CONTROL AUTHORITY
ONE WINDOW CELL

File No: Deh/PC-3/OWC/Arch:&Planning/2022/47 Dated: 19/04/2022

(ARCHITECTURAL CONCEPT PLAN)
(NOT VALID FOR CONSTRUCTION)

M/S. Almas Builders & Developers,
Mr. Hazoor Bux Gabol (42501-8309225-3)
& Others (Owner/Attorney/Partner)
Office address: 181, Mezzanine Gulfway Tower, plot H-1, Block-8, Main Clifton Road, Near Teen Talwar, Karachi.

Area of plot: 9680.00 Sq.yds
Gross covered area: 879074.64 Sq.fts
Net area after exemptions:515155.22 Sq.fts
Category: Commercial

Professional Team:-
1. Lic. Arch: Syed Junaid Iqbal (AL-01-791)
2. Lic. Engr. Rameez Bilwani (SE-06-316)
3. Lic. Site Engr: Rameez Bilwani (Civil/24028)
4. Membership of ABAD: (F.M. 2612)

Subject: - **PROPOSED ARCHITECTURAL CONCEPT PLAN IN RESPECT OF PLOT NO. NC-21, (02 ACRES) SECTOR:34-A, DEH DOZAN TAPPO GUJRO, SCHEME-33, KARACHI.**

Reference:- PROP-20220304-31, dated: 15-03-2022

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 has been issued as per Notification Issued by Director General, SBCA vide letters No. SBCA/PS-CE/2020/05, Dated: 27-7-2020, 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 plot admeasuring 9680.00 sq.yds for Basement-2 (ARS + Project Parking + Services) + Basement-1 (Visitor Parking + Services) + Ground Floor (Project Parking + Shops + Services) + 1st Floor Tower A, B & C (Recreation Area + Flats) + 2nd to 18th Floors Tower A, B &C (Flats) + 19th Floor Tower-B (Flats) + Roof (Solar Panel + Battery Room + Services) only with following terms and conditions: -

1. This approval is granted on the basis of title verification by the response to the letter No. SBCA/Title Verification Cell/AD/Arch:&Planning/2022/38, dated: 24-03-2022 by Deputy Director, OWC/ Arch.&Planning, SBCA. Reply has been received through portal vide letter No.DC/K(E)/ Rev.BR/972/2022, Dated: 14-04-2022, by the For Additional Deputy Commissioner-I, District East, Karachi alongwith vide letter No.Mukh/G.H/D(E)/499/2022, Dated:12-04-2022 issued by the Mukhtiarkar, Gulzar -e-Hijri, District East, Karachi.
2. This approval is granted as per revised layout plan issued by SMPA vide letter No. URP-33-754/Revised/SMPA/2021/UD/2022/1517/L, Dated: 13-04-2022, duly signed by Assistant Director, (UD-II) SMPA.
3. This Architectural Concept Plan is for Basement-2 (ARS + Project Parking + Services) + Basement-1 (Visitor Parking + Services) + Ground Floor (Project Parking + Shops + Services) + 1st Floor Tower A, B & C (Recreation Area + Flats) + 2nd to 18th Floors Tower A, B &C (Flats) + 19th Floor Tower-B (Flats) + Roof (Solar Panel + Battery Room + Services) only.
4. Parking in Basement-2, Basement-1, Ground Floor and Recreation Area at 1st Floor Tower A, B & C and shall not be misused under any circumstances.
5. This approval is granted with the condition that Air Raid Shelter provided as per provision of KB&TPR-2002 is for the use of allottees of Flats only in emergency condition and shall not be sale by owner/builder under any circumstance.
6. 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.

Continued on Page/2

7. 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.
8. In case of any complaint / dispute of any court matter the SBCA shall not be the party and shall not be the responsible.
9. Land escaping shall be provided as per KB&TPR-2002 (amended upto date).
10. Subject to condition that all constructional activities, supervision etc. shall jointly be the responsibility of professionals and owner / builder.
11. 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.
12. NOC / Clearance from Structure Section of SBCA to obtained before Final Construction permits.
13. 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 construction permit.
14. In case of any compliant / evidence regarding Sale / Booking of units without Sale NOC, this Architectural Concept Plan will be withdrawn and Builder License shall be cancelled by the Authority.
15. The owner is required to produce NOCs from Height Clearance from concerned authority & Valid Builder's License is required before construction permit or within 90 days from date of issuance of this letter.
16. 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.
17. 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.
18. Owner/builder will provide the List of previous project of Builder with details showing completion certificate to be produced before construction permit or within 90 days from date of issuance of this letter.
19. Owner/builder/Lic.Architect will produce all required NOCs and documents before final construction permit or within 90 days from issuance of this Architect Concept Plan otherwise said plan will be cancelled/Expired automatically without any notice.
20. 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.

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

19/4/22

19/04/22

Copy for information to: -

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

GOVERNMENT OF PAKISTAN
Ministry of Defence
Survey of Pakistan
Directorate of Map Publication
Tele: 051-9290207

(6)

No. 190/42-A-3 (DSCO)

Dated: 18 - 03 -2022.

To,

Mr. Muhammad Afzal,
"Almas Builder & Developer's"
CNIC # 42201-0248805-7,
Address: 181 Mezzanine Gulfwaay Tower,
Plot H-1, Block-8, Main Clifton Road, Near Teen Talwar,
KARACHI.
Contact No. 0334-3888947.

Sub: **PROVISION OF SITE CO-ORDINATES IN WGS-84:**

Ref:
i) Your letter No. Nil, dated Nil.
ii) DSCO letter No.152-T/42-A-2, dated 28-02-2022.
iii) 6 Party letter No. 780/42-A-3/Verify, dated 03-03-2022.

With reference to your letter cited above at Sl. (i) Following WGS-84, co-ordinates and heights of under mentioned site are sent herewith for further necessary action at your end, please.

Company/Station/Site Name	Point ID	Latitude	Longitude	A.M.S.L (Height in Meters)
ALMAS BUILDERS & DEVELOPER'S COMMERCIAL PLOT NO. NA CLASS NO.21, SECTOR 34-A DEH DOZAN TAPPO GUJRO SCHEME 33, KARACHI	MA-01	24°56'40.12"	67°09'05.04"	41.55
	MA-04	24°56'39.44"	67°09'05.82"	41.58
	MA-02	24°56'42.45"	67°09'06.97"	41.70
	MA-03	24°56'41.37"	67°09'08.07"	41.72

Nisar

(NISAR ALI HUSSAIN)
DEPUTY DIRECTOR
MAP PUBLICATION OFFICE
SURVEY OF PAKISTAN
RAWALPINDI

Copy for information & necessary action.

(i) The Director Southern Circle, Survey of Pakistan, Karachi.
(ii) Additional Director, Aerodrome Standards Branch, Headquarters Pakistan Civil Aviation Authority **(PCAA)**, Inspectorate Building, Jinnah International Airport, Karachi.
(iii) Assistant Director, Navigation, Directorate of Air Traffic Services **(ATS)**, Air Headquarters, Islamabad.

(2)

SSGC | Sui Southern Gas Company Limited

SSGC/Sales/Mains/NOC-057/2019

January 22, 2019

Mr. Hazoor Bux Gabol
Green Sone, Builders And Developers
Madina Royal Cottages, Survey No. 53, 54,55, Deh Dozan
Sector 34 A, Scheme 33, Near Safoora Chowrangi
Karachi.

Subject: ***PROVISIONAL NO OBJECTION CERTIFICATE***

Dear Sir,

This is with reference to letter No. 21-Dozen for issuance of No Objection Certificate (NOC) in respect of your proposed project at **Sector 34-A, Deh Dozan (Madina Royal Cottages) Scheme 33, Karachi.**

It is to inform you that gas requirements will be considered as and when you will actually need the connections subject to fulfilling the following conditions and prevailing Government / Company's policy.

1. The Provisional NOC is being issued at your request and not a commitment on SSGC part for supply of gas to the project in future.
2. On the basis of Provisional NOC, customer, authorized representative / residents will not be entitled to claim gas connection from SSGC.
3. Prevailing payment against gas main network will be charged on 100% recoverable cost basis, as per prevailing policy.
4. You will provide all required documents, Productions of the approved construction plan and / or the completion plan duly approved by the Sindh Building Control Authority, or Cantonment Board / Revenue Department / relevant authority along with property documents / attested sale deeds of the said area & CNIC copy.
5. Case will only be processed for distribution mains network on receiving formal application after verification of land documents from relevant authority and physical survey and completion of formalities.
6. Application will only be received from direct applicant / legal employee/legal representative.
7. No Objection Certificate (NOC) will be sent through courier at applicant's official address and will not be provided to agent.
8. You will undertake to provide required NOC, Road cutting permissions from relevant Authorities to SSGC at your cost.
9. You will arrange to keep an open and free passage from any protected work as safety distance applicable to gas main existing within or near the premises as per SSGC specification.
10. Gas supply to above project will be subject to prevailing GOP / Policy / Company policy and the availability of gas.
11. RLNG may be supplied (Subject to availability) to your project, as per prevailing GOP policy and tariff notified by OGRA / Competent authority.
12. The above conditions may be reviewed, modified by SSGC in future. SSGC reserves the right to withdraw NOC at any stage.

Kindly confirm for our record that these conditions are acceptable to you.

With regards,

Afeef Ahmed
General Manager (Sales)

(3)

Karachi Water & Sewerage Board

DIRECTOR BULK / GPS

RRG DEPARTMENT

9th Mile, Karsaz, Shahrae Faisal, Karachi

Phone: 99245159/99245152 Web:www.kwsb.gos.pkEmail:md@kwsb.gos.pk

No. Secy/NOC Committee/RRG/2019/ 302 Dated: 1.

The Deputy Director (UD-II)
Master plan department
Sindh Building Control Authority,
Karachi.

Subject: **NO OBJECTION CERTIFICATE.**

Ref: No. URP-33/754/MPD/2018/UP-198/L DATED: 30-05-2018
MR. HAZOOR BUX GABOL, KARIM BUX GAOL & M. RAMZAN GABOL, M/S. MADINA ROYAL COTTAGES ADMEASURING 02 ACRES, SECTOR 34-A DEH DOZAN, SCHEME-33

Whereas with reference to the above letter No. URP-33/754/MPD/2018/UP-198/L DATED: 30-05-2018 received from Sindh Building Control Authority Karachi along with copy of concept plan and title documents for issuance of NOC for the water and sewerage services by KW&SB.

Now therefore in the current circumstances of severe water shortage and inadequate sewerage services in Karachi, this NOC is being issued with the following conditions.

- This No Objection Certificate (NOC) is being issued at the request of Sindh Building Control Authority Karachi, with reference to the above cited letter subject to the payment of advance 25% of water and sewerage connection charges.
- Separate application for water connection will only be considered until full operational capacity (260 MGD) of Phase-I K-IV Project is obtained at the end terminals of distribution system, and the remaining 75% of the water connection charges prevailing at that time, is adjusted / paid by the applicant along-with other applicable charges if any.
- Use of any alternate source of water i.e. sub-soil water etc. for any purpose will also be subject to approval from KW&SB under sub-soil water regulations for which separate application is required which will be examined & processed accordingly.
- The NOC issued to the construction site where the change of land use is permitted / allowed by SBCA in conformity with the approved Master Plan and in line with Supreme Court orders.
- The SBCA shall not issue completion plan / occupancy certificate to the project until the water / sewerage connections are provided by KW&SB to the said premises.
- The Builder / Developer shall not let the premises occupy in case the utility connections are not provided.
- KW&SB reserves the right to with draw this NOC at any stage.

Secretary,
NOC Committee, KW&SB

Copy to:

1. Managing Director, KW&SB.
2. Dy. Managing Director (TS) / Convener.
3. Dy. Managing Director (RRG), KW&SB.
4. Builder / Owner of Project.

(4)

K ELECTRIC LIMITED

Office & Postal address: 4th Floor K.E Building Civic Centre
Gulshan-e-Iqbal, Karachi

Letter — External

Recipient:

Hazoor Bux & Karim Bux & M.Ramzan Gabol
M/s MADINA ROYAL COTTAGES
Site office : DEH Dozan Sector 34-A,
Sec-33, Near Safoora Chowrangi,
Adjacent Mualium Housing Society,
Karachi.
Tel : 0321-122-4301 / 0300-374-40775

Name	Syed Shafqat Amim
Business Unit	New Connection (P) R-3 & 4
Location	4th Floor, KE Bldg, Civic Center
Tel No.	021-111 537 211 Ext: 6422 / 6564
Fax	
Email	shafqat.amim@ke.com.pk
Your Ref No.	
Our Ref No	NC EP (A-80) / P/NOC/18/13046
Date	11-September-2018

Subject: **Request for No Objection Certificate for M/s MADINA ROYAL COTTAGES at Plot No Land Admeasuring 02 Acres, Sector 34-A, Deh Dozan, Scheme-33, Karachi (in Favour of Hazoor Bux Gobal, Karim Bux Gabol & M. Ramzan Gobal).**

This refers to your request received in new connection on 16th July, 2018, we would like to inform you that supply of electric connection for the premise mentioned above would depend upon the loading condition of 11 kV network prevailing in the area at the time of preparation of electrification scheme. The applicant will not ask for provision of supply in case K-Electric is unable to provide due to technical feasibility and will have to wait till the system may become feasible. K-Electric shall prepare electrification scheme as per prevailing policy at the time of applying for permanent connection and applicant will have to pay scheme cost, Security Deposit (SD), Shut down Charges etc. and also have to bear the cost of diversion of underground cable (if any). They will also have to clear the dues of all existing meters (if any).

Moreover for the save guard of the K-Electric installations, applicant will have to inform our relevant E.H.T/ HT UG cable department prior to any excavation work inside and outside their premises. **As per load demand, applicant has to provide one (01) substation space of (02) rooms having min. space (30' front x 20' width x 12' Height) as per KE standards & specifications (must be on Ground floor).** The subject substation must be on road facing and no pillar, ramp, drainage line will pass through it. The size of substation may vary as per policy applicable at that time and assessed load of the entire building.

Please note that case for the above mentioned plot will be processed subject to approval of building plan from concerned civic agency, i-e, clearly mentioning no. of floors. As per orders from court, construction will be carried out as Ground + 06 floors and NOC is given for subject mentioned floors only.

In view of the above, please submit revised plan showing Substation Location as mentioned above enabling KE to issue requested NOC.

K-Electric assures the best services at all the times

Regards,

13/9/2018

Kashif Raza
AM (Planning)
New Connection Central Region

13/09/2018

Syed Shafqat Amim
Manager (Planning)
New Connection Central Region

cc:

- GM New Connection,

New Connection Helpdesk:

Email: shafqat.amim@ke.com.pk
Tel No: 021-38709132 (Ext: 5422)

Visiting Hours for Actual Applicants or Authorized Representatives only:
Mon to Thu: 10:00 AM – 12:30 PM & 02:00 PM – 05:00 PM

(7)

(DEFUNCT MASTER PLAN DEPARTMENT)

9th Floor, Civic Center, Gulshan-e-Iqbal, Karachi.

No.URP-33-754/ Revised/SMPA/2021/UD:04/2. Dated: 04.-01-2022.

Deputy Commissioner,
Office of Dy. Commissioner (East), Karachi.

SUB: Approval for Restoration and Revision of Layout Plan for Commercial Land admeasuring 02 Acres , Sector 34-A, Deh Dozar , Scheme-33, Karachi in favor of Muhammad Afzal, Special Power of Attorney for Hazoor Bux Gabol, Karim Bux Gabol & M.Ramzan Gabol.

Ref.

1. Forwarding letter of Addl. Commissioner-I for D.C Karachi East DC/K(E)/Rev.Br/LOP/63/2018 Karachi dated 10-05-2018 , Forwarding letter of Assistant Commissioner vide No. AC/G.H/SCH-33/735/2018 Dated 25-04-2018.
2. Letter from the Mukhtiarkar, Gulzar-e-Hijri, Karachi East, vide No. MUKH/G.H/SCH-33/412/2018 dated 25-04-2018, entry no. 101 in favor of Hazoor Bux Gabol and two others.
1. varification of ownership as well as entry number by Addl. Commissioner-I letter DC/(E)/LOP/ Rev.Br /35/2019 Karachi dated 27-06-2019 through Letter from the Mukhtiarkar, Gulzar-e-Hijri, Karachi East, vide No. MUKH/G.H/SCH-33/102/2019 dated 30-01-2019 addressed to AC w.r.t Dy Director Gulshan-1 SBCA letter dated 4-9-2018 & correction letter by Mukhtiarkar, Gulzar-e-Hijri, Karachi East, vide No. MUKH/G.H/SCH-33/426/2019 dated 26-06-2019 for entry no. 95/103 dated 26-06-2009 in favor of Hazoor Bux Gabol & others .Verification/Clarification of ownership letter from Addl. Commissioner-I for D.C Karachi East DC/K(E) LOP/Rev.Br/ 35/2019 Karachi dated 27-06-2019 .
3. Regularization of land by LU & sold two acres to Mrs. Amina by Moin Maniar (exchangy kaboli land in Sector 34-A from Deh Thoming, exchange letter dated 30-07-1991) detail vide LU Letter No.03-43-02/SO-I/298 dated 01-03-2008 .
4. Sale Deed dated Feb-2009 , R No.1073 between vendor M.Sadiq,Abdul Rashid ,M. Rafiq jumma, Mrs .Amina (through Attorney M.Yousaf & M.Shabbir) , Rafiq Aboo Bakar & Abdul Razzak (through Attorney M.Asif) vendee Hazoor Bux Gabol, Karim Bux Gabol & M.Ramzan Gabol .
5. NOC for sale by Revenue Office to M.Sadiq,Abdul Rashid ,M. Rafiq jumma,Mrs .Amina, Rafiq Aboo Bakar & Abdul Razzak vide No. No.MUkh/ACSO/Sch-33/8/2009 dated 3-1-2009 .Vrification of Documents by Mukhtiyarkar to Sub-Registrar –II Gulshan Town vide No.MUkh/ACSO/Sch-33/83/2009 dated 30-1-2009 in favor of M.Sadiq & Abdul Rashid & four others .
6. Copy of Deh Form-II, comorising 02-acres in favour of M.Sadiq,Abdul Rashid ,M. Rafiq jumma,Mrs .Amina, Rafiq Aboo Bakar & Abdul Razzak Deh Farm-II vide entry No 95/18 and Copy of Deh Form-II entry No. 95/101 in favour of Haji Hazoor Bux Gabol ,Karim Bux Gabol ,M.Ramzan Gabol .

04/01/2022

(DEFUNCT MASTER PLAN DEPARTMENT)

9TH Floor, Civic Center, Gulshan-e-Iqbal, Karachi.

7. Copy for Special Power of Attorney, regarding ownership ,vide Serial No.28563 dated 15-10-2021 in favor of Muhammad Afza Muhammad Akram, Resident of House No.731, Sector S-1, Malir Saudaabad Karachi.
8. Prvious NOC issued vide this Office letter No.URP-33-754/MPD/2019/UD:173/L dated 24-07-2019.Cancelled on the request of the owner vide letter bearing NO.286 dated04-11-2019.
9. Aplication for subject Restoartion & Revision vide of Senior Director, Sindh Master Plan Authority-SMPA/MPD vide diary No.1810 dated: 15-11-2021.

With reference to your above cited forwarding Letters, it is to inform you that the subject case regarding **Approval for Restoration and Revision of Layout Plan for Commercial Land admeasuring 02 Acres , Sector 34-A, Deh Dozan , Scheme-33, Karachi in favor of Muhammad Afzal, Special Power of Attorney for Hazoor Bux Gabol,Karim Bux Gabol & M.Ramzan Gabol** has been examined in this Office and the Competent Authority has approved the said Layout Plan vide Para- 39 of Noting Page-06. The undersigned is directed to issue **No Objection Certificate from Planning Point of view only**, subject to the following terms & conditions:

1. **Subject to clear title of the land, land-use & area , if there is any mis- representation of the facts regarding the ownership, inform accordingly, subject to MPD, SBCA Letter No. SBCA/MPD/Scheme-33/2019/UD: 273/L dated 21-10-2019 , letter bearing No.340/L dated 26-12-2019 & New forwarding letter bearing No.209/L dated 31-08-2020 & letter regarding suspicious entries by Directorate (E & I) BOR Sindh dated 12-05-2020 bearing No. D(E& I)/2020/306.**
2. Based on forwarding Letters of Lessor / Addl. DC, AC & Mukhtiarkar, as referred above.
3. This NOC is being issued from technical / planning point of view only. The Builder / Owner / Attorney must / shall obtain **'Sale NOC'** from the concerned authority / regulator (e.g. Design Section, SBCA) before announcing / advertising any public sale project on the subject land.
4. This NOC shall be valid for two years.
5. If the subject area comes in any already approved Layout plan or any litigation, then the subject approval shall automatically be treated cancelled without any notice.
6. Subject to clearance of payment of Outer Development Charges (ODC) by the Sponsor/Owner/Attorney to the Concerned Authority i.e. Revenue, BOR.
7. Outer boundary of the said land shall be demarcated through the concerned Revenue Office in coordination with Additional Director (W&S), Scheme-33.
8. All relevant Rules, Regulations of Karachi Building & Town Planning Regulation -2002 up-to date shall be applicable.
9. Necessary approval on Form MP-I shall be obtained from the SBCA before Sale advertisement, construction and development of the Project, after verification of NOC from SMPA and Payment of ODC to the Revenue Office, BOR in this regard.

04/11/2021

(DEFUNCT MASTER PLAN DEPARTMENT)

9TH Floor, Civic Center, Gulshan-e-Iqbal, Karachi.

10. Individual Building Plan shall be got approved from SBCA in accordance with approved Layout from MPD and Sale NOC from regulator.
11. Internal development of the entire land shall be done by the Sponsor/Owner/Attorney according to the approved Layout Plan.
12. Necessary approval from utility Agencies shall be obtained.
13. Overhead / Underground Services, if passing through the land, shall be taken care of by the Sponsors/Owner/Attorney/Builder.
14. Subject to all conditions accepted by the Owner/Applicant/attorney in the Undertaking submitted 15-10-2021.
15. Right of way of Super Highway/Sectoral roads, its reservations and all future Roads/Services reservations passing through the said project shall be maintained by the Sponsors/Owner/Attorney/Builder.
16. In case if any dispute, litigation, controversy arises with the Revenue Office, High Court, NAB, Ombudsman, Anti-corruption **regarding the Ownership & sale of plot** on the said land, the same shall be sorted out by the sponsor / owner/ attorney themselves and MPD, Karachi will not be responsible in any manner.
17. In case of misrepresentation and concealment of facts that comes into the notice of MPD, regarding the **ownership, land-use, area and/or Sale of plots** on subject land, the approval of Layout Plan shall be cancelled by the MPD, SBCA, without any notice.
18. Sponsor / owner/ attorney/builder shall abide all the Rules & Regulations and follow the instructions issued by the MPD, SBCA from time to time.
19. In case of any mis- representation of the facts and violation of terms & conditions, this NOC shall be withdrawn without any notice.

04/11/2

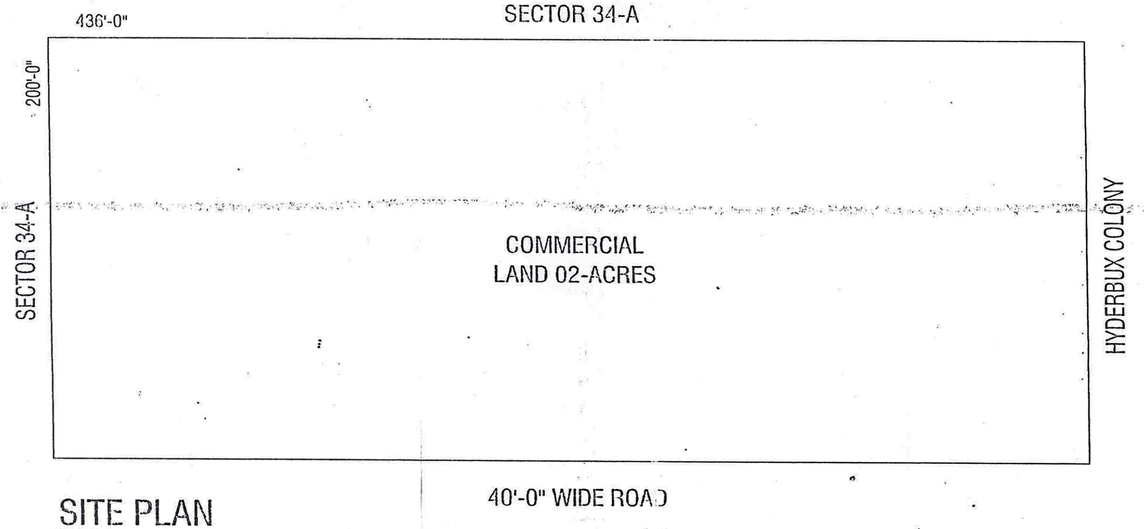
Dy. Director (UD-II), MPD

Encl: Copy of NOC along-with copy of Layout-plan is forwarded for information and necessary action to:-

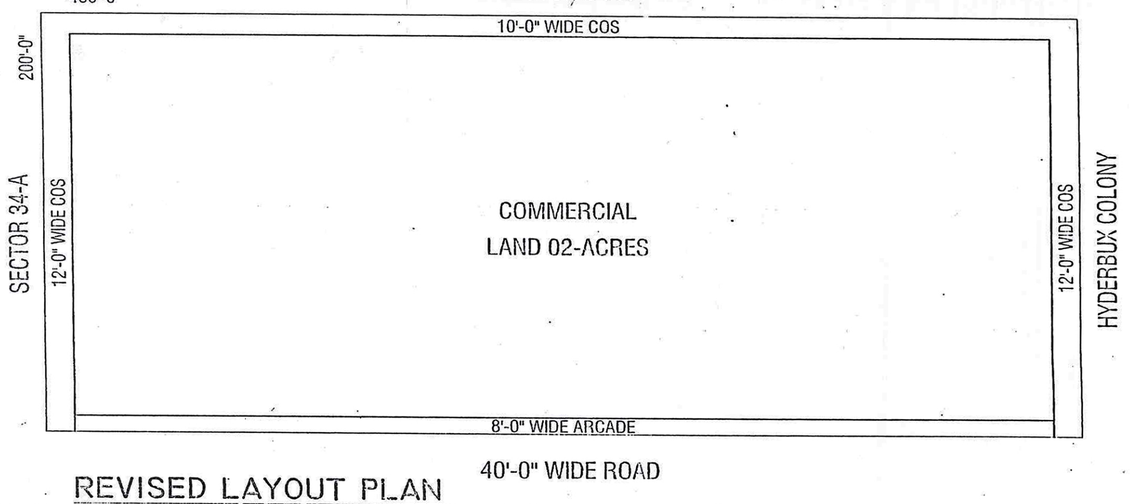
Copy to:

i. The Sr. Director, SMPD.
ii. Project Director, Scheme-33.
iii. Secretary to Director General, SBCA
iv. Director / Controller of Building (Gulshan Town-I) SBCA.
v. Director (Design & Complaints), SBCA
vi. Mrs. Amina R/o House No.S-A,Fernadus Luxury Apartments, Stadium Road, Bahadurabad, Karachi
vii. Hazoor Bux Gabol,Karim Bux Gabol & M.Ramzan Gabol , Village Paryo Gabol ,UC-13, Safora ,34-A, Deh Dozan , Scheme-33 Karachi
viii. M.Sadiq,Abdul Rashid ,M. Rafiq jumma,Mrs .Amina (through Attorney M.Yousaf & M.Shabbir) , Rafiq Aboo Bakar & Abdul Razzak (through Attorney M.Asif) address: Village Paryo Gabol ,UC-13, Safora ,34-A, Deh Dozan , Scheme-33.
ix. Attorney Muhammad Afzal, Resident of House No.731, Sector S-1, Malir Saudaabad Karachi.

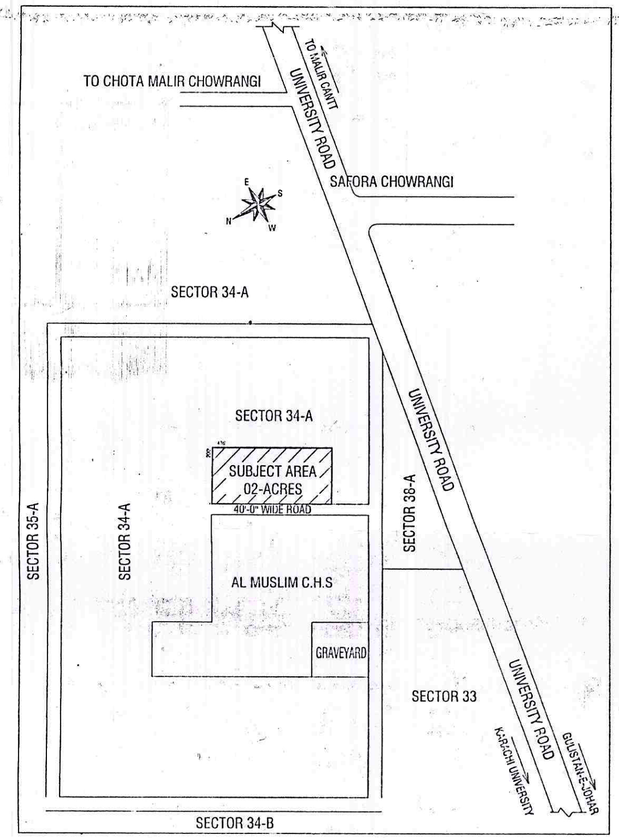
Annex II: Site Plan



SITE PLAN



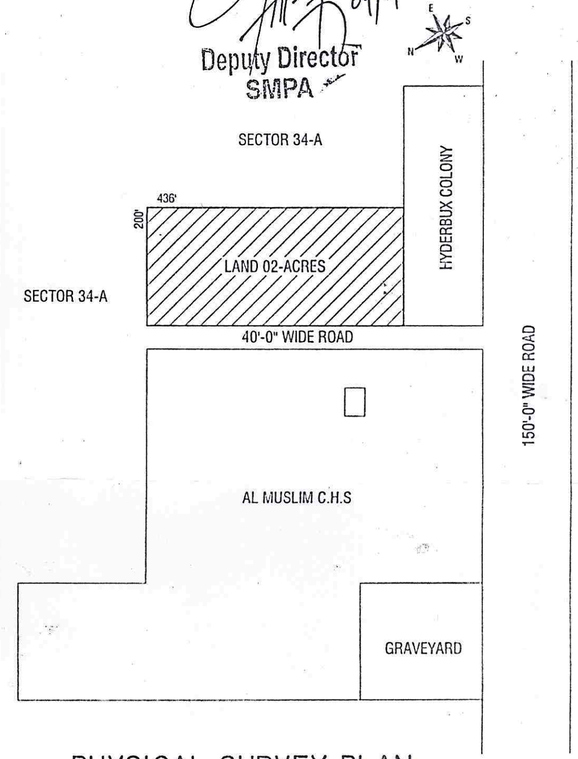
REVISED LAYOUT PLAN



LOCATOPN PLAN

Sindh Master Plan Authority
Master Plan Department Karachi.
No Objection Certificate from Planning Point of view with the condition vide letter
No: DRP-33-354 (Revised) SMPA/2021/UD: 041/1
Dated: 04-01-2022

04/1/2022
Deputy Director
SMPA



PHYSICAL SURVEY PLAN

SCHEDULE OF AREA

PLOT AREA.	=	9688.89 SYD
C.O.S AREA.	=	991.11 SYD
ARCADE AREA.	=	366.22 SYD

TITLE:

REVISED LAYOUT PLAN FOR COMMERCIAL LAND 02- ACRES DEH DOZAN, SECTOR 34-A, SCHEEM-33.

OWNER/ATTORNEY.

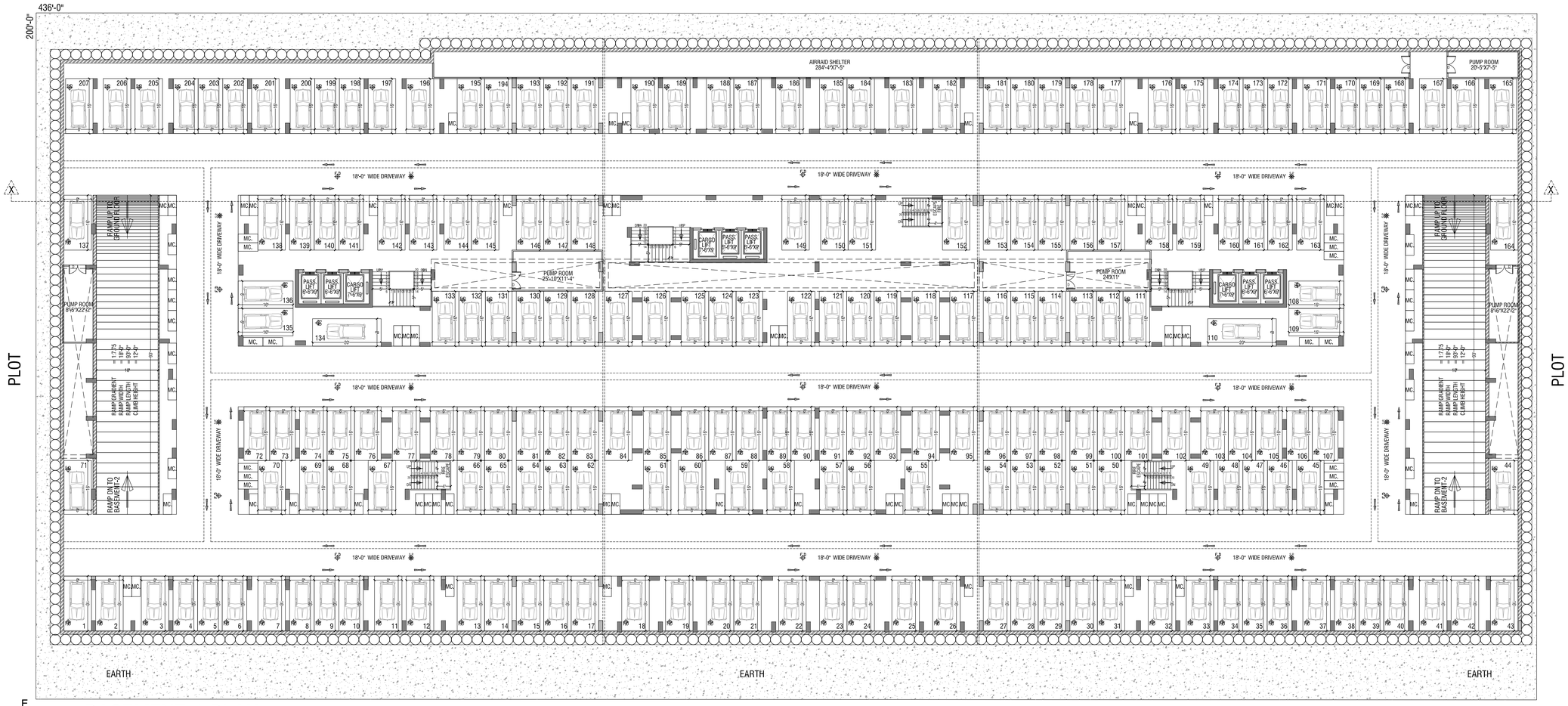
MUHAMMAD AFZAL S/O MUHAMMAD AKRAM

TOWN PLANNER.

Town Planner Anis Samoo
B.CRP, M.PCATP and M.IPP
License, SBCA
(No.TP-02-59

Annex III: Submission Drawings

PLOT



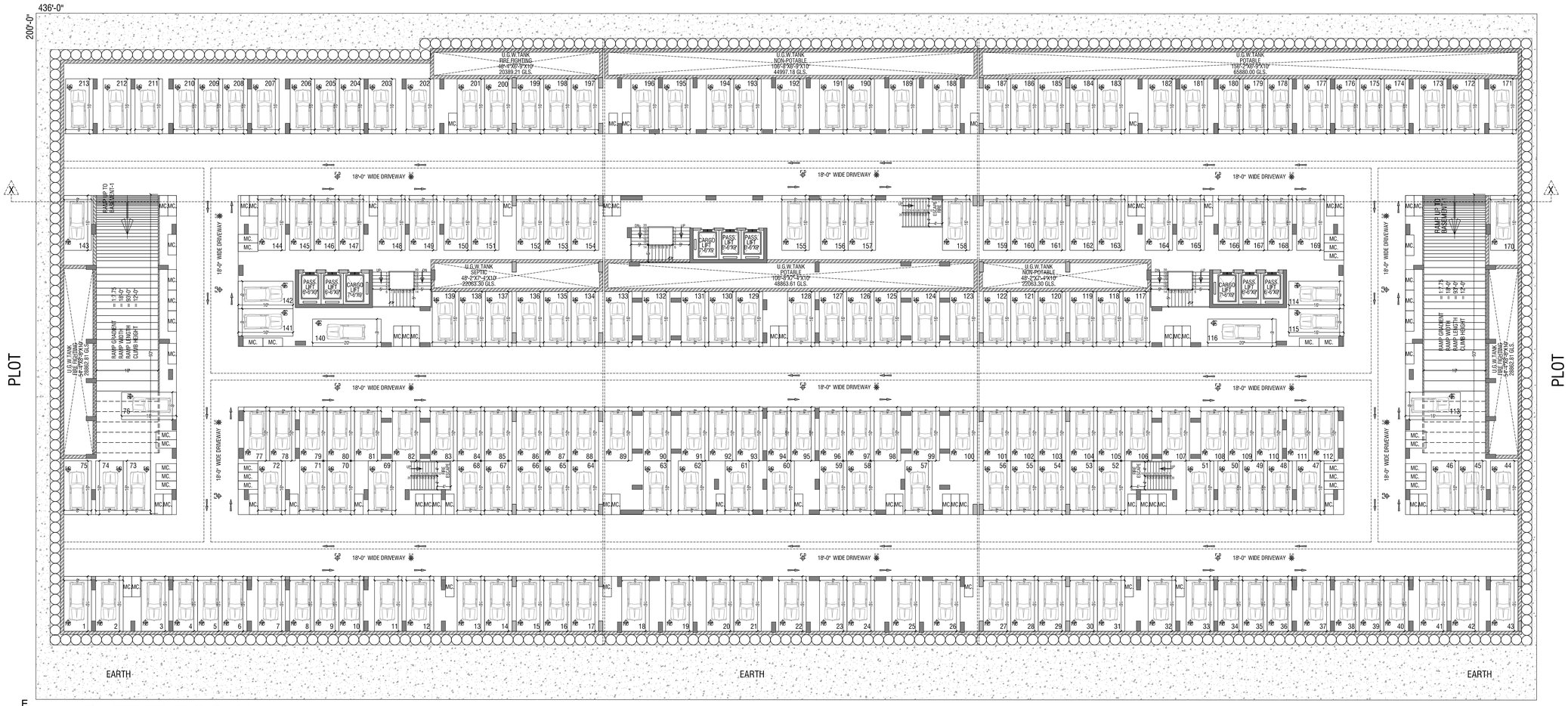
E N S W

BASEMENT-1 PLAN (VISITOR PARKING)

TOTAL NO. OF CARS = 207
TOTAL NO. OF M/C. = 210

40'-0" WIDE ROAD

PLOT



E N S W

BASEMENT-2 PLAN (PROJECT PARKING)

TOTAL NO. OF CARS = 213
TOTAL NO. OF M/C. = 215

U.G.W.TANK POTABLE = 114743.61 GLS.
U.G.W.TANK NON-POTABLE = 67060.48 GLS.
U.G.W.TANK FIRE FIGHTING = 78114.83 GLS.
U.G.W.TANK SEPTIC = 22063.30 GLS.

40'-0" WIDE ROAD

ADDRESS:

PROPOSED BUILDING PLAN ON PLOT NO. NC-21 (02-ACRES), SECTOR 34-A, DEH DOZAN, TAPPO GUJRO, SCHEME-33, KARACHI.

NORTH:

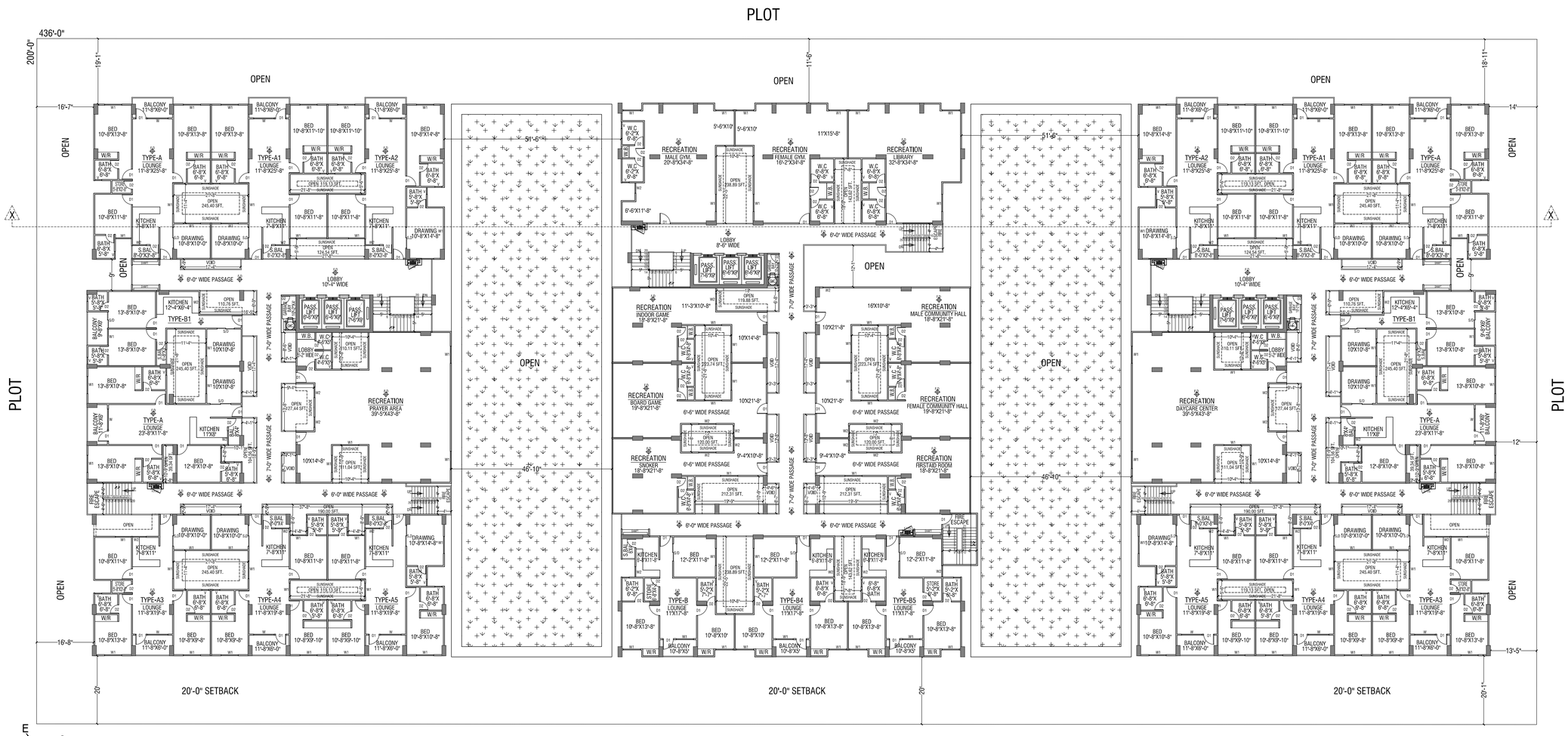
E N S W

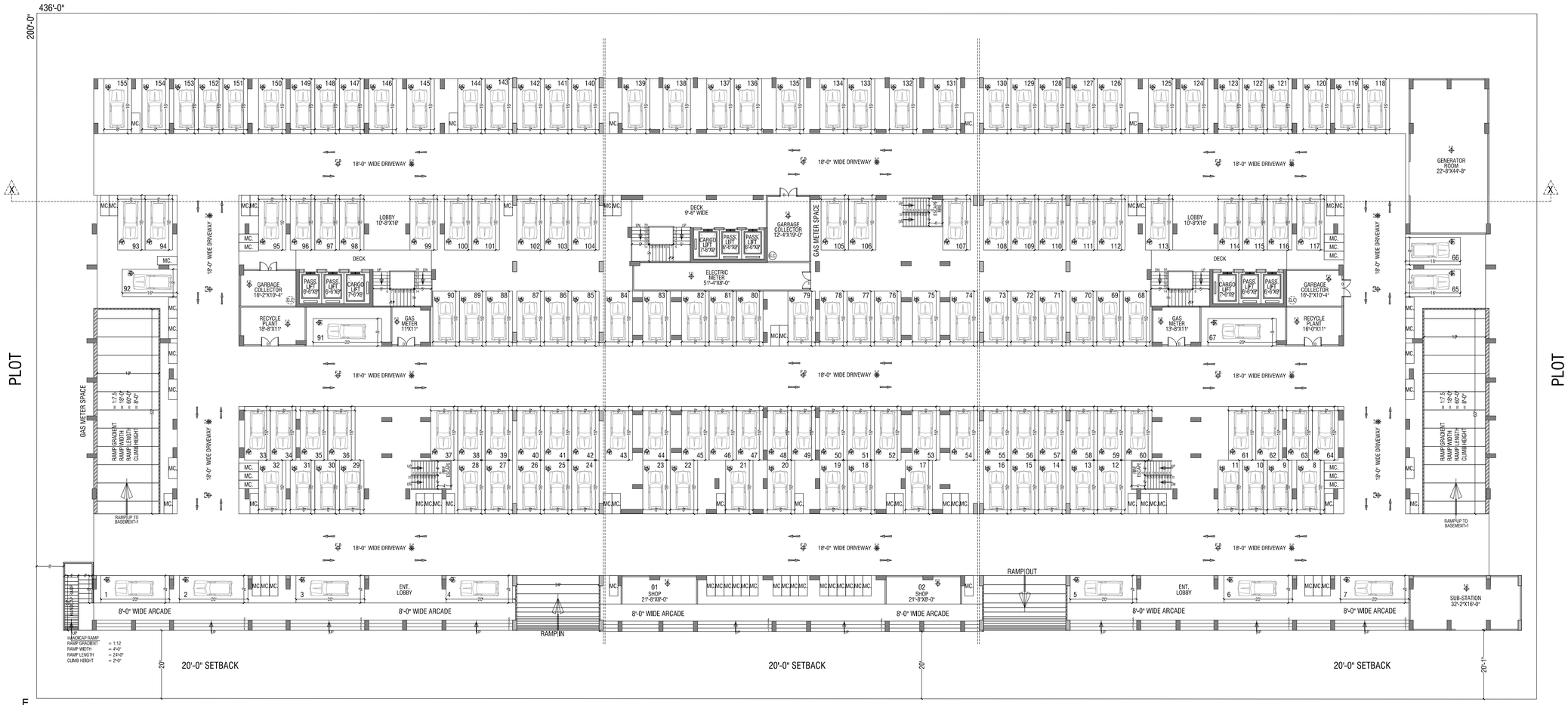
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DRAWN BY:	S.R
DRG NO #	01/07

OWNERS / PARTNER / ATTORNEY :

LIC. ENGINEER:

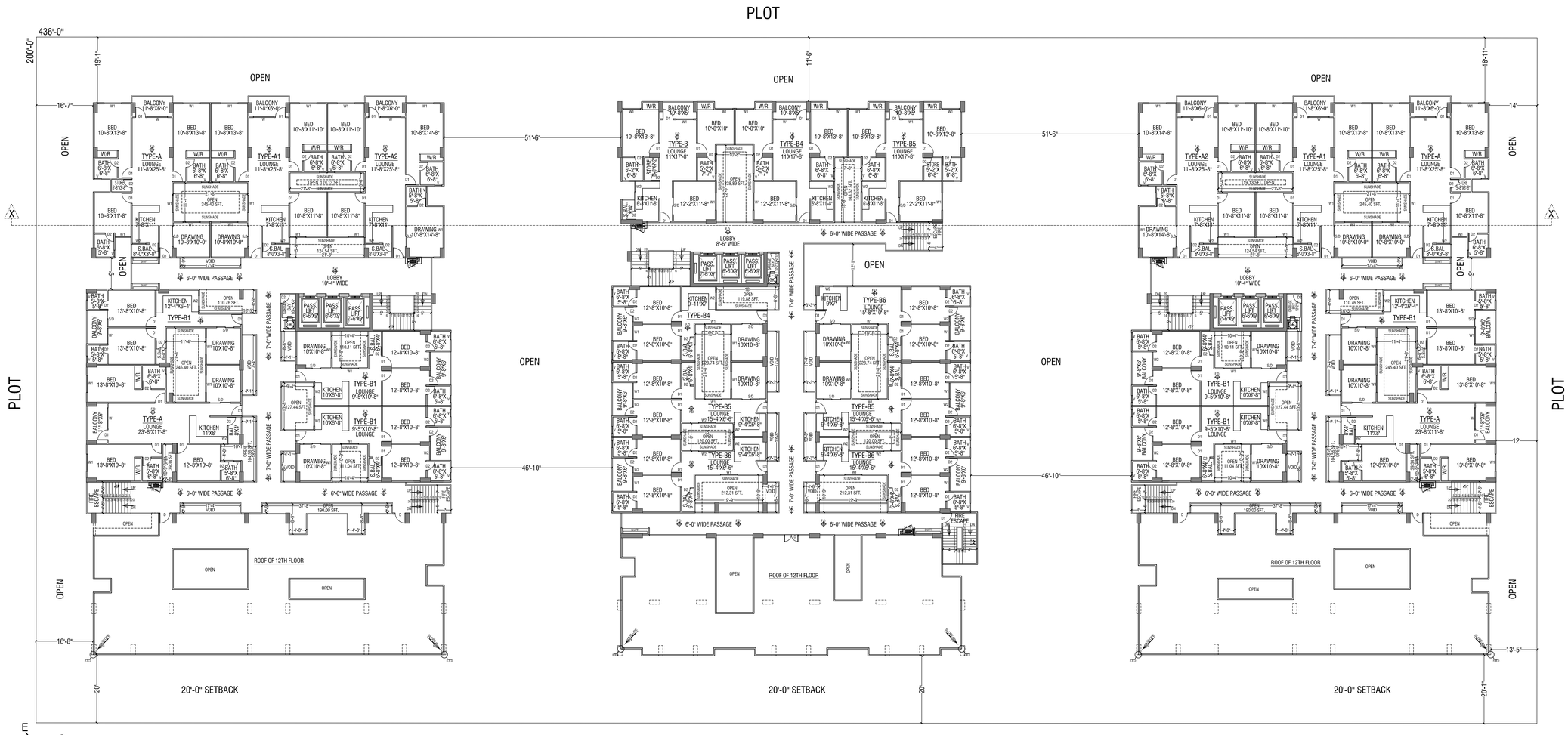
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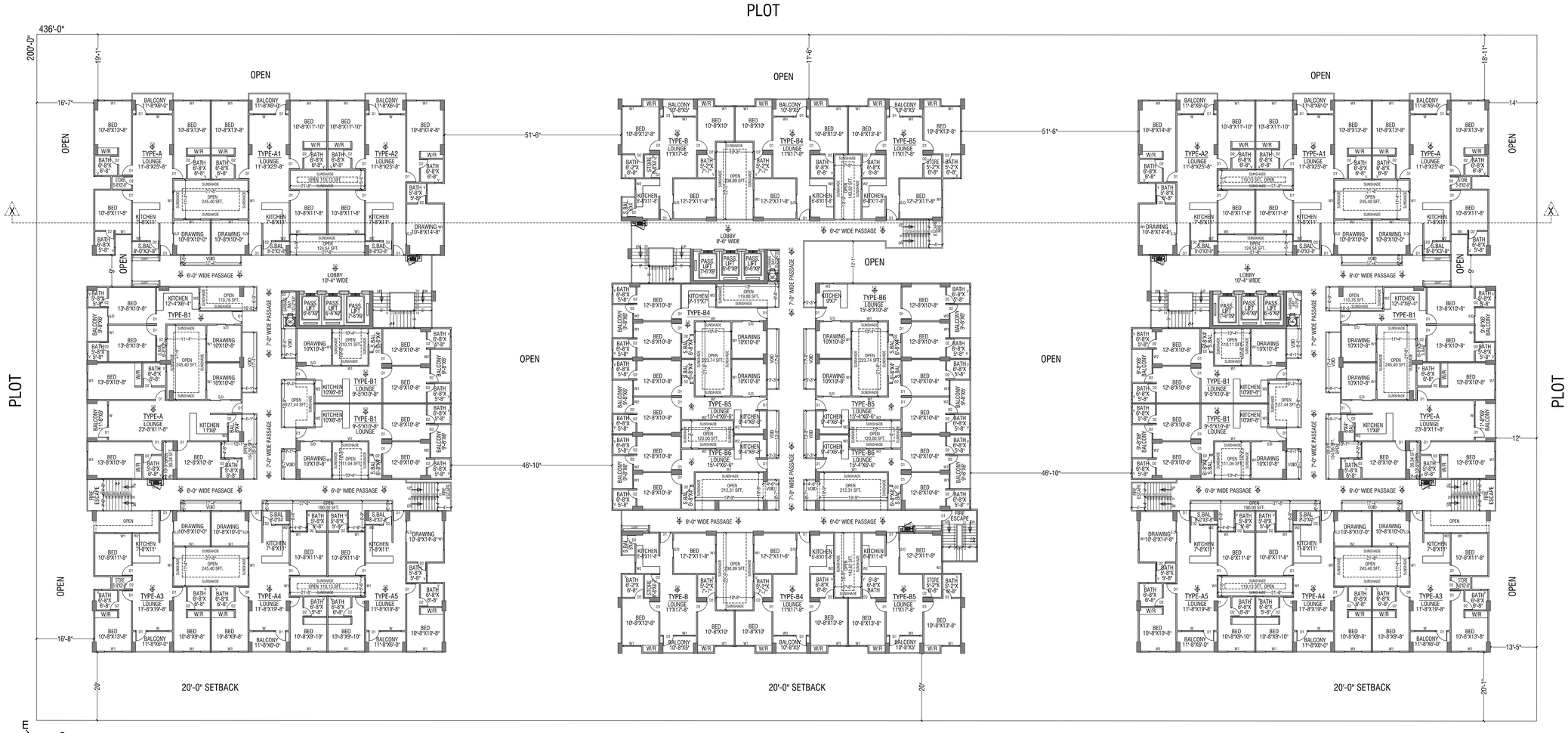
ADDRESS: PROPOSED BUILDING PLAN ON PLOT NO. NC-21 (02-ACRES), SECTOR 34-A, DEH DOZAN, TAPPO GUJRO, SCHEME-33, KARACHI.	NORTH:	SCALE: 1/16"=1'-0" DRAWN BY: S.R DRG NO # 02/07	OWNERS / PARTNER / ATTORNEY :	LIC. ENGINEER: / LIC.ARCHITECT:

M:\SULAIMAN BHAI PLOT#2 ACRES\SUBMISSION.DWG / PLOT DATE : Monday, April 25, 2022 12:39:54 PM / PLOT SCALE : 1/16" = 1'-0" / LOGIN NAM



13TH. TO 18TH. FLOOR

TOTAL NOS OF FLAT 23 X 06 = 138



2ND TO 12TH FLOOR PLAN

TOTAL NOS OF FLAT 32 X 14 = 448

ADDRESS:

PROPOSED BUILDING PLAN ON PLOT NO. NC-21 (02-ACRES), SECTOR 34-A, DEH DOZAN, TAPPO GUJRO, SCHEME-33, KARACHI.

NORTH:

SCALE:	1/16"=1'-0"
DRAWN BY:	S.R
DRG NO #	03/07

OWNERS / PARTNER / ATTORNEY :

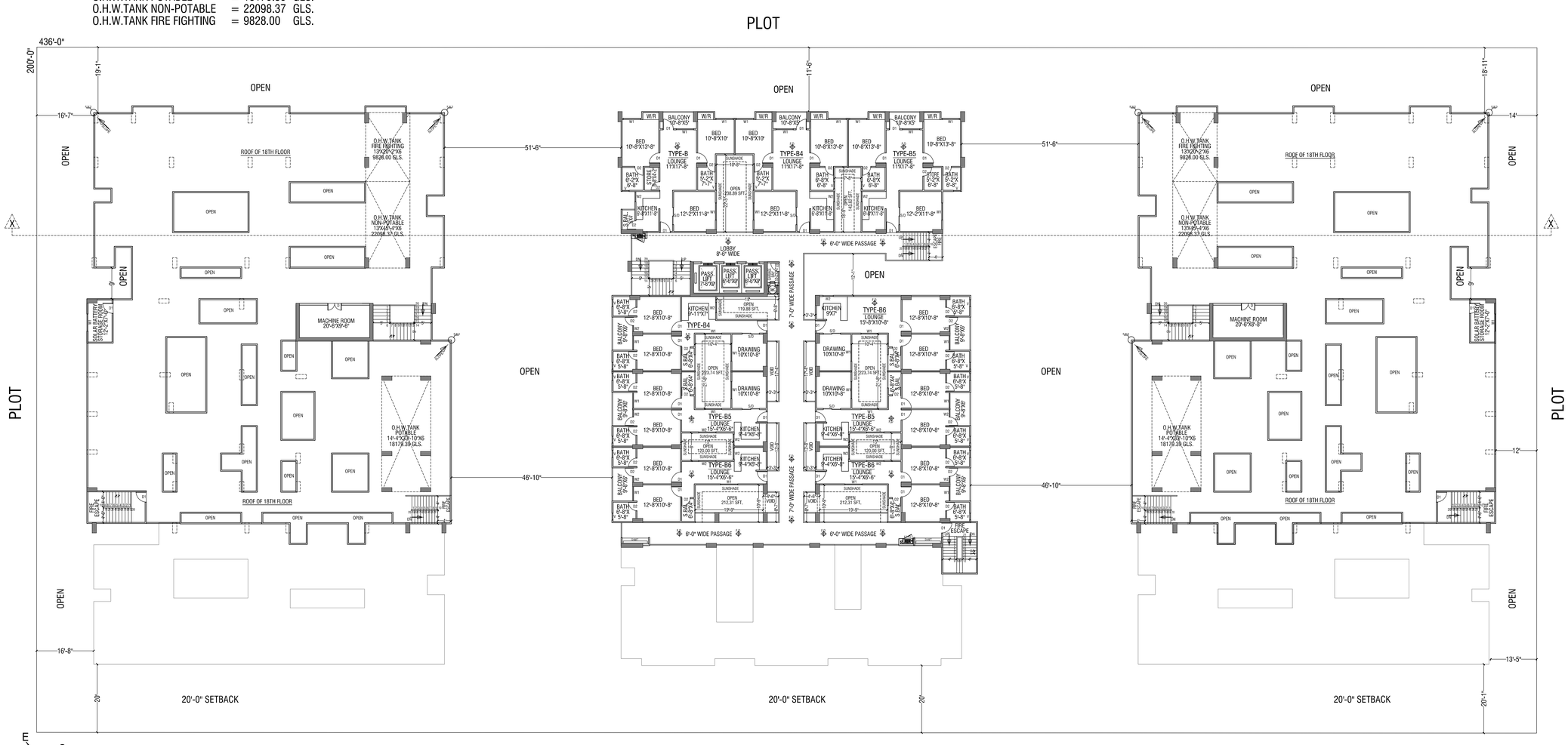
LIC. ENGINEER:

LIC.ARCHITECT:



ROOF PLAN

O.H.W.TANK POTABLE = 18179.39 GLS.
O.H.W.TANK NON-POTABLE = 22098.37 GLS.
O.H.W.TANK FIRE FIGHTING = 9828.00 GLS.



19TH. FLOOR

TOTAL NOS OF FLAT = 09
O.H.W.TANK POTABLE = 36358.78 GLS.
O.H.W.TANK NON-POTABLE = 44196.74 GLS.
O.H.W.TANK FIRE FIGHTING = 19656.00 GLS.

ADDRESS:

PROPOSED BUILDING PLAN ON PLOT NO. NC-21 (02-ACRES), SECTOR 34-A, DEH DOZAN, TAPPO GUJRO, SCHEME-33, KARACHI.

NORTH:

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

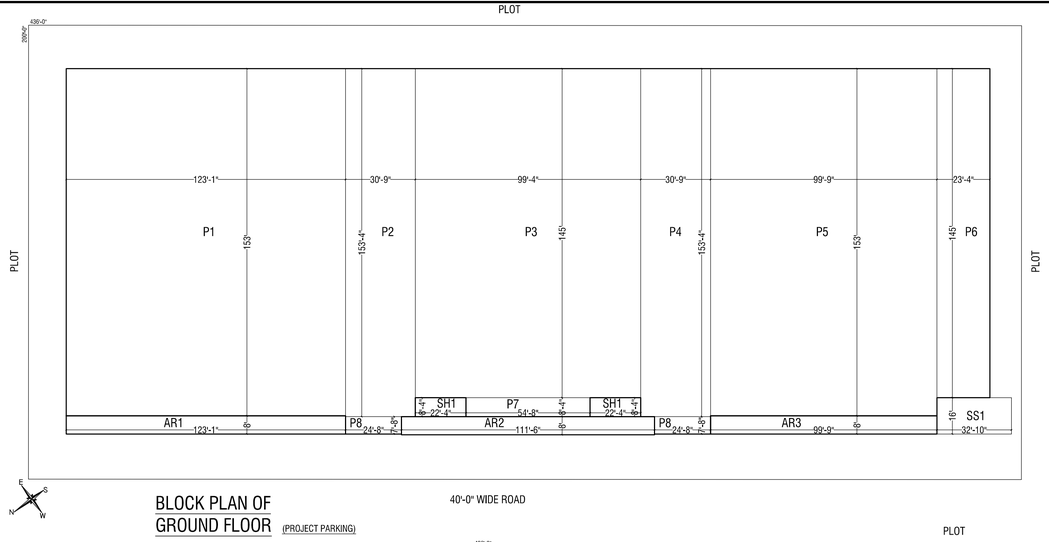
DRAWN BY: S.R

DRG NO # 04/07

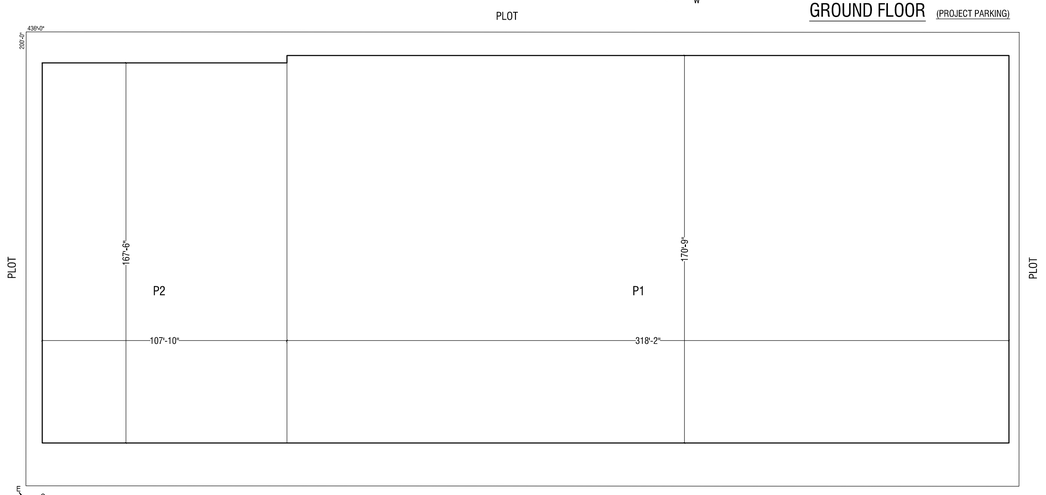
OWNERS / PARTNER / ATTORNEY :

LIC. ENGINEER:

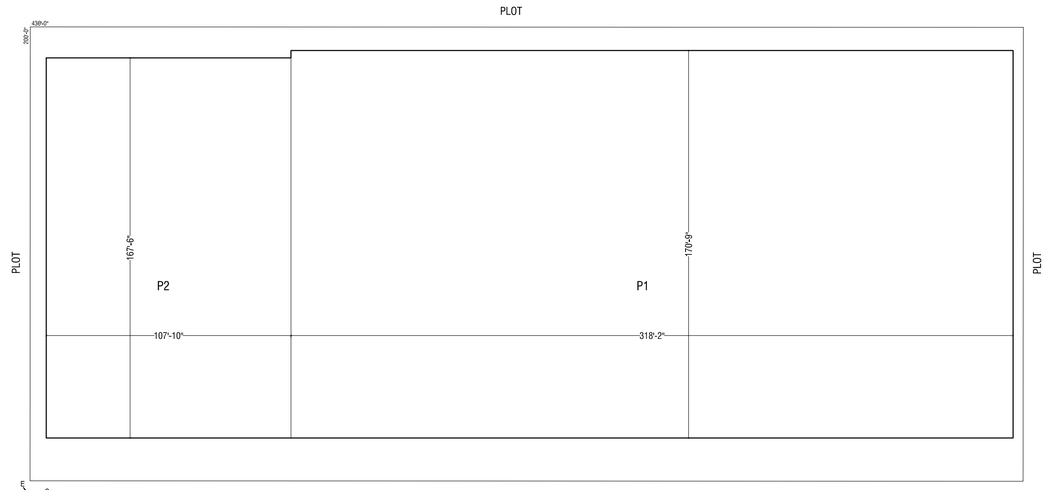
LIC.ARCHITECT:



BLOCK PLAN OF GROUND FLOOR (PROJECT PARKING)



BLOCK PLAN OF BASEMENT-2 (PROJECT PARKING)

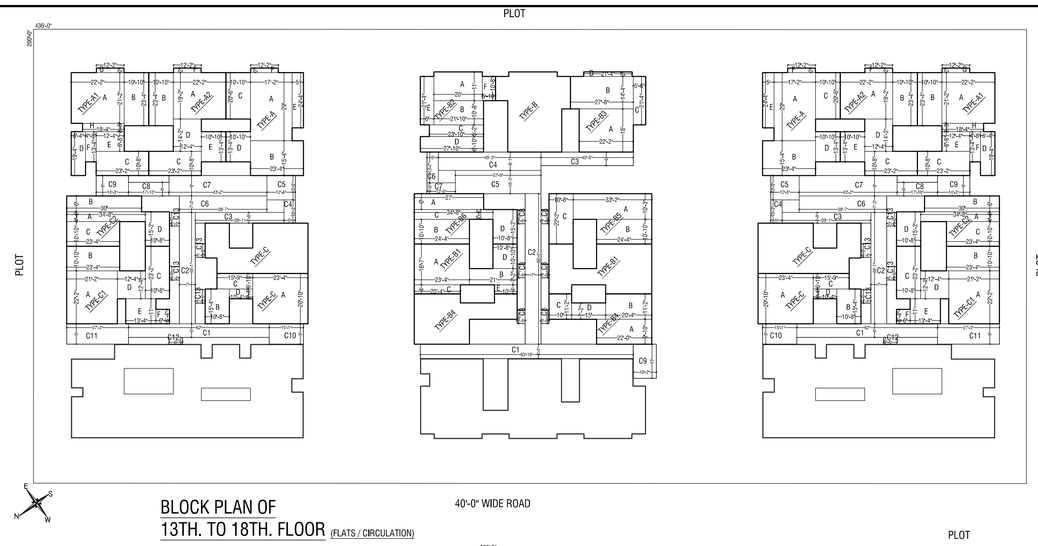


BLOCK PLAN OF BASEMENT-1 (VISITOR PARKING)

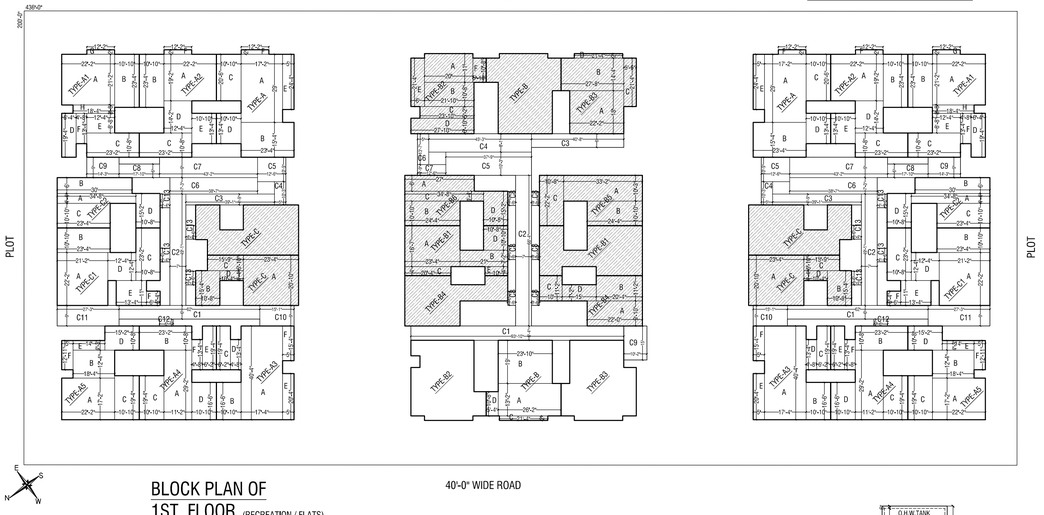


FRONT ELEVATION

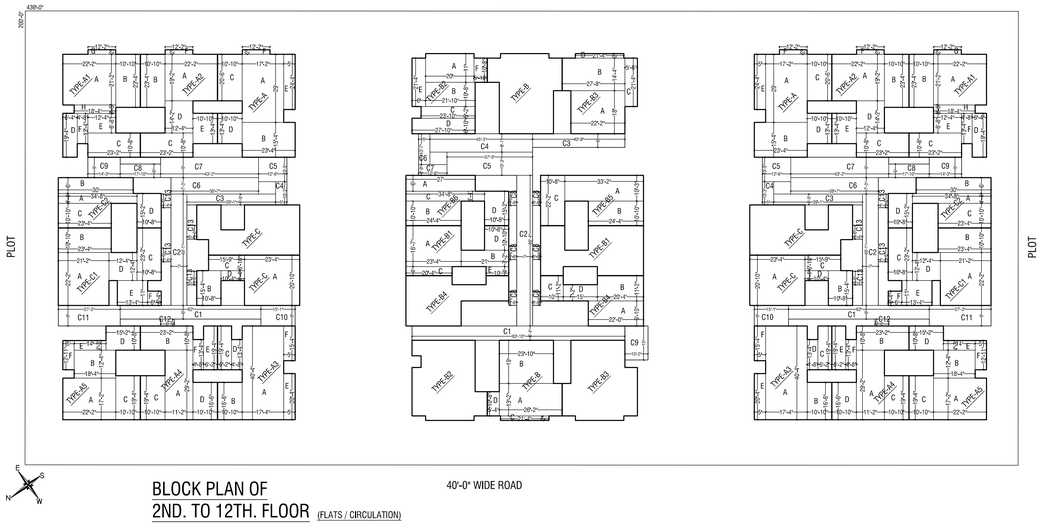
ADDRESS: PROPOSED BUILDING PLAN ON PLOT NO. NC-21 (02-ACRES), SECTOR 34-A, DEH DOZAN, TAPPO GUJRO, SCHEME-33, KARACHI.	NORTH:	SCALE: 1/16"=1'-0" DRAWN BY: S.R DRG NO # 05/07	OWNERS / PARTNER / ATTORNEY :	LIC. ENGINEER:	LIC.ARCHITECT:



BLOCK PLAN OF
13TH. TO 18TH. FLOOR (FLATS / CIRCULATION)



BLOCK PLAN OF
1ST. FLOOR (RECREATION / FLATS)

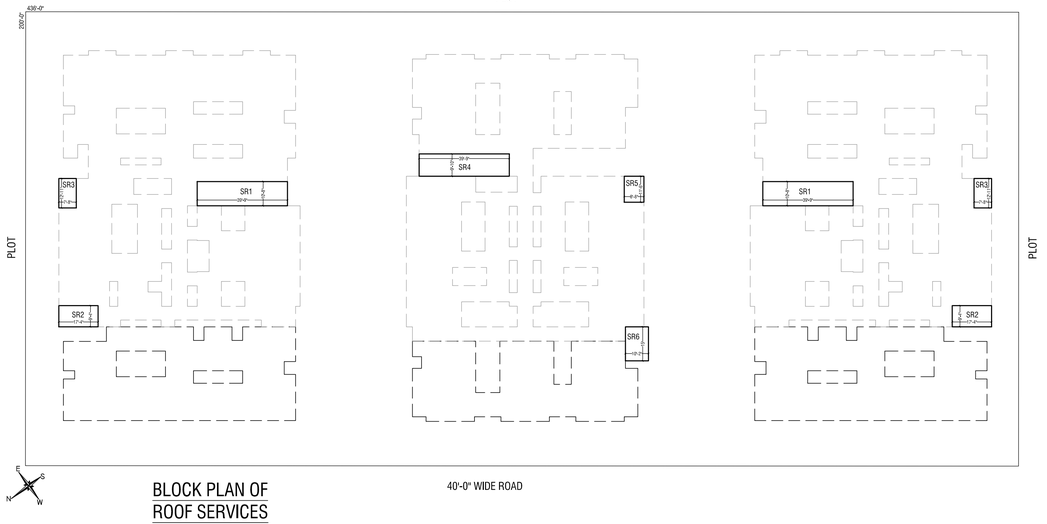


BLOCK PLAN OF
2ND. TO 12TH. FLOOR (FLATS / CIRCULATION)

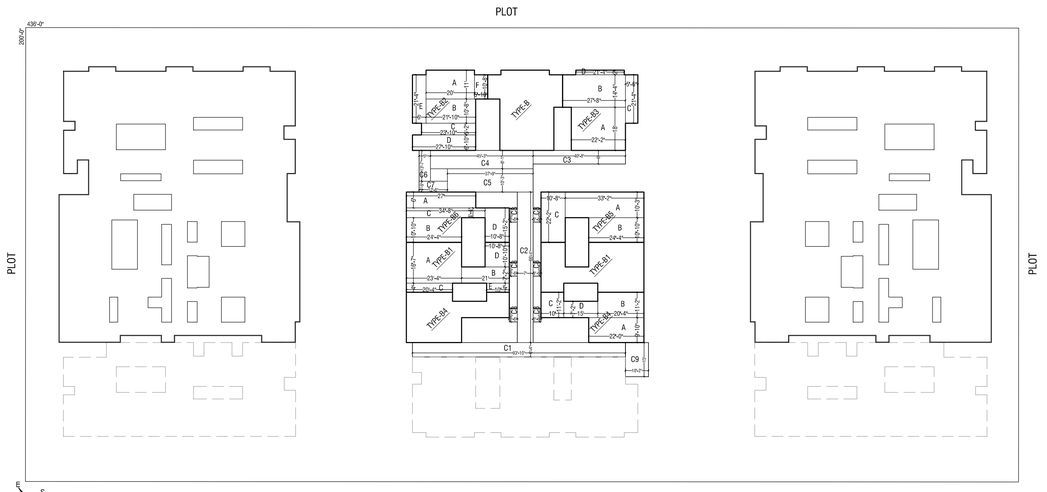


SECTION AT X-X

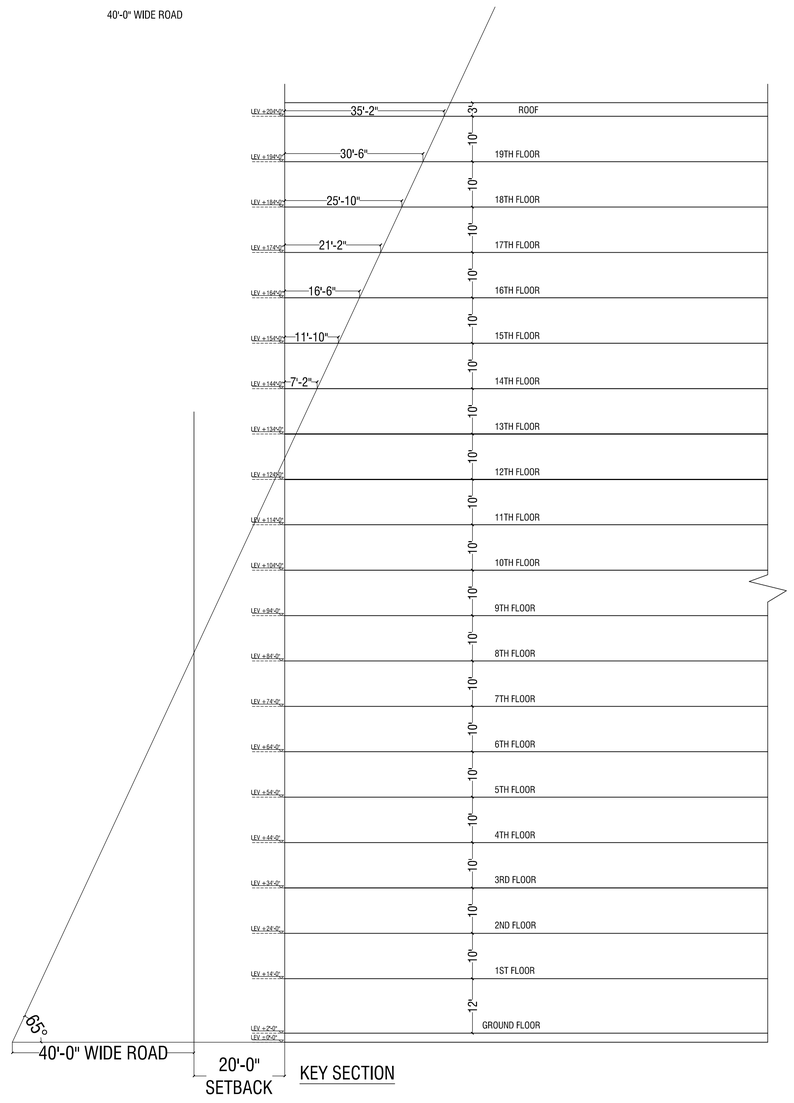
ADDRESS: PROPOSED BUILDING PLAN ON PLOT NO. NC-21 (02-ACRES), SECTOR 34-A, DEH DOZAN, TAPPO GUJRO, SCHEME-33, KARACHI.	NORTH:	SCALE: 1/16"=1'-0" DRAWN BY: S.R DRG NO # 06/07	OWNERS / PARTNER / ATTORNEY :	LIC. ENGINEER:	LIC.ARCHITECT:



BLOCK PLAN OF
ROOF SERVICES



BLOCK PLAN OF
19TH. FLOOR (FLATS / CIRCULATION)



KEY SECTION

SUMMARY

BASEMENT-02 PLAN	PROJECT PARKING	=	72387.34 SQ.FT
BASEMENT-01 PLAN	VISITOR PARKING	=	72387.34 SQ.FT
GROUND FLOOR	PARKING & SERVICES	=	65713.50 SQ.FT
1ST FLOOR	RECREATION / FLATS	=	39747.87 SQ.FT
2ND FLOOR	FLATS & CIRCULATION	=	39747.87 SQ.FT
3RD FLOOR	FLATS & CIRCULATION	=	39747.87 SQ.FT
4TH FLOOR	FLATS & CIRCULATION	=	39747.87 SQ.FT
5TH FLOOR	FLATS & CIRCULATION	=	39747.87 SQ.FT
6TH FLOOR	FLATS & CIRCULATION	=	39747.87 SQ.FT
7TH FLOOR	FLATS & CIRCULATION	=	39747.87 SQ.FT
8TH FLOOR	FLATS & CIRCULATION	=	39747.87 SQ.FT
9TH FLOOR	FLATS & CIRCULATION	=	39747.87 SQ.FT
10TH FLOOR	FLATS & CIRCULATION	=	39747.87 SQ.FT
11TH FLOOR	FLATS & CIRCULATION	=	39747.87 SQ.FT
12TH FLOOR	FLATS & CIRCULATION	=	39747.87 SQ.FT
13TH FLOOR	FLATS & CIRCULATION	=	29980.63 SQ.FT
14TH FLOOR	FLATS & CIRCULATION	=	29980.63 SQ.FT
15TH FLOOR	FLATS & CIRCULATION	=	29980.63 SQ.FT
16TH FLOOR	FLATS & CIRCULATION	=	29980.63 SQ.FT
17TH FLOOR	FLATS & CIRCULATION	=	29980.63 SQ.FT
18TH FLOOR	FLATS & CIRCULATION	=	29980.63 SQ.FT
19TH FLOOR	FLATS & CIRCULATION	=	9716.89 SQ.FT
ROOF PLAN	ROOF SERVICES	=	2011.35 SQ.FT
TOTAL		=	879074.64 SQ.FT

DEDUCTIONS			
PARKING	(ON BASEMENT-02)	=	72387.34 SQ.FT
PARKING	(ON BASEMENT-01)	=	72387.34 SQ.FT
PARKING	(ON GROUND FLOOR)	=	62141.57 SQ.FT
ARCADE	(ON GROUND FLOOR)	=	2674.64 SQ.FT
SUB-STATION	(ON GROUND FLOOR)	=	525.28 SQ.FT
RECREATION	(2% ALLOWABLE)	=	10307.07 SQ.FT
CIRCULATION	(PROPOSED)	=	141484.83 SQ.FT
ROOF SERVICES		=	2011.35 SQ.FT
TOTAL		=	363919.42 SQ.FT
879074.64 - 363919.42		=	515155.22 SQ.FT

SUMMARY OF PARKING

SHOPS AREA			372.01 SQ.FT
372.01 / 800			0.46 SAY 01 CARS
FLATS AREA			514783.21 SQ.FT
514783.21 / 1200			428.98 SAY 429 CARS
01 + 429			430 CARS
M.C / C.P = 16% OF 430 = 68.80 CARS		SAY	69 CARS
REQUIRED CAR PARKING	430 - 69	=	361 CARS
M.C / C. PARKING	69 X 6	=	414 M.C
DISABLE CAR PARKING			
361 / 50 = 7.22 (I/C IN PROVIDED CARS)			08 CARS
PROJECT CAR PARKING			
BASEMENT-02		=	213 CARS
GROUND FLOOR		=	155 CARS
TOTAL PROVIDED CAR PARKING		=	368 CARS
PROJECT M.C PARKING			
BASEMENT-02		=	215 M.C
GROUND FLOOR		=	200 M.C
TOTAL PROVIDED M.C PARKING		=	415 M.C
VISITOR CAR PARKING			
BASEMENT-01		=	207 CARS
TOTAL PROVIDED CAR PARKING		=	207 CARS
VISITOR M.C PARKING			
BASEMENT-01		=	210 M.C
TOTAL PROVIDED M.C PARKING		=	210 M.C

SUMMARY OF 1ST. FLOOR (RECREATION)

TYPE	NET AREA	NOS	TOTAL AREA
TYPE-A	1367.62 SQ.FT	02	2735.24 SQ.FT
TYPE-A1	1351.07 SQ.FT	02	2702.14 SQ.FT
TYPE-A2	1267.39 SQ.FT	02	2534.78 SQ.FT
TYPE-A3	1237.08 SQ.FT	02	2474.16 SQ.FT
TYPE-A4	1141.51 SQ.FT	02	2283.02 SQ.FT
TYPE-A5	1101.25 SQ.FT	02	2202.50 SQ.FT
TYPE-B	896.50 SQ.FT	01	896.50 SQ.FT
TYPE-B2	955.85 SQ.FT	01	955.85 SQ.FT
TYPE-B3	955.21 SQ.FT	01	955.21 SQ.FT
TYPE-C1	1305.07 SQ.FT	02	2610.14 SQ.FT
TYPE-C2	744.33 SQ.FT	02	1488.66 SQ.FT
RECREATION (TYPE-B)	896.50 SQ.FT	01	896.50 SQ.FT
RECREATION (TYPE-B1)	773.93 SQ.FT	02	1547.86 SQ.FT
RECREATION (TYPE-B2)	955.85 SQ.FT	01	955.85 SQ.FT
RECREATION (TYPE-B3)	955.21 SQ.FT	01	955.21 SQ.FT
RECREATION (TYPE-B4)	662.14 SQ.FT	02	1324.28 SQ.FT
RECREATION (TYPE-B5)	839.60 SQ.FT	01	839.60 SQ.FT
RECREATION (TYPE-B6)	737.16 SQ.FT	01	737.16 SQ.FT
RECREATION (TYPE-C)	801.66 SQ.FT	04	3206.64 SQ.FT
CIRCULATION (TOWER-01 & 03)	2493.07 SQ.FT	02	4986.14 SQ.FT
CIRCULATION (TOWER-02)	2460.43 SQ.FT	--	2460.43 SQ.FT
TOTAL	19 UNITS		39747.87 SQ.FT

SUMMARY OF 2ND. TO 12TH. FLOOR (EACH FLOOR)

TYPE	NET AREA	NOS	TOTAL AREA
TYPE-A	1367.62 SQ.FT	02	2735.24 SQ.FT
TYPE-A1	1351.07 SQ.FT	02	2702.14 SQ.FT
TYPE-A2	1267.39 SQ.FT	02	2534.78 SQ.FT
TYPE-A3	1237.08 SQ.FT	02	2474.16 SQ.FT
TYPE-A4	1141.51 SQ.FT	02	2283.02 SQ.FT
TYPE-A5	1101.25 SQ.FT	02	2202.50 SQ.FT
TYPE-B	896.50 SQ.FT	02	1793.00 SQ.FT
TYPE-B1	773.93 SQ.FT	02	1547.86 SQ.FT
TYPE-B2	955.85 SQ.FT	02	1911.70 SQ.FT
TYPE-B3	955.21 SQ.FT	02	1910.42 SQ.FT
TYPE-B4	662.14 SQ.FT	02	1324.28 SQ.FT
TYPE-B5	839.60 SQ.FT	01	839.60 SQ.FT
TYPE-B6	737.16 SQ.FT	01	737.16 SQ.FT
TYPE-C	801.66 SQ.FT	04	3206.64 SQ.FT
TYPE-C1	1305.07 SQ.FT	02	2610.14 SQ.FT
TYPE-C2	744.33 SQ.FT	02	1488.66 SQ.FT
CIRCULATION (TOWER-01 & 03)	2493.07 SQ.FT	02	4986.14 SQ.FT
CIRCULATION (TOWER-02)	2460.43 SQ.FT	--	2460.43 SQ.FT
TOTAL	32 UNITS		39747.87 SQ.FT

SUMMARY OF 13TH. TO 18TH. FLOOR (EACH FLOOR)

TYPE	NET AREA	NOS	TOTAL AREA
TYPE-A	1367.62 SQ.FT	02	2735.24 SQ.FT
TYPE-A1	1351.07 SQ.FT	02	2702.14 SQ.FT
TYPE-A2	1267.39 SQ.FT	02	2534.78 SQ.FT
TYPE-B	896.50 SQ.FT	01	896.50 SQ.FT
TYPE-B1	773.93 SQ.FT	02	1547.86 SQ.FT
TYPE-B2	955.85 SQ.FT	01	955.85 SQ.FT
TYPE-B3	955.21 SQ.FT	01	955.21 SQ.FT
TYPE-B4	662.14 SQ.FT	02	1324.28 SQ.FT
TYPE-B5	839.60 SQ.FT	01	839.60 SQ.FT
TYPE-B6	737.16 SQ.FT	01	737.16 SQ.FT
TYPE-C	801.66 SQ.FT	04	3206.64 SQ.FT
TYPE-C1	1305.07 SQ.FT	02	2610.14 SQ.FT
TYPE-C2	744.33 SQ.FT	02	1488.66 SQ.FT
CIRCULATION (TOWER-01 & 03)	2493.07 SQ.FT	02	4986.14 SQ.FT
CIRCULATION (TOWER-02)	2460.43 SQ.FT	--	2460.43 SQ.FT
TOTAL	23 UNITS		29980.63 SQ.FT

SUMMARY OF 19TH. FLOOR

TYPE	NET AREA	NOS	TOTAL AREA
TYPE-B	896.50 SQ.FT	01	896.50 SQ.FT
TYPE-B1	773.93 SQ.FT	02	1547.86 SQ.FT
TYPE-B2	955.85 SQ.FT	01	955.85 SQ.FT
TYPE-B3	955.21 SQ.FT	01	955.21 SQ.FT
TYPE-B4	662.14 SQ.FT	02	1324.28 SQ.FT
TYPE-B5	839.60 SQ.FT	01	839.60 SQ.FT
TYPE-B6	737.16 SQ.FT	01	737.16 SQ.FT
CIRCULATION (TOWER-02)	2460.43 SQ.FT	--	2460.43 SQ.FT
TOTAL	09 UNITS		9716.89 SQ.FT

TYPE-B2 :

A	=	20'-0"	X	11'-0"	= 220.00 SQ.FT.
B	=	21'-10"	X	10'-8"	= 232.70 SQ.FT.
C	=	23'-10"	X	5'-2"	= 122.96 SQ.FT.
D	=	27'-10"	X	6'-10"	= 190.07 SQ.FT.
E	=	6'-0"	X	21'-4"	= 127.98 SQ.FT.
F	=	5'-10"	X	10'-8"	= 62.14 SQ.FT.
TOTAL					= 955.85 SQ.FT.

TYPE-B3 :

A	=	22'-2"	X	18'-0"	= 398.88 SQ.FT.
B	=	27'-8"	X	14'-4"	= 396.36 SQ.FT.
C	=	21'-4"	X	5'-6"	= 117.31 SQ.FT.
D	=	21'-4"	X	2'-0"	= 42.66 SQ.FT.
TOTAL					= 955.21 SQ.FT.

TYPE-B4 :

A	=	22'-0"	X	9'-10"	= 216.26 SQ.FT.
B	=	20'-4"	X	11'-2"	= 226.88 SQ.FT.
C	=	10'-0"	X	11'-2"	= 111.60 SQ.FT.
D	=	15'-0"	X	7'-2"	= 107.40 SQ.FT.
TOTAL					= 662.14 SQ.FT.

TYPE-B5 :

A	=	33'-2"	X	10'-3"	= 339.89 SQ.FT.
B	=	24'-4"	X	10'-10"	= 263.49 SQ.FT.
C	=	10'-8"	X	22'-2"	= 236.22 SQ.FT.
TOTAL					= 839.60 SQ.FT.

TYPE-B6 :

A	=	27'-0"	X	6'-0"	= 162.00 SQ.FT.
B	=	24'-4"	X	10'-10"	= 263.49 SQ.FT.
C	=	34'-8"	X	4'-4"	= 150.07 SQ.FT.
D	=	10'-8"	X	15'-2"	= 161.60 SQ.FT.
TOTAL					= 737.16 SQ.FT.

TYPE-C :

A	=	23'-4"	X	20'-10"	= 485.96 SQ.FT.
B	=	10'-8"	X	15'-4"	= 163.41 SQ.FT.
C	=	15'-9"	X	6'-10"	= 107.57 SQ.FT.
D	=	10'-4"	X	4'-4"	= 44.72 SQ.FT.
TOTAL					= 801.66 SQ.FT.

TYPE-C1 :

A	=	21'-2"	X	22'-2"	= 468.90 SQ.FT.
B	=	23'-4"	X	10'-10"	= 252.66 SQ.FT.
C	=	10'-8"	X	23'-2"	= 246.88 SQ.FT.
D	=	12'-4"	X	12'-4"	= 152.02 SQ.FT.
E	=	13'-4"	X	11'-0"	= 146.63 SQ.FT.
F	=	6'-0"	X	6'-4"	= 37.98 SQ.FT.
TOTAL					= 1305.07 SQ.FT.

TYPE-C2 :

A	=	34'-8"	X	4'-4"	= 150.07 SQ.FT.
B	=	30'-0"	X	6'-0"	= 180.00 SQ.FT.
C	=	23'-4"	X	10'-10"	= 252.66 SQ.FT.
D	=	10'-8"	X	15'-2"	= 161.60 SQ.FT.
TOTAL					= 744.33 SQ.FT.

CIRCULATION : (TOWER-01 & 03)

C1	=	62'-0"	X	6'-0"	= 372.00 SQ.FT.
C2	=	7'-0"	X	49'-1"	= 343.56 SQ.FT.
C3	=	39'-1"	X	4'-9"	= 185.63 SQ.FT.
C4	=	5'-0"	X	10'-3"	= 51.25 SQ.FT.
C5	=	12'-6"	X	10'-9"	= 134.37 SQ.FT.
C6	=	38'-7"	X	7'-3"	= 279.70 SQ.FT.
C7	=	43'-2"	X	9'-0"	= 388.44 SQ.FT.
C8	=	17'-10"	X	6'-0"	= 106.98 SQ.FT.
C9	=	14'-3"	X	9'-0"	= 128.25 SQ.FT.
C10	=	15'-1"	X	9'-0"	= 135.72 SQ.FT.
C11	=	27'-3"	X	9'-0"	= 245.25 SQ.FT.
C12	=	6'-0"	X	3'-0"	= 18.00 SQ.FT.
C13	=	4'-4"	X	6'-0" X4	= 103.92 SQ.FT.
TOTAL					= 2493.07 SQ.FT.

CIRCULATION : (TOWER-02)

C1	=	93'-10"	X	6'-4"	= 593.94 SQ.FT.
C2	=	7'-0"	X	66'-4"	= 464.31 SQ.FT.
C3	=	40'-8"	X	6'-0"	= 243.96 SQ.FT.
C4	=	45'-3"	X	8'-1"	= 365.62 SQ.FT.
C5	=	37'-9"	X	10'-3"	= 386.93 SQ.FT.
C6	=	5'-0"	X	13'-7"	= 67.90 SQ.FT.
C7	=	12'-6"	X	4'-9"	= 59.37 SQ.FT.
C8	=	3'-6"	X	6'-0" X6	= 126.00 SQ.FT.
C9	=	10'-2"	X	15'-0"	= 152.40 SQ.FT.
TOTAL					= 2460.43 SQ.FT.

DETAIL OF ROOF PLAN

ROOF SERVICES :

RS1	=	39'-9"	X	10'-8"	X2	= 847.47 SQ.FT.
RS2	=	17'-4"	X	9'-4"	X2	= 323.37 SQ.FT.
RS3	=	7'-8"	X	12'-11"	X2	= 197.78 SQ.FT.
RS4	=	39'-9"	X	9'-10"		= 390.74 SQ.FT.
RS5	=	8'-8"	X	11'-6"		= 99.59 SQ.FT.
RS6	=	10'-2"	X	15'-0"		= 152.40 SQ.FT.
TOTAL						= 2011.35 SQ.FT.

SUMMARY OF 1ST. FLOOR (RECREATION)

TYPE	NET AREA	NOS	TOTAL AREA
RECREATION (TYPE-B)	896.50 SQ.FT	01	896.50 SQ.FT
RECREATION (TYPE-B1)	773.93 SQ.FT	02	1547.86 SQ.FT
RECREATION (TYPE-B2)	955.85 SQ.FT	01	955.85 SQ.FT
RECREATION (TYPE-B3)	955.21 SQ.FT	01	955.21 SQ.FT
RECREATION (TYPE-B4)	662.14 SQ.FT	02	1324.28 SQ.FT
RECREATION (TYPE-B5)	839.60 SQ.FT	01	839.60 SQ.FT
RECREATION (TYPE-B6)	737.16 SQ.FT	01	737.16 SQ.FT
RECREATION (TYPE-C)	801.66 SQ.FT	04	3206.64 SQ.FT
TOTAL	13 UNITS		10463.10 SQ.FT

SUMMARY OF CIRCULATION

FLOORS	TOTAL AREA
1ST. TO 19TH. FLOOR (7446.57 X 19)	141484.83 SQ.FT
TOTAL	141484.83 SQ.FT

AREA SCHEDULE

PLOT AREA	=	9680.00	SQ.YD
OR	=	87120.00	SQ.FT

ITEM	ALLOWABLE		PROPOSED
RATIO = 1:5.5	479160.00 SQ.FT.	515353.67 SQ.FT. (479160.00 + 36193.67)	515155.22 SQ.FT
ADDITIONAL AREA AGAINST VISITOR PARKING POLICY	36193.67 SQ.FT.		
FOOT PRINT GRD. 50% -65%	43560.00 SQ.FT 56628.00 SQ.FT		3046.65 SQ.FT
FOOT PRINT TYP. 45% -60%	39204.00 SQ.FT 52272.00 SQ.FT		39747.87 SQ.FT
RECREATION 2%	10307.07 SQ.FT		(10307.07 + 156.03) 10463.10 SQ.FT 156.03 IN F.A.R
CIRCULATION 30%	154606.10 SQ.FT		141484.83 SQ.FT

SUMMARY (AGAINST VISITOR PARKING POLICY) (REFER SUMMARY OF AREA)

FLOORS	
BASEMENT-01 AREA (PARKING)	72387.34 SQ.FT.
TOTAL AREA	72387.34 SQ.FT.
ADD. AREA AGAINST VISITOR PARKING	VISITOR PARKING AREA X 50% 72387.34 X 50% 36193.67 SQ.FT.
TOTAL ALLOWABLE AREA	VISITOR PARKING AREA + RATIO. 36193.67 + 479160.00 515353.67 SQ.FT.

DETAIL OF BASEMENT-02 (PROJECT PARKING)

COVERED AREA

P1	=	318'-2"	X	170'-9"	= 54325.82 SQ.FT.
P2	=	107'-10"	X	167'-6"	= 18061.52 SQ.FT.
TOTAL					= 72387.34 SQ.FT.

DETAIL OF BASEMENT-01 (VISITOR PARKING)

COVERED AREA

P1	=	318'-2"	X	170'-9"	= 54325.82 SQ.FT.
P2	=	107'-10"	X	167'-6"	= 18061.52 SQ.FT.
TOTAL					= 72387.34 SQ.FT.

DETAIL OF GROUND FLOOR

SHOP

SH1	=	22'-4"	X	8'-4" X2	= 372.01 SQ.FT.
TOTAL					= 372.01 SQ.FT.

ARCADE

AR1	=	123'-1"	X	8'-0"	= 984.64 SQ.FT.
AR2	=	111'-6"	X	8'-0"	= 892.00 SQ.FT.
AR3	=	99'-9"	X	8'-0"	= 798.00 SQ.FT.
TOTAL					= 2674.64 SQ.FT.

PARKING

P1	=	123'-1"	X	153'-0"	= 18831.24 SQ.FT.
P2	=	30'-9"	X	153'-4"	= 4714.89 SQ.FT.
P3	=	99'-4"	X	145'-0"	= 14402.85 SQ.FT.
P4	=	30'-9"	X	153'-4"	= 4714.89 SQ.FT.
P5	=	99'-9"	X	153'-0"	= 15261.75 SQ.FT.
P6	=	23'-4"	X	145'-0"	= 3382.85 SQ.FT.
P7	=	54'-8"	X	8'-4"	= 455.31 SQ.FT.
P8	=	24'-8"	X	7'-8" X2	= 377.79 SQ.FT.
TOTAL					= 62141.57 SQ.FT.

SUB-STATION

SS1	=	32'-10"	X	16'-0"	= 525.28 SQ.FT.
TOTAL					= 525.28 SQ.FT.

SHOP AREA	=	372.01 SQ.FT.
ARCADE AREA	=	2674.64 SQ.FT.
PARKING AREA	=	62141.57 SQ.FT.
SUB-STATION AREA	=	525.28 SQ.FT.
TOTAL	=	65713.50 SQ.FT.

DETAIL OF INDIVIDUALS & CIRCULATION

TYPE-A :

A	=	17'-2"	X	29'-0"	= 497.64 SQ.FT.
B	=	23'-4"	X	15'-4"	= 357.64 SQ.FT.
C	=	10'-10"	X	20'-6"	= 222.01 SQ.FT.
D	=	10'-10"	X	13'-4"	= 144.36 SQ.FT.
E	=	24'-4"	X	5'-0"	= 121.65 SQ.FT.
F	=	12'-2"	X	2'-0"	= 24.32 SQ.FT.
TOTAL					= 1367.62 SQ.FT.

TYPE-A1 :

A	=	22'-2"	X	21'-2"	= 468.90 SQ.FT.
B	=	10'-10"	X	23'-4"	= 252.66 SQ.FT.
C	=	23'-2"	X	10'-8"	= 246.88 SQ.FT.
D	=	6'-4"	X	19'-4"	= 122.35 SQ.FT.
E	=	12'-4"	X	8'-8"	= 106.77 SQ.FT.
F	=	4'-8"	X	13'-4"	= 62.11 SQ.FT.
G	=	12'-2"	X	2'-0"	= 24.32 SQ.FT.
H	=	18'-4"	X	3'-8"	= 67.08 SQ.FT.
TOTAL					= 1351.07 SQ.FT.

TYPE-A2 :

A	=	22'-2"	X	19'-2"	= 424.58 SQ.FT.
B	=	10'-10"	X	23'-4"	= 252.66 SQ.FT.
C	=	23'-2"	X	10'-8"	= 246.88 SQ.FT.
D	=	12'-4"	X	14'-2"	= 174.59 SQ.FT.
E	=	10'-10"	X	13'-4"	= 144.36 SQ.FT.
F	=	12'-2"	X	2'-0"	= 24.32 SQ.FT.
TOTAL					= 1267.39 SQ.FT.

TYPE-A3 :

A	=	17'-4"	X	40'-4"	= 698.91 SQ.FT.
B	=	10'-10"	X	16'-6"	= 178.69 SQ.FT.
C	=	6'-2"	X	19'-4"	= 119.07 SQ.FT.
D	=	4'-8"	X	13'-4"	= 62.11 SQ.FT.
E	=	5'-0"	X	20'-4"	= 101.65 SQ.FT.
F	=	5'-0"	X	15'-4"	= 76.65 SQ.FT.
TOTAL					= 1237.08 SQ.FT.

TYPE-A4 :

A	=	11'-2"	X	29'-2"	= 325.42 SQ.FT.
B	=	23'-2"	X	10'-8"	= 246.88 SQ.FT.
C	=	10'-10"	X	19'-4"	= 209.34 SQ.FT.
D	=	10'-10"	X	16'-6"	= 178.69 SQ.FT.
E	=	6'-2"	X	19'-4"	= 119.07 SQ.FT.
F	=	4'-8"	X	13'-4"	= 62.11 SQ.FT.
TOTAL					= 1141.51 SQ.FT.

TYPE-A5 :

A	=	22'-2"	X	17'-2"	= 380.26 SQ.FT.
B	=	18'-4"	X	12'-4"	= 226.00 SQ.FT.
C	=	10'-10"	X	19'-4"	= 209.34 SQ.FT.
D	=	15'-2"	X	10'-8"	= 161.60 SQ.FT.
E	=	14'-0"	X	4'-3"	= 59.50 SQ.FT.
F	=	5'-0"	X	12'-11"	= 64.55 SQ.FT.
TOTAL					= 1101.25 SQ.FT.

TYPE-B :

A	=	26'-2"	X	13'-2"	= 344.26 SQ.FT.
B	=	23'-10"	X	19'-0"	= 452.77 SQ.FT.
C	=	21'-4"	X	2'-0"	= 42.66 SQ.FT.
D	=	5'-4"	X	10'-8"	= 56.81 SQ.FT.
TOTAL					= 896.50 SQ.FT.

TYPE-B1 :

A	=	23'-4"	X	16'-7"	= 386.81 SQ.FT.
B	=	21'-0"	X	7'-2"	= 150.36 SQ.FT.
C	=	20'-4"	X	4'-0"	= 81.32 SQ.FT.
D	=	10'-8"	X	10'-10"	= 115.44 SQ.FT.
E	=	10'-0"	X	4'-0"	= 40.00 SQ.FT.
TOTAL					= 773.93 SQ.FT.

ADDRESS:

PROPOSED BUILDING PLAN ON PLOT NO. NC-21 (02-ACRES), SECTOR 34-A, DEH DOZAN, TAPPO GUJRO, SCHEME-33, KARACHI.

NORTH:

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

DRAWN BY: S.R

DRG NO # 07/07

OWNERS / PARTNER / ATTORNEY :

LIC. ENGINEER:

LIC.ARCHITECT:

Annex IV: Monitoring Reports

Ambient Air Quality Test Report

Project Name:	**EIA-Blue Sky Residency**	**Test Report No:**	**QTS/BSR/22/3016**
		Sample Duration:	**24hr's**
Sample Description:	**Ambient Air Quality Test**	**Location:**	**24°56'40.47"N 67° 9'6.30"E**

SEQS -PARAMETERS

Date	Time	NO (µg/m³)	NO_2 (µg/m³)	SO_2 (µg/m³)	PM 10 (µg/m³)	PM 2.5 (µg/m³)	SPM (µg/m³)	Lead (µg/m3)
21.04.2022	10:00	13.0	20.2	42.6	84	28	231	ND
21.04.2022	11:00	10.3	23.4	44.2	91	34	229	ND
21.04.2022	12:00	10.6	22.5	50.4	97	38	245	ND
21.04.2022	13:00	18.2	28.8	52.3	101	39	250	ND
21.04.2022	14:00	15.5	36.6	55.4	110	45	254	ND
21.04.2022	15:00	13.6	40.2	55.2	118	49	262	ND
21.04.2022	16:00	10.4	41.2	54.4	132	55	271	ND
21.04.2022	17:00	11.3	44.3	52.2	144	60	287	ND
21.04.2022	18:00	16.2	42.3	48.5	138	66	291	ND
21.04.2022	19:00	14.5	36.0	44.2	137	65	286	ND
21.04.2022	20:00	13.4	30.9	40.4	129	52	277	ND
21.04.2022	21:00	16.2	24.0	35.3	106	49	274	ND
21.04.2022	22:00	18.0	18.8	30.2	102	44	270	ND
21.04.2022	23:00	14.8	15.5	22.4	96	38	268	ND
22.04.2022	00:00	16.2	13.0	20.5	89	36	264	ND
22.04.2022	01:00	18.4	10.9	18.6	61	31	257	ND
22.04.2022	02:00	15.6	11.8	15.4	60	23	249	ND
22.04.2022	03:00	13.3	12.6	13.6	57	22	238	ND
22.04.2022	04:00	12.4	13.7	14.5	55	20	226	ND
22.04.2022	05:00	10.2	15.0	15.4	59	22	218	ND
22.04.2022	06:00	09.8	16.0	17.3	64	23	223	ND
22.04.2022	07:00	12.3	16.9	19.8	66	24	225	ND
22.04.2022	08:00	14.4	19.3	21.5	74	26	227	ND
22.04.2022	09:00	16.2	19.6	25.4	82	27	229	ND
MIN		09.8	10.9	13.6	55	20	218	ND
MAX		18.4	44.3	55.4	144	66	291	ND
AVG		13.9	23.8	33.7	93.8	38.1	252.1	ND
SEQS		40	80	120	150	75	500	1.5
LDL-Limits		1.0	1.0	1.0	10.0	2.5	1 .0	-

Quality Testing Services Karachi Q.T.S

Ambient Air Quality Test Report

Project Name:	**EIA-Blue Sky Residency**	**Test Report No:**	**QTS/BSR/22/3016**
		Sample Duration:	**24hr's**
Sample Description:	**Ambient Air Quality Test**	**Location:**	**24°56'40.47"N 67° 9'6.30"E**

Parameter	Unit	Monitoring Duration	Average Obtained Concentration	SEQS	LDL-Limits	Methodology
Carbon Monoxide (CO)	mg/m3	08 Hours	0.217	5.0	0.00	Non Dispersive Intra Red (NDIR)
Nitrogen oxide (NO)	µg/m3	24 Hours	13.9	40.0	1.0	Chemiluminescence
Nitrogen Dioxide (NO2)	µg/m3	24 Hours	23.8	80.0	1.0	
Sulphur Dioxide (SO2)	µg/m3	24 Hours	33.7	120.0	1.0	Ultraviolet Fluorescence Method
Ozone (O3)	µg/m3	01 Hour	24.2	130.0	0 ppm	Non Dispersive UV Absorption Method
Particulate Matter (PM10)	µg/m3	24 Hours	93.8	150.0	10.0	β Ray Absorption Method
Particular Matter (PM2.5)	µg/m3	24 Hours	38.1	75.0	2.5	
Total Suspended Particles (TSP)	µg/m3	24 Hours	252.1	500.0	1.0	
Lead	µg/m3	24 Hours	ND	1.5	-	ASS Method

*SEQS= Sindh Environmental Quality Standards.
*IFC= International Finance Corporation
(24 Hours Standard for all the parameters Except O3 and CO),
µg/m3= Micrograms per Cubic Meter
,mg/m3= Milligrams per Cubic Meter
ppm = Parts per million
ND= Not Detected

Remarks:
The average concentration calculated for the 24 hours are well within guideline values set by SEQS

Sample Analyzed By: Sajid Ali	**Signature of Laboratory Incharge:**_____ **Name : Ali Raza**

Quality Testing Services Karachi Q.T.S

Lab Report Ref. No. : EMC/QTS/BSR/22/3017 Reporting Date: 26/04/2022

Project Name: EIA- Blue Sky Residency

SAMPLE DESCRIPTION
Sample ID: Noise Level Test Sample Description: Ambient Noise No. of samples: 04 Sample Collected/Submitted by: QTS representative Sampling Date: 21/04/2022 Sample Receipt at QTS - Date: 21/04/2022

NOISE LEVEL TEST REPORT

S.NO.	LOCATION/SOURCE	Noise Level Readings			
		Minimum	Maximum	Average	Limits
1	Front side Right Corner of the project Area	51.2	58.9	55.0	SEQS-Limits: 65dB(A)
2	Front side Near Left Corner project Area	50.4	58.7	54.5	
3	Back side Right corner Area	49.8	60.0	54.9	
4	Back side Left Corner Area	52.3	57.8	55.0	

SEQS *= Sindh Environmental Quality Standards (Outside Noise Level)*
dB (A) Leq=Time weighted average of the level of sound in decibel on scale which is relatable to human hearing.
*Maximum Allowable Limits of Noise Level for Commercial Zone / Category "B".

Term & Condition:

- 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.

Sample Analyzed by: Sajid Ali	**Signature of Laboratory In charge:** **Name : Ali Raza**

Quality Testing Services Karachi Q.T.S

Annex V: Land Documents

1073

The Classic Documentation

SEVEN STAR ESTATE

Property Consultants, Sale, Purchase & Rent

SALE DEED

SEVEN STAR ESTATE

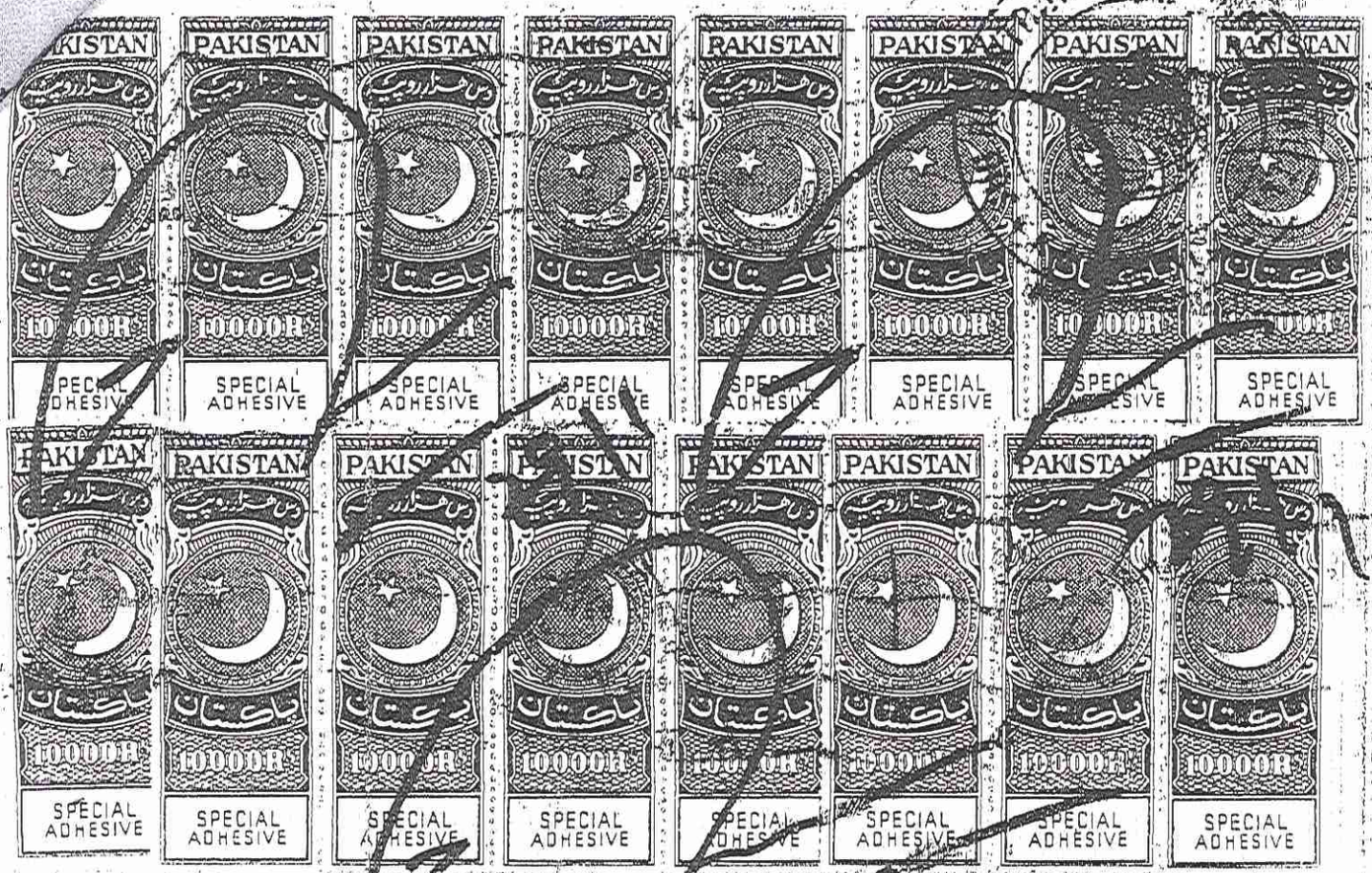
Off. # 4, 1st Floor Square Opp. Jumma Bazar

University Road, Block No. 11

Gulshan-e-Iqbal, Karachi.

☎ 461 0290 – 46 13417

MR. MUHAMMAD RAMZAN GABOL. Dated. 28/1



SALE DEED OF IMMOVEABLE PROPERTY FOR RS.1,42,30,000/-

(Rupees One Crore Forty Two Lac Thirty Thousand Only)

This Indenture of Sale is made at Karachi, on this 11 day of Feb 2009. Between

R.No. 4073
Sub-Registrar-II
Gulshan-e-Iqbal Town, Karachi

(1) MR. MUHAMMAD SADIQ SON OF ABDUL SATTAR, holding National Identity Card No.42201-3866719-3, ... (Share 25%)

(2) MR. ABDUL RASHID SON OF HAJI ABU BAKAR, holding National Identity Card No.42201-4605147-5, ... (Share 25%)

(3) MR. MUHAMMAD RAFIQ JUMMA SON OF HAJI JUMMA YAQOOB, holding National Identity Card No.42201-5371180-3, ... (Share 12.5%)

(4) MRS. AMINA WIFE OF SALEH MUHAMMAD, holding National Identity Card No.42101-9917780-6, ... (Share 12.5%)

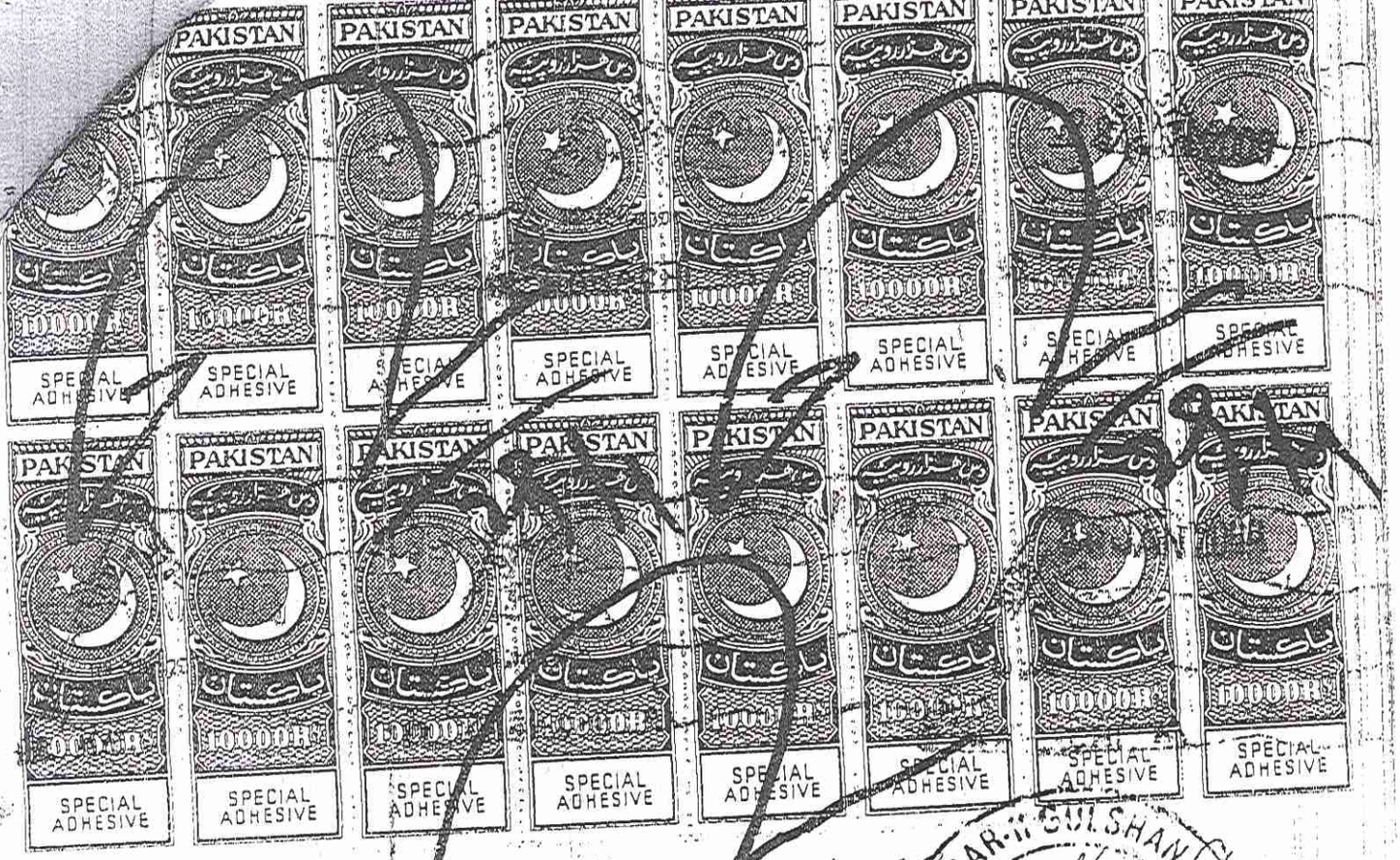
(Total Share 75% of Serial No.1 to 4)

THROUGH ATTORNEY (1) MR. MUHAMMAD YOUSUF SON OF MUHAMMAD YOUNUS, holding National Identity Card No.42101-5339174-7, Muslim, adult, resident of Suit No.5 & 6, Osif Centre, Block No.13-A, Gulshan-e-Iqbal, University Road, Karachi,

(2) MR. MUHAMMAD SHABBIR SON OF TAHIR MUHAMMAD, holding National Identity Card No.42101-1423081-3, Muslim, adult, resident of Suit No.5 & 6, Osif Centre, Block No.13-A, Gulshan-e-Iqbal, University Road, Karachi,

(Vide General Power of Attorney under Registration No.7607, of Book No.IV, by Sub-Registrar, Gadap Town, Karachi, Dated.13-11-2006, and M.F. Roll No.U-104138/3947, by Photo-Registrar, Karachi, Dated.29-12-2006),

Continued on Page Two.



(5) *MR. RAFIQ ABOO BAKAR PANJWANI SON OF ABOO BAKER PANJWANI, holding National Identity Card No.516-86-325991,* Muslim, adult, resident of Karachi, ... *(Share 12.5%)*

(6) *MR. ABDUL RAZZAQ PANJWANI SON OF NOOR MUHAMMAD PANJWANI, holding National Identity Card No.501-53-336112,* Muslim, adult, resident of Karachi, ... *(Share 12.5%)*

THROUGH ATTORNEY *MR. MUHAMMAD ASIF SON OF ALI MUHAMMAD YAQOOB, holding National Identity Card No.42201-0709232-3 and Old No.517-89-330068,* Muslim, adult, resident of Plot No.103, Block No.7/Ishaq & 8, K.M.C.H.S., Karachi, (Vide *General Power of Attorney* under Registration No.313, at pages 34 to 35, Volume No.284, of Book No.IV Addl., by Sub-Registrar, "T" Div.IV, Karachi, Dated.07-02-1998),

THROUGH SUB-ATTORNEY *(1) MR. MUHAMMAD YOUSUF SON OF MUHAMMAD YOUNUS, holding National Identity Card No.42101-5339174-7,* Muslim, adult, resident of Suit No.5 & 6, Osif Centre, Block No.13-A, Gulshan-e-Iqbal, University Road, Karachi,

(2) MR. MUHAMMAD SHABBIR SON OF TAHIR MUHAMMAD, holding National Identity Card No.42101-1423081-3, Muslim, adult, resident of Suit No.5 & 6, Osif Centre, Block No.13-A, Gulshan-e-Iqbal, University Road, Karachi,

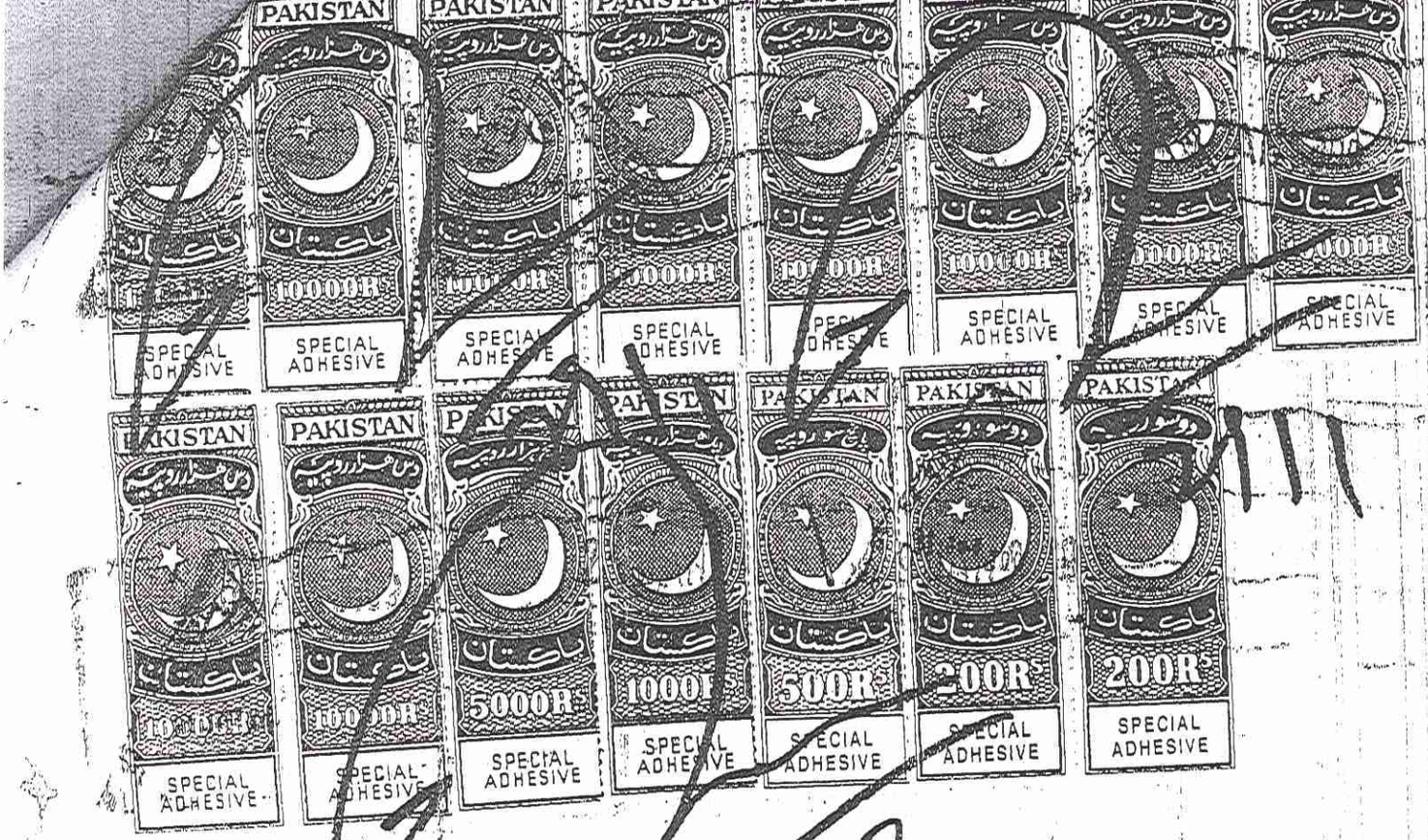
(Vide *General Power of Sub-Attorney* under Registration No.7606, of Book No.IV, by Sub-Registrar, Gadap Town, Karachi, Dated.13-11-2006, and M.F. Roll No.U-104139/3947, by Photo-Registrar, Karachi, Dated.29-12-2006).

(Total Share 25% of Serial No.5 & 6)

(Serial No.1 to 6 Total Share 100%)

hereinafter called the *Vendor* (which expression shall wherever the context so permits, shall mean and include their legal heirs, executors, administrators, successors and assigns) of the One Part :

Continued on Page Three.



MUHAMMAD UMER QURESHI
OFFICE SURERINTENDENT
STAMP OFFICE GOVT OF SINDH
CITY COURTS KARACHI

29 JAN 2009

And

(1) MR. HAZOOR BUKHSH GABOL SON OF HAJI RAMZAN GABOL, holding National Identity Card No.42501-8309225-3, Muslim, adult, resident of Village Paryo Gabol, Sector No.34-A, KDA Scheme No.33, U.C. No.13, Safoora, Gulshan-e-Iqbal Town, Karachi,

,,,,,,,,,,,,,,,, *(50% Share)*

(2) MR. KARIM BUKHSH GABOL SON OF HAJI RAMZAN GABOL, holding National Identity Card No.41207-6776858-1, Village Paryo Gabol, Sector No.34-A, KDA Scheme No.33, U.C. No.13, Safoora, Gulshan-e-Iqbal Town, Karachi,

,,,,,,,,,,,,,,,, *(25% Share)*

(3) MR. MUHAMMAD RAMZAN GABOL SON OF HAZOOR BUKHSH GABOL, holding National Identity Card No.42501-4715162-7, Muslim, adult, resident of Village Paryo Gabol, Sector No.34-A, KDA Scheme No.33, U.C. No.13, Safoora, Gulshan-e-Iqbal Town, Karachi,

,,,,,,,,,,,,,,,, *(25% Share)*

hereinafter called the *Vendees* (which expression shall wherever the context so permits, shall mean and include their legal heirs, executors, administrators, successors and assigns) of the Other Part :

Continued on Page Four.

SUB-REGISTRAR-II GULSHAN-E-IQBAL TOWN KARACHI

R. No: 1073
Sub-Registrar-II
Gulshan-e-Iqbal Town, Karachi

Whereas the Vendor aforesaid is at the date of these presents seized and possessed of and is otherwise well and sufficiently entitled to an Immoveable Property Viz : Lease hold rights for 99 Years of Naclass No.21, Jiryan No.18/95, measuring 02-00 Acres/9680 Sq.Yds., in Sector No.34-A, Situated at K.D.A. Scheme No.33, Deh Dozan Tappo Gujro, Karachi, (hereinafter called the said property).

Whereas the Indenture of Lease executed by *MR. MOIN MANIAR SON OF MUHAMMAD HANIF MANIAR,* in favour of *(1) MR. MUHAMMAD SADIQ SON OF ABDUL SATTAR, (2) MR. ABDUL RASHID SON OF HAJI ABU BAKAR, (3) MR. MUHAMMAD RAFIQ JUMMA SON OF HAJI JUMMA YAQOOB, (4) MRS. AMINA WIFE OF SALEH MUHAMMAD, (5) MR. RAFIQ ABOO BAKAR PANJWANI SON OF ABOO BAKER PANJWANI, (6) MR. ABDUL RAZZAQ PANJWANI SON OF NOOR MUHAMMAD PANJWANI,* Vide Registration No.1629, of Book No.I, by Sub-Registrar, "T" Div. Karachi, Dated.26-03-1997, and M.F. Roll No.2353, by Photo-Registrar, Karachi, Dated.28-04-1997, and REGULARIZATION ORDER No.03-43-02/S0-I/298, Dated. 01-03-2009, by Government of Sindh, Land Utilization Department Entry No.79, Vide Challan of Difference amount of Rs.21,09,600/- Dated.13-02-2008.

And Whereas (1) MR. MUHAMMAD SADIQ SON OF ABDUL SATTAR, (2) MR. ABDUL RASHID SON OF HAJI ABU BAKAR, (3) MR. MUHAMMAD RAFIQ JUMMA SON OF HAJI JUMMA YAQOOB, (4) MRS. AMINA WIFE OF SALEH MUHAMMAD, (5) MR. RAFIQ ABOO BAKAR PANJWANI SON OF ABOO BAKER PANJWANI, (6) MR. ABDUL RAZZAQ PANJWANI SON OF NOOR MUHAMMAD PANJWANI, has obtain NOC FOR SALE from Office of the Mukhtiarkar /ACSO/Scheme No.33, City District Government Karachi, Vide Letter No.Mukh/ACSO/Sch-33/08/2009, Dated.03-01-2009.

Continued on Page Five.

SUB-REGISTRAR-II GULSHAN-E-IQBAL ★ KARACHI ★

R. No: 1073

Sub-Registrar
Gulshan-e-Iqbal Town, Karachi

And Whereas (1) MR. MUHAMMAD SADIQ SON OF ABDUL SATTAR, (2) MR. ABDUL RASHID SON OF HAJI ABU BAKAR, (3) MR. MUHAMMAD RAFIQ JUMMA SON OF HAJI JUMMA YAQOOB, (4) MRS. AMINA WIFE OF SALEH MUHAMMAD, (5) MR. RAFIQ ABOO BAKAR PANJWANI SON OF ABOO BAKER PANJWANI, (6) MR. ABDUL RAZZAQ PANJWANI SON OF NOOR MUHAMMAD PANJWANI, has obtain DEH JO FORM No.II Vide Jirvan 18/95, issued by Mukhtiarkar Scheme No.33, City District Karachi, Dated.03-01-2009.

And WHEREAS the *Vendor* above named has agreed to sell and transfer the said property with leasehold rights to the above named *Vendee*, for a lump sum sale consideration of Rs.1,42,30,000/- (Rupees One Crore Forty Two Lac Thirty Thousand only).

And WHEREAS THIS INDENTURE FURTHER WITNESSETH that the *Vendor* has already received the above sale consideration of Rs.1,42,30,000/- (Rupees One Crore Forty Two Lac Thirty Thousand only) in Cash from the aforesaid *Vendee*, being *Full And Final* settlement, receipt whereof the said *Vendor* doth hereby fully admit and acknowledge and from the same and every part thereof doth hereby release, acquit and discharge the said *Vendee*.

Continued on Page Six.

R. No: 2072

Sub-Registrar III
Gulshan-e-Iqbal Town, Karachi

That THE *Vendor* doth hereby grant, assign, sell and otherwise transfer the said lease hold right, in the said property to the aforesaid *Vendee*, free from all sorts of claims, liens, charges and encumbrances of whatsoever nature to have and to hold the same for and to the use of the said *Vendee* subject to all the terms and conditions if any upon which the *Vendor* held the said property.

SUB-REGISTRAR-III GULSHAN-E-IQBAL TOWN KARACHI

That the *Vendor* doth hereby covenant with the *Vendee* that the lease Deed in respect of the said property is in full force and is subsisting and the *Vendor* has not committed any thing by which the same may be impaired or has become void or voidable and that cesses and taxes if any due and payable shall be paid by the *Vendor*. That the *Vendor* doth hereby covenant and assure the *Vendee* that he/she is the full owner of the said property hereby conveyed and transferred and none else has any right or interest in the said property and that he/she has good right and title and full authority to sell the said property and that he/she has not prior to the date of these present done, made, committed, caused or knowingly suffered to be done any such acts, things, deeds, whereby or by reason of which the right to transfer the said property has been or may be impaired or that the property is charged, encumbered or prejudicially effected in any way.

That the *Vendee* has taken possession of the said property and shall continue to remain the owner of the same and shall enjoy all rights, rent and profits of the same without let or hindrance, claims, denials, interruptions, evictions by the *Vendor*.

That THE *Vendor* doth hereby covenant with the *Vendee* that he/she shall from time to time and at all times wherever called upon by the *Vendee* do or cause to be done all lawful and reasonable acts, things, deeds, for better assuring and more perfectly assigning the said property unto the *Vendee* and he/she will keep the *Vendee* indemnified and harmless against all losses, damages, occasioned to and sustained by the *Vendee* due to any defect in title or any suit or demand preferred by any one in respect of the said property.

That THE *Vendor* shall assist the *Vendee* in getting the said property purchaser name mutated/transferred in the record of relevant Government Authorities. That the *Vendor* shall also assist to get/acquire the property title in favour of the *Vendee* from the concerned offices/authorities without any cost and hindrance.

Continued on Page Seven.

That THE *Vendee* have hereafter peacefully have, hold, occupy use and enjoy the same as his own property without any hindrance, interruption, claim, demand from the *Vendee* or any other person claiming through or under *Vendor*.

That THE *Vendor* hereby delivers to the *Vendee* all deeds, documents, site plan, receipts, and writings etc., in their possession and custody relating to the title and rights over the said property with or without building thereon as hereby sold and transferred and has also delivered actual physical possession of the property to *Vendee* for later absolute and independent use.

And Whereas the *Vendors* have the following share in the said land :-

1)	MUHAMMAD SADIQ	.....	25%.
2)	ABDUL RASHEED HAJI ABBU BAKKAR	.....	25%.
3)	RAFIQ ABBU BAKKAR PANJWANI	.....	12.5%.
4)	MUHAMMAD RAFIQ JUMMA	.....	12.5%.
5)	MRS. AMINA	.....	12.5%.
6)	ABDUL RAZZAQ PANJWANI	.....	12.5%.

And Whereas the *Vendees* shall have the following share in the said land :-

(1)	*MR. HAZOOR BUKHSH GABOL*	*,,,,,,,,,,,,,,,, (50% Share)*
(2)	*MR. KARIM BUKHSH GABOL*	*,,,,,,,,,,,,,,,, (25% Share)*
(3)	*MR. MUHAMMAD RAMZAN GABOL*	*,,,,,,,,,,,,,,,, (25% Share)*

The Vendor doth hereby further declare that he/she has paid all the taxes, dues, demands of the concerned authority/ies upto date and that he/she will be responsible for the payment of all or any rents, taxes, assessments and dues that may be found due and payable in respect of the said property upto the date of these presents, and if any amount has not been paid it shall be paid by the *Vendor* before the registration of this Conveyance Deed, where after it shall be the sole responsibility of the *Vendee*.

And FURTHER the *Vendor* has handed over vacant peaceful possession of the said property together with all the Original documents of title in respect of the said property, and the *Vendee* hereby agrees to observe and comply with all the terms and conditions of lease in respect of the said property.

SCHEDULE OF PROPERTY

All That Piece or Parcel of Immoveable Property Viz : Lease Hold rights for 99 Years of Naclass No.21, Jiryan No.18/95, measuring 02-00 Acres/9680 Sq.Yds., in Sector No.34-A, Situated at K.D.A. Scheme No.33, Deh Dozan Tappo Gujro, Karachi, in jurisdiction of Sachal Police Station, in the Registration District, Sub-District and City of Karachi and butted and bounded as follows :

On the North by : 40 Feet Wide Road/ Muslim Society.
On the South by : Ali Village.
On the East by : Ali Village.
On the West by : Haider Buksh Village.

Continued on Page Eight.

scribed their respective hands at Karachi, the day, month and the year first above mentioned.

Witnesses :

1. _____
Name: Mohd Mushtaq
Address: C-195 Block 6
Gulshan Iqbal Karachi

2. _____
Name: LAL MUHAMMAD
Address: YAR MUHAMMAD
Gotu Malir Cantt



Vendor _____
(1) MUHAMMAD YOUSUF
NIC No.42101-5339174-3
(Attorney of Serial No.1 to 4 above
& Sub-Attorney from Serial No.5 & 6 above).



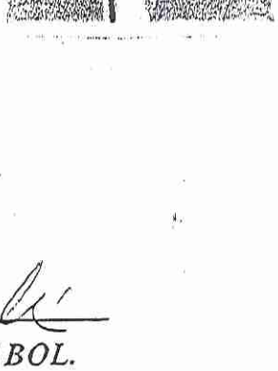
Vendor _____
(2) MUHAMMAD SHABBIR.
NIC No.42101-1423081-3.
(Attorney of Serial No.1 to 4 above
& Sub-Attorney from Serial No.5 & 6 above).



Vendee _____
(1) HAZOOR BUKHSH GABOL.
NIC No.42501-8309225-5.



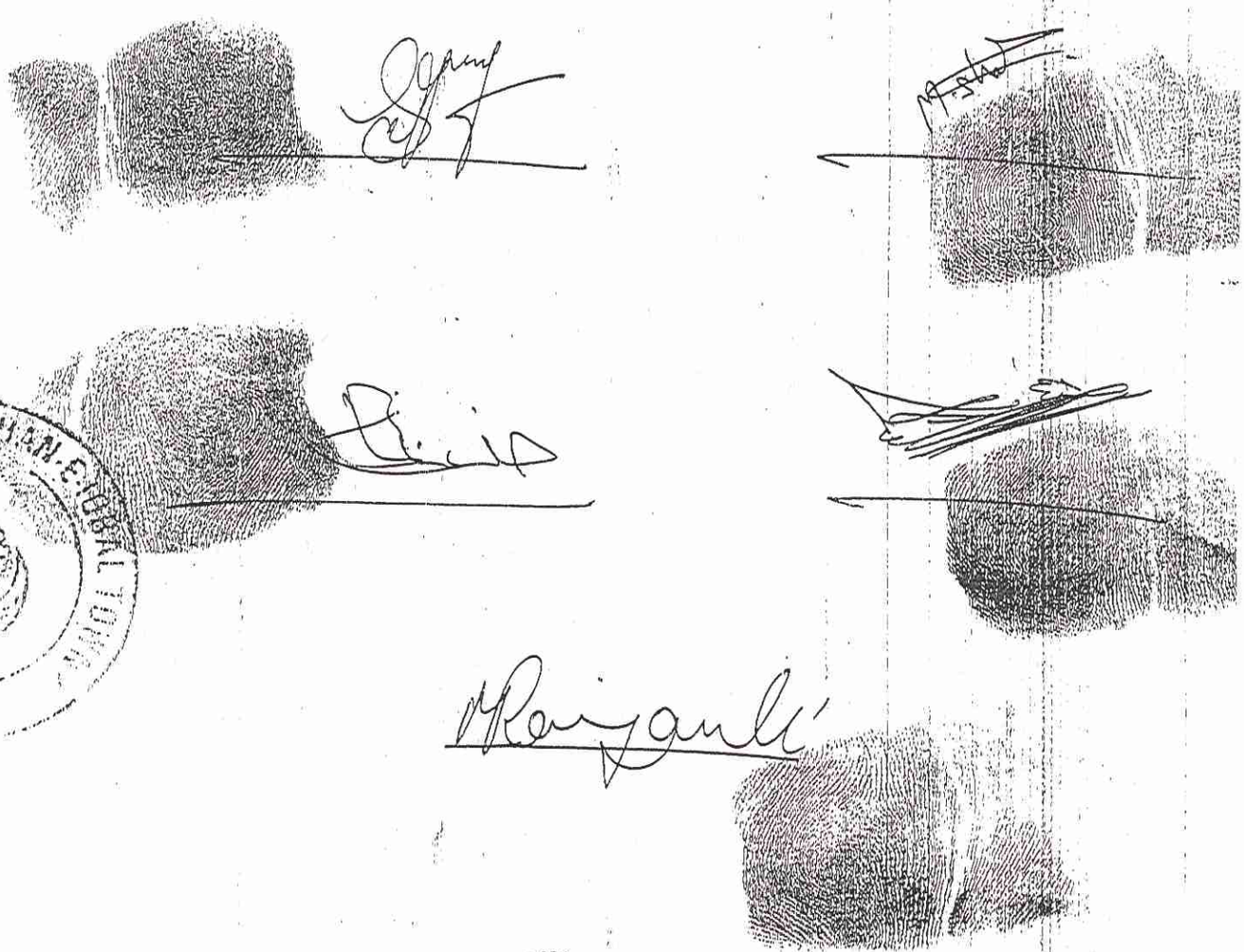
Vendee _____
(2) KARIM BUKHSH GABOL
NIC No.41207-6776858-1.





Vendee _____
(3) MUHAMMAD RAMZAN GABOL.
NIC No.42501-4715162-7.

Mr:~~Mrs:Miss~~: Muhammad Ramzan Gabol
S/o ~~D/o W/o~~ Hazoor Bakhsh Gabol
Executing Party Business/~~Service~~ ____
Muslim ____ Age: 22
R/o Gulzar-e-Hijri Karachi
Admits execution of this deed
NIC NO: 42501-7715762-7



MEHBOOB HUSSAIN
Advocate Karachi
L.No. 1137 K.B.A.

States that he personally knows the above executant and identifies him.
Date: 11 FEB 2009

Sub-Registrar-II
Gulshan-e-Iqbal Town, Karachi
Khudadad Khan

Adj for C.U.T. & Land clearance
& Pay order

SUB-REGISTRAR-II
GULSHAN-E-IQBAL TOWN
KARACHI.
Khudadad Khan

Rs. 284000/= Rupees Two Lac Eighty four thousand Six Hundred only Paid and Received, hence the document order for Registration.

SUB-REGISTRAR-II
GULSHAN-E-IQBAL TOWN
KARACHI.

17 FEB 2009

Registered No: 1073
Book No: 1
Date: 17 FEB 2009

Khudadad Khan

Sub-Registrar-II
Gulshan-e-Iqbal Town, Karachi

Khudadad Khan

SUB-REGISTRAR-II GULSHAN-E-IQBAL TOWN KARACHI

M.F. Roll No:U 18986
5732

Photo-Registrar. Karachi
Date....2/03/2009



حکومت پاکستان

قومی شناختی کارڈ

42101-5339174-7

نام: محمد یوسف صدیقی

جنس: مرد

والد کا نام: محمد یونس

شناختی علامت: کوئی نہیں

تاریخ پیدائش: 25/12/1956





شناختی نمبر: 42101-5339174-7 خاندان نمبر: L535FF

موجودہ پتہ: مکان نمبر B-400

بلاک 13 گلستان سعد ایسٹ پی ای ایچ ایس، کراچی

ڈاکخانہ ایسٹ پی ای ایچ ایس، تحصیل و ضلع کراچی وسطی

مستقل پتہ: ایضاً

تاریخ اجراء: 23/11/2002 تاریخ تنسیخ: 31/10/2007

گمشدہ کارڈ ملنے پر قریبی نیشنل بینک میں ڈال دیں







R. No: 1073
Sub-Registrar-II
Gulshan-e-Iqbal Town, Karachi







Annex VI: Geotechnical (Soil) Investigation Report

MR. HAZOOR BUKSH GABOOL
MR. KARIM BUKSH GABOOL
AND MR. RAMZAN BUKSH GABOOL

R E P O R T
O N
SUBSOIL INVESTIGATION
FOR BUILDING
ON PLOT # NC-21 (02 ACRES), SECTOR 34-A
SCHEME-33, DEH DOZAN
TAPPO GUJRO, KARACHI

APRIL, 2022

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

R E P O R T
O N
SUBSOIL INVESTIGATION
FOR BUILDING
ON PLOT # NC-21 (02 ACRES) SECTOR 34-A
SCHEME- 33, DEH DOZAN, TAPPO GUJRO
K A R A C H I

C O N T E N T S

S.No.	I t e m		Page
1.	INTRODUCTION		1
2.	PROGRAM OF INVESTIGATION		2
3.	SUBSURFACE CHARACTERISTICS		4
4.	FOUNDATION RECOMMENDATIONS		5
	4.1	General	5
	4.2	Foundation Type	5
	4.3	Allowable Bearing Capacity	6
	4.4	Stability of Excavation	6
	4.5	Dewatering	6
	4.6	Seismic Coefficients	7
	4.7	Cement Type	7

A P P E N D I X

R E P O R T
O N
SUBSOIL INVESTIGATION
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SCHEME- 33, DEH DOZAN, TAPPO GUJRO
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1. INTRODUCTION:

Mr Hazoor Buksh Gabool, Mr Karim Buksh Gabool and Mr. Ramzan Buksh Gabool have planned to construct a building on Plot # NC-21 (02 Acres), Sector 34-A, Scheme-33, Deh Dozan, Tappo Gujro, Karachi. The project shall comprise of double basement plus ground plus 20 storeys.

M/s Yakoob & Rameez Associates are providing consultancy services to the project.

In order to obtain geotechnical information for the design of foundations, a program of subsoil investigation was undertaken at the site. The job of subsoil investigation was awarded to `*Geotechnical Services',* Karachi. The job was accomplished in March, 2022.

The program of investigation comprised drilling of nine boreholes, varying in depth from 60.0-100.0 feet.

In order to ascertain the degree of compactness of soil, standard penetration tests (SPTs) were performed at regular depth intervals where found feasible. Moreover core samples were extracted using double tube core barrel.

Selected soil and water samples were tested in the laboratory of 'Geotechnical Services', Karachi, for the evaluation of geo-engineering characteristics of subsoil materials.

This report presents a review of subsurface investigation performed at the project site. The field and laboratory test results have been used in the interpretation of soil design parameters. The report incorporates recommendations regarding the type and allowable bearing capacity of foundations.

2. PROGRAM OF INVESTIGATION:

Field Investigation

The program of subsurface investigation at the project site consisted of drilling nine boreholes. 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	60.0
BH-4	60.0
BH-5	60.0
BH-6	60.0
BH-7	60.0
BH-8	60.0
BH-9	100.0

The locations of these boreholes are shown on borehole location plan appended to this report.

Standard penetration tests (SPTs) were performed at various depth horizons wherever found feasible. These tests were performed in accordance with ASTM Designation D-1586. This test gives indication of 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

Moreover, core samples were extracted by means of double tube core barrel. 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 sample.

Laboratory Testing:

In order to arrive at a rational evaluation of the geotechnical properties of the substrata, a program of laboratory testing was undertaken in the laboratory of Geotechnical Services. The testing was generally performed as per ASTM Standards.

The laboratory tests were conducted on selected soil and water samples:

- Grain size analysis
- Atterberg limits
- Moisture content
- Unconfined Compression
- Bulk density
- 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.

3. SUBSURFACE CHARACTERISTICS:

Subsurface investigation has revealed that top 10.0-17.0 feet consist of very dense, fine to coarse SAND, fragmented SANDSTONE and very stiff to hard, clayey SILT deposits. This is followed by medium hard, SILTSTONE and SANDSTONE which continues up to the investigated depth of 100.0 feet.

It must be noted that in boreholes BH-5, BH-6 & BH-9, top 5.0-12.0 feet consist of fill material.

Major subsurface deposits can be described as follows:

A. Brown, very dense, fine to coarse SAND

B. Brown, fragmented SANDSTONE

C. Brownish gray, very stiff to hard, clayey SILT

D. Brown/ Gray, medium hard, SILTSTONE

E. Gray, medium hard, SANDSTONE

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

Ground Water Table was encountered at the depth of about 3.0 feet below the existing ground level.

4. FOUNDATION RECOMMENDATIONS:

4.1 General:

The foundation of a structure is considered satisfactory if it satisfies the following requirements:

a) The foundation must be safe against the possibility of shear failure.

b) The foundation must not undergo excessive settlements.

c) It must be adequately designed in case of problematic soils such as collapsible soils, expansive clay, dispersive soils etc.

4.2 Foundation Type:

The choice about the foundation type has been made on the basis of geotechnical properties of the substrata, type of structure and anticipated loading conditions.

A study of site plan shows that top 10.0-17.0 feet consist of very dense, fine to coarse SAND, fragmented SANDSTONE and very stiff to hard, clayey SILT deposits. This is followed by medium hard, SILTSTONE and SANDSTONE which continues up to the investigated depth.

Taking into account the subsoil conditions and anticipated structural loads, it is recommended that proposed structure be supported on **raft foundation** placed at 18.0 feet depth below the existing ground level.

4.3 Allowable Bearing Capacity:

Allowable (gross) bearing capacity of **raft foundation** (with basement) placed at **18.0 feet** depth below the existing ground level should be adopted as **3.50 tons/ft^2**

Modulus of subgrade reaction at 18.0 feet may be adopted as 140 kcf.

It is important to note that before placing foundation concrete the excavations should be carefully inspected to ensure that foundation is being placed in competent stratum. This precaution is necessary to guard against localized fills and inhomogenities.

4.4 Stability of Excavation:

A study of site plan shows that on two sides of the subject plot, there is an offset of 10.0 feet from the property line. On the third side, one portion is contiguous while one has an offset of 15.0 feet from the property line. On the fourth side, there exists road.

During the excavation, it will be essential to maintain the stability of excavation cuts. This can be done by providing proper shoring / bracing. On the side which is contiguous to the plot, secant pile must be installed.

It is essential to keep the excavation dry and excavation should be performed during dry season.

4.5 Dewatering:

Since groundwater occurs at about 3.0 feet depth, dewatering must be efficient so that the excavation is kept dry. This can be achieved by a system of well points or by submersible pumps.

However, the ground water regime can change with the passage of time depending upon the climatic conditions and environmental changes.

4.6 Seismic Coefficients:

According to the Uniform Building Code (1997), the soil profile falls in **'S_B'** category.

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

4.7 Cement Type:

Sulphate content in ground water has been found to be excessive. It is, therefore, recommended that Sulphate Resistant Cement (SRC) be used in foundation concrete. Moreover, since chloride content is also high, measures must be taken to protect rebars from corrosion. This may be done by adopting lower water cement ratio and greater concrete cover.

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For GEOTECHNICAL SERVICES

SAIF AHMED SAEED, P.E.
B.E. (Civil), M. Engg. (AIT)
AMASCE, MIE (Pak), Consult 882

C E R T I F I C A T E

This is to certify that I, Saif Ahmed Saeed, am submitting the soil investigation report for building on Plot # NC-21 (02 acres), Sector 34-A, Scheme-33, Deh Dozan Tappo Gujro, Karachi, which has been carried out under my guidance and supervision. The recommended bearing capacity is given on page 6 and summarized below:

- Allowable (gross) bearing capacity of **raft foundation** (with basement) placed at **18.0 feet** depth below the existing ground level should be adopted as **3.50 tons/ft^2**

I certify that following conditions have been observed while performing the entire soil investigation:

1. I was present at site from 26.02.22 to 07.03.22 when field work of the subsoil investigation was in progress on above site.

2. The representative of subsoil testing laboratory Mr. Asif Yusuf was 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

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

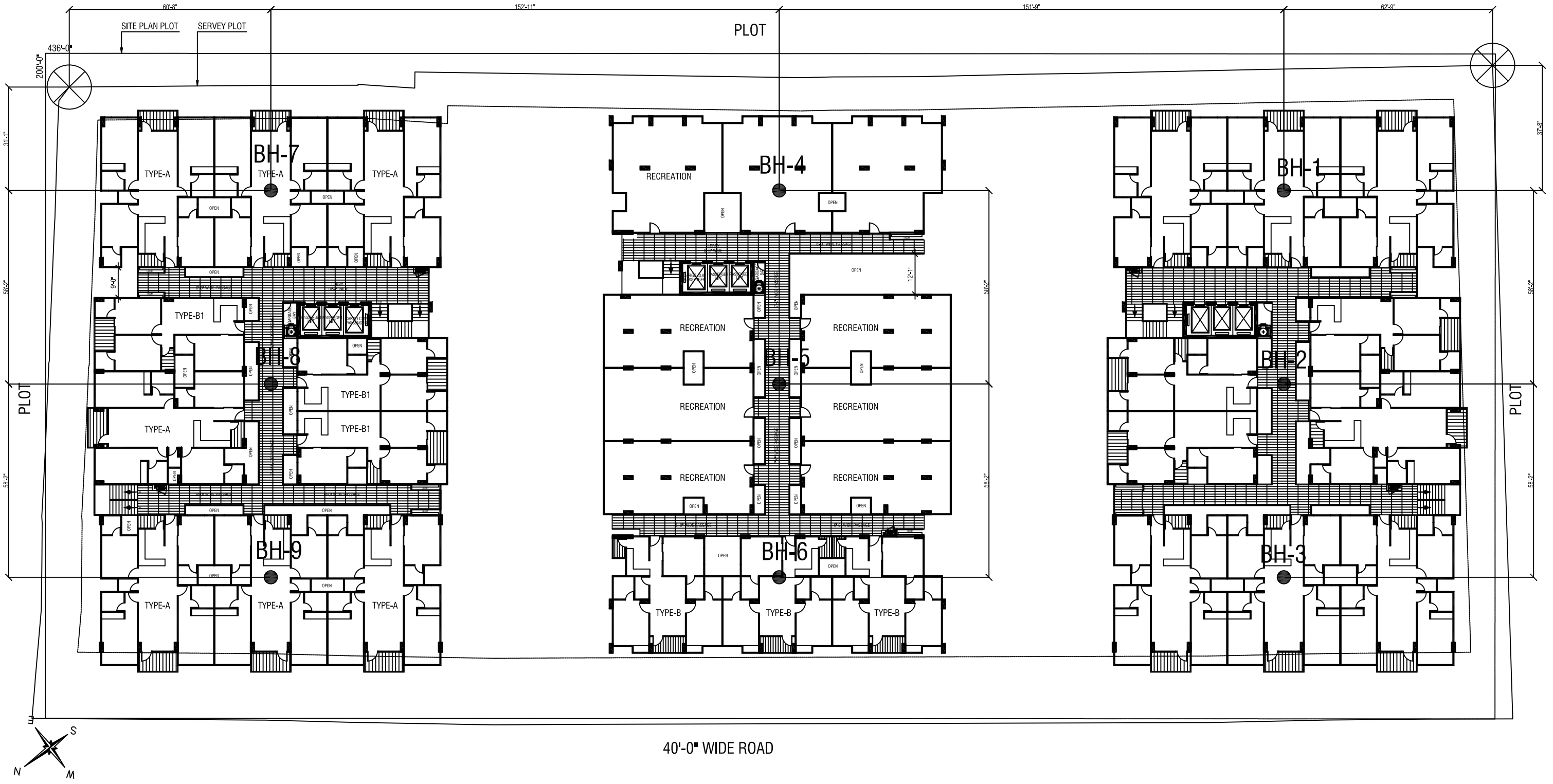
   BY LAMB & WHITMAN

5. FOUNDATION ENGINEERING

   BY PECK, HANSON & THORNBURN

…….

A P P E N D I X


60'-8"
152'-11"
151'-9"
62'-9"
SITE PLAN PLOT
SERVEY PLOT
PLOT
436'-0"
200'-0"
31'-1"
56'-2"
37'-8"
BH-7
BH-8
BH-9
BH-4
BH-5
BH-6
BH-1
BH-2
BH-3
TYPE-A
TYPE-B
TYPE-B1
RECREATION
OPEN
9'-4"
12'-1"
PLOT
E
S
N
M
40'-0" WIDE ROAD

GEOTECHNICAL SERVICES

Bore Hole No BH-1

Sheet 1 of 2

SUBSURFACE EXPLORATION LOG

Project **PLOT # NC-21 (02 ACRES), SECTOR 34-A, SCHEME-33, DEH DOZAN, TAPPO GUJRO, KARACHI**

Ground Water Depth 3.58 feet

Geologist M. Asif Yousuf/ mk

Type of Boring ROTARY

Date 26.02.22 TO 28.02.22

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	SM	Brownish gray, very dense, silty, fine to coarse SAND, little gravel						
	SPT-1				50/6"				
4.0									
	SPT-2		Brown, fragmented BOULDERS with cemented sand		50/2"				05
9.0	SPT-3				50/4"				
	CORE	ML	Brown, hard, clayey SILT, trace to little sand			48	18	3.06	10
	SPT-4				50/6"				Waxed Core 10.17-10.50
	CORE					50	Nil		
	SPT-5				50/2"				15
17	CORE					62	22	3.10	Waxed Core 16.50-17.00
	CORE					99	66		20
									Waxed Core 20.00-20.50
	CORE					63	23		25
									Waxed Core 25.00-25.42
	CORE		Brown, medium hard, SILTSTONE with interlayers of sand			95	73	25.13	30
									Waxed Core 33.17-33.66
	CORE					80	58		35
									Waxed Core 37.33-37.84
	CORE					88	23		40
									Waxed Core 43.08-43.42
	CORE					93	23		45
									Waxed Core 47.00-47.42
50									50

GEOTECHNICAL SERVICES

Bore Hole No BH-1

Sheet 2 of 2

SUBSURFACE EXPLORATION LOG

Project **PLOT # NC-21 (02 ACRES), SECTOR 34-A, SCHEME-33, DEH DOZAN, TAPPO GUJRO, KARACHI**

Ground Water Depth 3.58 feet

Geologist M. Asif Yousuf/ mk

Type of Boring ROTARY

Date 26.02.22 TO 28.02.22

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		Gray, medium hard, SILTSTONE with interlayers of sand			61	18		Waxed Core 50.00-50.42
								19.13	55
	CORE					45	15		Waxed Core 55.00-55.33
									60
	CORE					62	15		Waxed Core 61.50-61.84
									65
	CORE					60	15		Waxed Core 66.00-66.58
									70
	CORE					80	52		Waxed Core 70.66-71.33
								21.01	75
	CORE					77	70		Waxed Core 75.66-76.33
									80
	CORE					65	60		Waxed Core 81.00-81.66
									85
	CORE					60	40		Waxed Core 85.33-85.75
									90
	CORE					70	25	26.89	Waxed Core 91.25-91.84
									95
	CORE					72	44		Waxed Core 95.33-95.92
100									100

BOTTOM OF BOREHOLE

GEOTECHNICAL SERVICES

Bore Hole No BH-2

Sheet 1 of 2

SUBSURFACE EXPLORATION LOG

Project **PLOT # NC-21 (02 ACRES), SECTOR 34-A, SCHEME-33, DEH DOZAN, TAPPO GUJRO, KARACHI**

Ground Water Depth 2.50 feet

Geologist M. Asif Yousuf/ mk

Type of Boring ROTARY

Date 28.02.22 TO 01.03.22

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	SM	Brownish gray, very dense, silty, fine to coarse SAND, little gravel		50/2"				
6.0	SPT-2		Brown, fragmented SANDSTONE with gravel		50/4"				05
	CORE	ML	Brown, hard, clayey SILT, trace to little sand			57	Nil		
	SPT-3				50/6"				
	CORE					60	10	4.69	10 Waxed Core 10.50-11.00
15	SPT-4				50/2"				15
	CORE		Brown, medium hard, SILTSTONE with interlayers of sand			60	23		Waxed Core 16.00-16.50
	CORE					62	20	4.11	20 Waxed Core 20.00-20.50
	CORE					57	20		25 Waxed Core 25.00-25.42
	CORE					63	25		30 Waxed Core 30.50-31.00
	CORE					70	15		35 Waxed Core 39.00-39.42
	CORE					63	40	14.90	40 Waxed Core 41.33-41.84
	CORE					60	25		45 Waxed Core 45.00-45.42
50									50

GEOTECHNICAL SERVICES

Bore Hole No BH-2

Sheet 2 of 2

SUBSURFACE EXPLORATION LOG

Project **PLOT # NC-21 (02 ACRES), SECTOR 34-A, SCHEME-33, DEH DOZAN, TAPPO GUJRO, KARACHI**

Ground Water Depth 2.50 feet

Geologist M. Asif Yousuf/ mk

Type of Boring ROTARY

Date 28.02.22 TO 01.03.22

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, medium hard, SILTSTONE with interlayers of sand			58	20	14.36	Waxed Core 50.00-50.42
55	CORE					65	30		Waxed Core 55.50-55.92
60			BOTTOM OF BOREHOLE						60

GEOTECHNICAL SERVICES

Bore Hole No BH-3

Sheet 1 of 2

SUBSURFACE EXPLORATION LOG

Project **PLOT # NC-21 (02 ACRES), SECTOR 34-A, SCHEME-33, DEH DOZAN, TAPPO GUJRO, KARACHI**

Ground Water Depth 3.58 feet

Geologist M. Asif Yousuf/ mk

Type of Boring ROTARY

Date 02.03.22

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, silty, fine sand, trace coarse sand						
	SPT-1	ML	Brownish gray, very stiff, clayey SILT, trace sand, trace gravel		19				
7.5	SPT-2				24				05
	CORE SPT-3				47	80	Nil		
	CORE		Brown, hard, clayey SILT/ soft SILTSTONE, trace sand			45	10	7.31	10 Waxed Core 11.50-12.00
15	CORE					77	50		15 Waxed Core 18.50-18.92
	CORE					70	20	9.89	20 Waxed Core 21.00-21.66
	CORE					67	30		25 Waxed Core 25.00-25.42
	CORE		Brown, medium hard, SILTSTONE with interlayers of sand			60	20		30 Waxed Core 30.50-31.00
	CORE					65	27	13.51	35 Waxed Core 35.50-36.00
	CORE					67	28		40 Waxed Core 41.00-41.42
	CORE					67	15		45 Waxed Core 45.84-46.25
50									50

GEOTECHNICAL SERVICES

Bore Hole No BH-3

Sheet 2 of 2

SUBSURFACE EXPLORATION LOG

Project **PLOT # NC-21 (02 ACRES), SECTOR 34-A, SCHEME-33, DEH DOZAN, TAPPO GUJRO, KARACHI**

Ground Water Depth 3.58 feet

Geologist M. Asif Yousuf/ mk

Type of Boring ROTARY

Date 02.03.22

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, medium hard, SILTSTONE with interlayers of sand			70	35		Waxed Core 50.84-51.33
55	CORE					68	32		Waxed Core 55.00-55.50
60			BOTTOM OF BOREHOLE						60

GEOTECHNICAL SERVICES

Bore Hole No BH-4

Sheet 1 of 2

SUBSURFACE EXPLORATION LOG

Project **PLOT # NC-21 (02 ACRES), SECTOR 34-A, SCHEME-33, DEH DOZAN, TAPPO GUJRO, KARACHI**

Ground Water Depth 3.83 feet

Geologist M. Asif Yousuf/ mk

Type of Boring ROTARY

Date 02.03.22 TO 03.03.22

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		Brown, silty, fine to coarse SAND, trace gravel		26				
	SPT-2	ML	Brown, very stiff, clayey SILT, little sand		31				05
10.5	SPT-3				29				10
	CORE	ML	Brown, hard, clayey SILT, trace sand			50	50		Waxed Core 14.50-15.00
15	SPT-4				50/6"			3.60	15
	CORE		Brown, hard, clayey SILT/ soft SILTSTONE, with interlayers of sand			60	28		Waxed Core 19.00-19.66
	CORE					62	20	4.46	20 Waxed Core 20.84-21.33
	CORE					65	18		25 Waxed Core 26.00-26.42
30	CORE		Brown, medium hard, SILTSTONE with interlayers of sand			63	14		30 Waxed Core 34.00-34.33
	CORE					67	10	7.72	35 Waxed Core 36.50-37.00
	CORE					63	15		40 Waxed Core 40.50-40.92
	CORE					65	12		45 Waxed Core 45.00-45.58
50									50

GEOTECHNICAL SERVICES

Bore Hole No BH-4

Sheet 2 of 2

SUBSURFACE EXPLORATION LOG

Project **PLOT # NC-21 (02 ACRES), SECTOR 34-A, SCHEME-33, DEH DOZAN, TAPPO GUJRO, KARACHI**

Ground Water Depth 3.83 feet

Geologist M. Asif Yousuf/ mk

Type of Boring ROTARY

Date 02.03.22 TO 03.03.22

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, medium hard, SILTSTONE with interlayers of sand			70	17	12.44	Waxed Core 51.42-51.92
55	CORE					75	14		Waxed Core 56.25-56.58
60			BOTTOM OF BOREHOLE						60

GEOTECHNICAL SERVICES

Bore Hole No BH-5

Sheet 1 of 2

SUBSURFACE EXPLORATION LOG

Project **PLOT # NC-21 (02 ACRES), SECTOR 34-A, SCHEME-33, DEH DOZAN, TAPPO GUJRO, KARACHI**

Ground Water Depth 3.41 feet

Geologist M. Asif Yousuf/ mk

Type of Boring ROTARY

Date 03.03.22 TO 04.03.22

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		Fill comprising of sandy clay/ clayey sand, clayey silt, fine sand & gravel						
	SPT-1				07				
5.5	SPT-2				19				05
	SPT-3	ML	Brown, very stiff, clayey SILT, little sand		27				
10.5									10
	CORE					90	30	10.71	Waxed Core 11.17-11.84
									Waxed Core 13.58-14.17
									15
	CORE					95	25	30.97	Waxed Core 16.33-16.88
									20
	CORE					63	10		Waxed Core 20.33-20.84
									25
	CORE		Brown, medium hard, SILTSTONE with interlayers of sand			67	14	18.38	Waxed Core 25.33-25.75
									30
	CORE					70	08		Waxed Core 30.50-30.92
									35
	CORE					67	10		Waxed Core 36.33-36.84
									40
	CORE					63	15		Waxed Core 42.00-42.50
									45
	CORE					65	12	21.04	Waxed Core 47.17-47.50
50									50

GEOTECHNICAL SERVICES

Bore Hole No BH-5

Sheet 2 of 2

SUBSURFACE EXPLORATION LOG

Project **PLOT # NC-21 (02 ACRES), SECTOR 34-A, SCHEME-33, DEH DOZAN, TAPPO GUJRO, KARACHI**

Ground Water Depth 3.41 feet

Geologist M. Asif Yousuf/ mk

Type of Boring ROTARY

Date 03.03.22 TO 04.03.22

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, medium hard, SILTSTONE with interlayers of sand			70	17		Waxed Core 51.84-52.33
55									
	CORE					75	14		Waxed Core 55.33-55.84
60			BOTTOM OF BOREHOLE						60

GEOTECHNICAL SERVICES

Bore Hole No BH-6

Sheet 1 of 2

SUBSURFACE EXPLORATION LOG

Project **PLOT # NC-21 (02 ACRES), SECTOR 34-A, SCHEME-33, DEH DOZAN, TAPPO GUJRO, KARACHI**

Ground Water Depth 3.58 feet

Geologist M. Asif Yousuf/ mk

Type of Boring ROTARY

Date 02.03.22 TO 03.03.22

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		Fill comprising of sandy gravel, clayey silt, fine to coarse sand & gravel						
	SPT-1				50/4"				
5.5	SPT-2				26				05
	SPT-3	ML	Brown, very stiff to hard, clayey SILT, trace sand		36				10
	SPT-4				50/6"				
13	CORE					99	15		Waxed Core 14.66-15.00
	CORE					62	07	5.58	15 Waxed Core 16.33-16.66
	CORE					65	20		20 Waxed Core 20.33-20.84
	CORE					63	15		25 Waxed Core 25.25-25.75
	CORE		Brown, medium hard, SILTSTONE with interlayers of sand			67	25	11.00	30 Waxed Core 30.50-31.00
	CORE					70	18		35 Waxed Core 36.00-36.50
	CORE					68	10	7.24	40 Waxed Core 40.50-41.00
	CORE					72	35		45 Waxed Core 45.00-45.58
50									50

GEOTECHNICAL SERVICES

Bore Hole No BH-6

Sheet 2 of 2

SUBSURFACE EXPLORATION LOG

Project **PLOT # NC-21 (02 ACRES), SECTOR 34-A, SCHEME-33, DEH DOZAN, TAPPO GUJRO, KARACHI**

Ground Water Depth 3.58 feet

Geologist M. Asif Yousuf/ mk

Type of Boring ROTARY

Date 02.03.22 TO 03.03.22

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, medium hard, SILTSTONE with interlayers of sand			80	27		Waxed Core 50.25-50.25
55								24.31	
	CORE					82	40		Waxed Core 56.00-56.50
60			BOTTOM OF BOREHOLE						60

GEOTECHNICAL SERVICES

Bore Hole No BH-7

Sheet 1 of 2

SUBSURFACE EXPLORATION LOG

Project **PLOT # NC-21 (02 ACRES), SECTOR 34-A, SCHEME-33, DEH DOZAN, TAPPO GUJRO, KARACHI**

Ground Water Depth 3.75 feet

Geologist M. Asif Yousuf/ mk

Type of Boring ROTARY

Date 27.02.22 to 01.03.22

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)
2.5	DS		Brown, silty, fine sand, trace coarse sand						
	SPT-1				17				
	SPT-2	ML	Brownish gray, very stiff, clayey SILT, little sand		24				05
	SPT-3				27				10
13.5	CORE SPT-4				31	72	Nil		
15	CORE SPT-5		Brown, hard, clayey SILT/ soft SILTSTONE		50/6"	88	44	4.57	Waxed Core 13.84-14.17
	CORE		Brown, medium hard, SILTSTONE with interlayers of sand			54	15		15
	CORE					78	15	9.43	Waxed Core 19.08-19.50
	CORE					77	28	8.75	20
	CORE					45	08		Waxed Core 21.50-21.84
	CORE					60	07		25
	CORE					60	08	11.14	Waxed Core 26.00-26.33
	CORE					56	08		30
50									Waxed Core 31.00-31.42
									35
									Waxed Core 35.66-36.50
									40
									Waxed Core 40.25-40.66
									45
									Waxed Core 49.08-49.50
									50

GEOTECHNICAL SERVICES

Bore Hole No BH-7

Sheet 2 of 2

SUBSURFACE EXPLORATION LOG

Project **PLOT # NC-21 (02 ACRES), SECTOR 34-A, SCHEME-33, DEH DOZAN, TAPPO GUJRO, KARACHI**

Ground Water Depth 3.75 feet

Geologist M. Asif Yousuf/ mk

Type of Boring ROTARY

Date 27.02.22 TO 01.03.22

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, medium hard, SILTSTONE with interlayers of sand			62	12		Waxed Core 53.84-54.50
55	CORE					60	07		Waxed Core 55.50-55.84
60			BOTTOM OF BOREHOLE						60

GEOTECHNICAL SERVICES

Bore Hole No BH-8

Sheet 1 of 2

SUBSURFACE EXPLORATION LOG

Project **PLOT # NC-21 (02 ACRES), SECTOR 34-A, SCHEME-33, DEH DOZAN, TAPPO GUJRO, KARACHI**

Ground Water Depth 3.00 feet

Geologist M. Asif Yousuf/ mk

Type of Boring ROTARY

Date 01.03.22 TO 02.03.22

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	CORE SPT-1		Brown, fragmented SANDSTONE with sand		27	50	Nil		
7.5	SPT-2	ML	Brown, very stiff to hard, clayey SILT with interlayers of sand		34				05
10	CORE SPT-3		Brown, hard, clayey SILT/ soft SILTSTONE		50/4"	80	35	6.74	Waxed Core 9.00-9.50
	CORE		Brown, medium hard, SILTSTONE with interlayers of sand			53	30		10 Waxed Core 11.17-11.58
	CORE					60	10		15 Waxed Core 19.00-19.58
	CORE					57	20	8.20	20 Waxed Core 20.50-21.00
	CORE					65	18		25 Waxed Core 25.42-25.84
	CORE					70	37	16.29	30 Waxed Core 30.42-30.92
	CORE					67	17		35 Waxed Core 35.17-35.66
	CORE					63	17		40 Waxed Core 40.66-41.33
	CORE					60	07		45 Waxed Core 45.33-45.66
50									50

GEOTECHNICAL SERVICES

Bore Hole No BH-8

Sheet 2 of 2

SUBSURFACE EXPLORATION LOG

Project **PLOT # NC-21 (02 ACRES), SECTOR 34-A, SCHEME-33, DEH DOZAN, TAPPO GUJRO, KARACHI**

Ground Water Depth 3.00 feet

Geologist M. Asif Yousuf/ mk

Type of Boring ROTARY

Date 01.03.22 TO 02.03.22

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, medium hard, SILTSTONE with interlayers of sand			63	07	13.90	Waxed Core 50.66-51.00
55	CORE					70	15		Waxed Core 55.00-55.42
60			BOTTOM OF BOREHOLE						60

GEOTECHNICAL SERVICES

Bore Hole No BH-9

Sheet 1 of 2

SUBSURFACE EXPLORATION LOG

Project **PLOT # NC-21 (02 ACRES), SECTOR 34-A, SCHEME-33, DEH DOZAN, TAPPO GUJRO, KARACHI**

Ground Water Depth 3.25 feet

Geologist M. Asif Yousuf/ mk

Type of Boring ROTARY

Date 05.03.22 TO 07.03.22

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		Fill comprising of silty, fine to coarse sand, trace gravel, roots, concrete pieces & sandy silt						
	SPT-1				50/2"				
	SPT-2				50/2"				05
	SPT-3				50/2"				
	SPT-4				50/2"				10
12.5	CORE		Brown fragmented SANDSTONE/ BOULDERS			75	Nil		
15	SPT-5				50/2"				15
	CORE		Brown, medium hard, SILTSTONE with interlayers of sand			45	Nil		
	CORE					60	07		20
								8.00	Waxed Core 24.00-24.33
	CORE					62	08		25 Waxed Core 25.50-25.92
	CORE					60	10		30 Waxed Core 30.00-30.50
	CORE					65	07	13.01	35 Waxed Core 36.17-36.50
	CORE					67	10		40 Waxed Core 43.50-44.00
	CORE					65	10		45 Waxed Core 45.50-46.00
50									50

GEOTECHNICAL SERVICES

Bore Hole No BH-9

Sheet 2 of 2

SUBSURFACE EXPLORATION LOG

Project **PLOT # NC-21 (02 ACRES), SECTOR 34-A, SCHEME-33, DEH DOZAN, TAPPO GUJRO, KARACHI**

Ground Water Depth 3.25 feet

Geologist M. Asif Yousuf/ mk

Type of Boring ROTARY

Date 05.03.22 TO 07.03.22

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		Gray, medium hard, SILTSTONE with interlayers of sand			62	07	25.59	Waxed Core 50.17-50.50
	CORE					70	10		55 Waxed Core 56.00-56.50
	CORE					67	10		60
	CORE					72	10	22.38	65 Waxed Core 66.00-66.50
	CORE					70	12		70 Waxed Core 70.84-71.42
	CORE					65	10		75 Waxed Core 75.42-75.92
	CORE					70	10	18.24	80 Waxed Core 81.00-81.50
	CORE					75	08		85 Waxed Core 85.00-85.42
	CORE					75	15		90 Waxed Core 90.25-90.84
94	CORE		Gray, medium hard, SANDSTONE with interlayers of silt			72	17	23.48	95 Waxed Core 95.84-96.33
100									100

BOTTOM OF BOREHOLE

PROJECT : PLOT # NC-21, SECTOR # 34-A, SCHEME # 33, KARACHI

DATE: April 20, 2022.
L.R. No.: 149/22

GRAIN SIZE ANALYSIS (PER CENT FINER BY WEIGHT) **HYDROMETER**
SIEVE SIZES IN mm **(DIA IN mm)**

S No	BH NO.	SAMPLE	DEPTH (ft)	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-1	3.00	100	94	86	78	68	63	56	52	41	30	18	09	02
2.	BH-1	Waxed Core	10.17-10.50	-	-	100	99	98	97	96	95	91	82	65	38	18
3.	BH-2	SPT-2	6.00	-	-	100	99	98	97	96	94	87	78	58	30	14
4.	BH-2	Waxed Core	10.50-11.00	-	-	-	-	-	100	99	98	97	85	62	32	15
5.	BH-3	SPT-3	9.00	-	-	-	-	-	100	98	97	95	82	60	32	15
6.	BH-4	SPT-2	6.00	-	-	100	99	98	97	95	93	87	78	55	32	15
7.	BH-4	Waxed Core	14.50-15.00	-	-	100	99	98	97	96	95	92	84	62	34	16
8.	BH-5	SPT-1	3.00	-	100	86	73	65	62	58	56	51	43	34	24	12
9.	BH-6	SPT-3	9.00	-	-	-	100	99	98	97	96	93	81	60	34	16
10.	BH-7	SPT-2	6.00	-	-	100	98	96	95	94	92	87	80	61	32	14

PROJECT : PLOT # NC-21, SECTOR # 34-A, SCHEME # 33, KARACHI

DATE: April 20, 2022.
L.R. No.: 149/22
SHEET 1 OF 3

ATTERBERG LIMITS / MOISTURE CONTENT

S. NO.	BORING NO.	SAMPLE	DEPTH (ft)	LIQUID LIMIT	PLASTICITY INDEX	MOISTURE CONTENT (%)
1.	BH-1	Waxed Core	10.17-10.50	41	17	18.64
2.	BH-1	Waxed Core	16.50-17.00	34	11	19.67
3.	BH-1	Waxed Core	33.17-33.66	39	15	12.93
4.	BH-1	Waxed Core	55.00-55.33	34	11	12.70
5.	BH-1	Waxed Core	75.66-76.33	33	11	12.72
6.	BH-1	Waxed Core	91.25-91.84	32	10	9.93
7.	BH-2	SPT-2	6.00	30	10	14.71
8.	BH-2	Waxed Core	10.50-11.00	34	11	18.75
9.	BH-2	Waxed Core	20.00-20.50	31	10	12.20
10.	BH-2	Waxed Core	39.00-39.42	32	11	12.09
11.	BH-2	Waxed Core	50.00-50.42	34	12	12.70
12.	BH-3	SPT-3	9.00	32	11	22.96
13.	BH-3	Waxed Core	11.50-12.00	32	10	13.90
14.	BH-3	Waxed Core	21.00-21.66	42	15	15.73
15.	BH-3	Waxed Core	35.50-36.00	32	10	11.81

…….cont'd

PROJECT : PLOT # NC-21, SECTOR # 34-A, SCHEME # 33, KARACHI

DATE: April 20, 2022.
L.R. No.: 149/22
SHEET 2 OF 3

ATTERBERG LIMITS / MOISTURE CONTENT

S. NO.	BORING NO.	SAMPLE	DEPTH (ft)	LIQUID LIMIT	PLASTICITY INDEX	MOISTURE CONTENT (%)
16.	BH-4	SPT-2	6.00	33	11	19.68
17.	BH-4	Waxed Core	14.50-15.00	36	13	18.86
18.	BH-4	Waxed Core	19.00-19.66	33	12	18.93
19.	BH-4	Waxed Core	34.00-34.33	34	12	12.60
20.	BH-4	Waxed Core	51.42-51.92	33	11	16.25
21.	BH-5	SPT-1	3.00	27	09	21.71
22.	BH-5	Waxed Core	11.17-11.84	33	11	15.03
23.	BH-5	Waxed Core	16.33-16.84	33	12	12.90
24.	BH-5	Waxed Core	25.33-25.75	33	11	12.31
25.	BH-5	Waxed Core	47.17-47.50	32	11	11.58
26.	BH-6	SPT-3	9.00	36	13	20.20
27.	BH-6	Waxed Core	16.33-16.66	37	13	16.35
28.	BH-6	Waxed Core	30.50-31.00	32	11	11.74
29.	BH-6	Waxed Core	40.50-41.00	43	17	16.55
30.	BH-6	Waxed Core	56.00-56.50	32	11	9.27

…….cont'd

PROJECT : PLOT # NC-21, SECTOR # 34-A, SCHEME # 33, KARACHI

DATE: April 20, 2022.
L.R. No.: 149/22
SHEET 3 OF 3

ATTERBERG LIMITS / MOISTURE CONTENT

S. NO.	BORING NO.	SAMPLE	DEPTH (ft)	LIQUID LIMIT	PLASTICITY INDEX	MOISTURE CONTENT (%)
31.	BH-7	SPT-2	6.00	32	10	21.24
32.	BH-7	Waxed Core	13.84-14.17	31	11	16.23
33.	BH-7	Waxed Core	19.08-19.50	33	10	14.97
34.	BH-7	Waxed Core	26.00-26.33	34	11	12.86
35.	BH-7	Waxed Core	40.25-40.66	38	14	12.52
36.	BH-8	Waxed Core	9.00-9.50	32	11	12.80
37.	BH-8	Waxed Core	20.50-21.00	31	09	18.88
38.	BH-8	Waxed Core	30.42-30.92	33	12	12.29
39.	BH-8	Waxed Core	50.66-51.00	33	11	12.65
40.	BH-9	Waxed Core	24.00-24.33	37	13	7.31
41.	BH-9	Waxed Core	36.17-36.50	31	09	11.17
42.	BH-9	Waxed Core	50.17-50.50	32	11	11.48
43.	BH-9	Waxed Core	66.00-66.50	31	10	10.77
44.	BH-9	Waxed Core	81.00-81.50	33	10	8.92

PROJECT : PLOT # NC-21, SECTOR # 34-A, SCHEME # 33, KARACHI

DATE: April 20, 2022.
L.R. No.: 149/22
SHEET 1 OF 2

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	10.17-10.50	3.06	5.26	2.082
2.	BH-1	Waxed Core	16.50-17.00	3.10	8.26	2.084
3.	BH-1	Waxed Core	33.17-33.66	25.13	2.73	2.257
4.	BH-1	Waxed Core	55.00-55.33	19.13	1.39	2.191
5.	BH-1	Waxed Core	75.66-76.33	21.01	1.45	2.219
6.	BH-1	Waxed Core	91.25-91.84	26.89	2.70	2.270
7.	BH-2	Waxed Core	10.50-11.00	4.69	6.49	2.092
8.	BH-2	Waxed Core	20.00-20.50	4.11	4.81	2.090
9.	BH-2	Waxed Core	39.00-39.42	14.90	1.41	2.166
10.	BH-2	Waxed Core	50.00-50.42	14.36	4.80	2.163
11.	BH-3	Waxed Core	11.50-12.00	7.31	6.89	2.127
12.	BH-3	Waxed Core	21.00-21.66	9.89	5.86	2.147
13.	BH-3	Waxed Core	35.50-36.00	13.51	1.13	2.158
14.	BH-4	Waxed Core	14.50-15.00	3.60	15.82	2.089
15.	BH-4	Waxed Core	19.00-19.66	4.46	8.59	2.095
16.	BH-4	Waxed Core	34.00-34.33	7.72	3.84	2.140
17.	BH-4	Waxed Core	51.42-51.92	12.44	3.47	2.168
18.	BH-5	Waxed Core	11.17-11.84	10.71	8.29	2.156
19.	BH-5	Waxed Core	16.33-16.84	30.97	2.72	2.296
20.	BH-5	Waxed Core	25.33-25.75	18.38	1.39	2.200

……cont'd

PROJECT : PLOT # NC-21, SECTOR # 34-A, SCHEME # 33, KARACHI

DATE: April 20, 2022.
L.R. No.: 149/22
SHEET 2 OF 2

UNCONFINED COMPRESSION / BULK DENSITY

S. NO.	BORING NO.	SAMPLE	DEPTH (ft)	UNCONFINED COMPRESSION		BULK DENSITY (gm/cc)
				qu (kg/cm^2)	STRAIN (%)	
21.	BH-5	Waxed Core	47.17-47.50	21.04	2.43	2.225
22.	BH-6	Waxed Core	16.33-16.66	5.58	8.06	2.104
23.	BH-6	Waxed Core	30.50-31.00	11.00	2.69	2.160
24.	BH-6	Waxed Core	40.50-41.00	7.24	6.40	2.138
25.	BH-6	Waxed Core	56.00-56.50	24.31	2.61	2.255
26.	BH-7	Waxed Core	13.84-14.17	4.57	11.60	2.092
27.	BH-7	Waxed Core	19.08-19.50	9.43	5.87	2.145
28.	BH-7	Waxed Core	26.00-26.33	8.75	5.35	2.140
29.	BH-7	Waxed Core	40.25-40.66	11.14	4.12	2.152
30.	BH-8	Waxed Core	9.00-9.50	6.74	4.12	2.121
31.	BH-8	Waxed Core	20.50-21.00	8.20	10.42	2.139
32.	BH-8	Waxed Core	30.42-30.92	16.29	1.42	2.175
33.	BH-8	Waxed Core	50.66-51.00	13.90	2.81	2.166
34.	BH-9	Waxed Core	24.00-24.33	8.00	2.65	2.144
35.	BH-9	Waxed Core	36.17-36.50	13.01	1.26	2.170
36.	BH-9	Waxed Core	50.17-50.50	25.59	1.37	2.264
37.	BH-9	Waxed Core	66.00-66.50	22.38	2.84	2.233
38.	BH-9	Waxed Core	81.00-81.50	18.24	2.65	2.199
39.	BH-9	Waxed Core	95.84-96.33	23.48	1.25	2.243

PROJECT : PLOT # NC-21, SECTOR # 34-A, SCHEME # 33, KARACHI

DATE: April 20, 2022.
L.R. No.: 149/22

CHEMICAL TESTS

S. NO.	BORING NO.	SAMPLE	DEPTH (ft)	TOTAL DISSOLVED SALTS	SULPHATE CONTENT	CHLORIDE CONTENT	pH VALUE
1.	BH-5	SPT-1	3.00	-	0.085 %	-	-
2.	BH-6	WATER	-	20000 mg/lit	342 mg/lit	7900 mg/lit	7.70
3.	BH-9	WATER	-	19400 mg/lit	329 mg/lit	7650 mg/lit	7.70


BH#09


BH#01


BH#02


BH#03


BH#04


BH#05


BH#06


BH#08