

ENVIRONMENTAL IMPACT ASSESSMENT TELE TOWN, MOUZA GORAMAST ZONE V, ISLAMABAD

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ABBREVIATIONS

CDA	Capital Development Authority
EMMP	Environmental Management and Monitoring Plan
EMP	Environmental Monitoring Program
EPA	Environmental Protection Agency
EPC	Environmental Protection Council
IUCN	International Union for Conservation of Nature
LAA	Land Acquisition Act
NEQS	National Environmental Quality Standards
NGOs	Non-governmental Organizations
NO ₂	Nitrogen Dioxide
PAPs	Project Affected Persons
MMM	Mitigation Management Matrix
SC	Supervisory Consultants
EO	Environmental Officer
MER	Monthly Environmental Report

ANNEXURES

Annexure- A	Layout Plan
Annexure- B	NEQS
Annexure- C	Environmental Testing Report
Annexure-D	Topographic Plan

EXECUTIVE SUMMARY

Just after few years CDA came into being on June 14, 1960, it was seriously felt by the CDA authorities that CDA would not be able to cope the increased residential requirements at a high residential speed due to complicated land acquisition problems and subsequent litigation. Therefore it is decided to invite private sector for the development of a substantial part of Islamabad. For this purpose CDA in exercise of power conferred by section 51 of CDA ordinance 1960 (XXIII of 1960) read with the section II there of got introduced the Islamabad Capital Territory Zoning Regulations 1992. Under this regulation, Islamabad was divided into five zones and the private sector was allowed to purchase/acquire land and develop residential scheme in zone II and zone V. The development was allowed under certain conditions, in accordance with the pattern of residential sectors planned in zone I in the light of modalities and procedure framed under ICT (zoning) Regulation 1992.

Tele Town is aimed to serve the residents of Islamabad City hoping to make a home of their own in the serene environs of Islamabad, the beautiful. The concept revolves primarily to deliver the shared need for a balance between personal and communal space. Emphasis has been laid on developing a functional hierarchy of all proposed uses while catering for the best planning practices. The natural topography of the scenic Potohar Region has been exploited to its best, optimizing cost effective design solutions. The proposed layout enriches the sense of place while offering exceptional view and vistas. It augments economic stimulus, education, and most importantly community pride. The project is not limited to volumes and façades, instead the quality of life of users, the quality of the environment generated is the design crux. The location of the housing estate has been instrumental in the genesis an development of the project. The project site is located 14 km east of Islamabad Highway in Moza Dhora Mast next to Gulberg g. Bimber Tarar Road lead to the project site.

The Master Planning, detailed designing of infrastructure and buildings in Tele Town Zone –V have been designed in compliance with the **“Modalities and Procedures framed under ICT (Zone) Regulations 1992” issued by Capital Development Authority (CDA).**

This report presents the findings of the Initial Environmental Examination (IEE) carried out by the team of experts on behalf of the Tele Town, Islamabad for the proposed project titled “Tele Town, Mouza Goramast, Zone-V, Islamabad”.

The Pakistan Environmental Protection Act, 1997 makes it mandatory for the project proponents to carry out an Environmental Impact Assessment of development projects and incorporate environmental and social mitigation measures as part of the project planning and obtain clearance from the Pak-EPA before the project is implemented.

The approach adopted for carrying out EIA study include review of proposed master plan, environmental baseline survey of the project which includes baseline information related to physical, ecological & social environment, analysis of collected data, impact identification and suggesting mitigation measures and preparation of environmental management plan based on identified impacts and suggested mitigation measures.

The main objectives of the Environmental Impact Assessment study are as follows:

- ✕ Determine pre-project state of affair to assess post-project condition if they have changed for better or worse;
- ✕ Document all the resources likely to be affected due to the implementation of the proposed project.
- ✕ Provide maximum information to the proponent and other stakeholder about the exiting environmental conditions and the implication of the proposed project;
- ✕ Allow planners to alleviate potential impacts of the proposed project on different environmental condition such as physical environment, biological environment and socio-economic environment; and
- ✕ Aid decision makers to take informed decisions.

At the end an Environmental Management and Monitoring Plan (EMMP) have been developed. EMMP provides an overall approach for managing and monitoring the environment related issues and describes the institutional framework and reporting mechanism to implement the EMMP for the proposed development.

The EMMP consists of the following sections:

- ✕ Legislations, guidelines and Environmental Standards
- ✕ Organizational structure and roles and responsibilities

-
- ✗ Mitigation Management Matrix (MMM)
 - ✗ Environmental monitoring program
 - ✗ Communication and documentation
 - ✗ Change management plan
 - ✗ Training program

Based on the findings an environmental mitigation management plan and a comprehensive monitoring program has been proposed. Monitoring protocol provides details of parameters to be monitored, frequency, and location of sampling and monitoring points for ambient air stack emissions, soil contamination, surface-water, wastewater and groundwater. The environmental monitoring at pre-construction stage and other in-house monitoring to be carried out by the Contractor(s) will be the part of his contract agreement.

The main conclusions of the Environmental Impact Assessment includes solid waste and soil contamination problems Pollution of existing surface water resources and spring water, disruption to infrastructure facilities. Quality of life will be improved due to improved socioeconomic conditions in the project area. Ecological disturbance of the area due to cutting of trees may be an adverse impact during the construction of the Project but the green areas provided in the project along with Nullah Banks will definitely improve the overall environment. The moderate impact will be on air quality due to generation of dust and exhaust gases and generation of high noise levels during the project construction and operation.

The environmental study has established that operation of Tele Town, shall not impact adversely on socio-economic conditions prevailing in the area and will in fact be beneficial in many respects. Based on overall assessment of impact of the reviewed project, it is concluded that the proposed project is not likely to cause any significant adverse impact on the social, physical and biological environment of the area, provided that suitable mitigation measures are implemented. It is further concluded that all potential environmental concerns associated with the project have been adequately addressed.

1. INTRODUCTION

1.1. GENERAL

This report presents the findings of the Environmental Impact Assessment carried out for the proposed project titled “**Tele Town, Mouza Goramast, Zone V Islamabad**”.

This EIA report has been prepared to conform to the requirements of Section 12 of the Pakistan Environmental Protection Act 1997 (PEPA), the Pakistan Initial Environmental Examination and Environmental Impact Assessment Review Regulations, 2000 and the guidelines provided in the Pakistan Environmental Assessment Procedures, 1997.

1.2. THE PROJECT

Just after few years CDA came into being on June 14, 1960, it was seriously felt by the CDA authorities that CDA would not be able to cope the increased residential requirements at a high residential speed due to complicated land acquisition problems and subsequent litigation. Therefore, it is decided to invite private sector for the development of a substantial part of Islamabad. For this purpose CDA in exercise of power conferred by section 51 of CDA ordinance 1960 (XXIII of 1960) read with the section II there of got introduced the Islamabad Capital Territory Zoning Regulations 1992. Under this regulation, Islamabad was divided into five zones and the private sector was allowed to purchase/acquire land and develop residential scheme in zone II and zone V. The development was allowed under certain conditions, in accordance with the pattern of residential sectors planned in zone I in the light of modalities and procedure framed under ICT (zoning) Regulation 1992.

Tele Town is aimed to serve the residents of Islamabad City hoping to make a home of their own in the serene environs of Islamabad, the beautiful. The concept revolves primarily to deliver the shared need for a balance between personal and communal space. Emphasis has been laid on developing a functional hierarchy of all proposed uses while catering for the best planning practices. The natural topography of the scenic Potohar Region has been exploited to its best, optimizing cost effective design solutions. The proposed layout enriches the sense of place while offering exceptional view and vistas. It augments economic stimulus, education, and most importantly –

community pride. The project is not limited to volumes and façades, instead the quality of life of users, the quality of the environment generated is the design crux. The location of the housing estate has been instrumental in the genesis and development of the project. The project site is located 14 km east of Islamabad Highway in Moza Dhora Mast next to Gulberg Residencia. Bimber Tarar Road leads to the project site.

1.3. NAME AND ADDRESS OF THE CONSULTANTS PREPARING THE REPORT

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1.4. NAME OF PROJECT

The name of the Project under this study is “Tele Town, Mouza Goramast, Zone V, Islamabad”.

1.5. AIMS & OBJECTIVES OF ENVIRONMENTAL IMPACT ASSESSMENT

This report serves two purposes. Firstly, it provides necessary information to the Pakistan Environmental Protection Agency to determine whether the project poses any environmental threat. Secondly, it shall serve as a ready-reckoner for the proponents to manage the project during construction and operation in an environment-friendly manner and abide especially by recommendations of the Environmental Management Plan and the Environmental Monitoring Programme.

The main **aims and objectives** of this Environmental study are to identify baseline environmental, physical and socio-economic conditions pertaining to the project, examine project alternatives, and discuss potential impact, along with formulation of suitable mitigation measures for environment-friendly implementation of the scheme. These are summarised as follows:

- ✓ Identification and assessment of all environmental impacts or social sensitivity, whether major or minor, caused during site development, construction and the operational stage in order to formulate an effective Environmental Management Plan;
- ✓ Suggest measures required to mitigate any possible adverse environmental impact through minimisation, elimination, reversal or compensation of such impact;
- ✓ Pinpoint and assess all possible impacts of project operation on the natural, physical, biological and socio-economic environment of the project area and evaluate these both qualitatively and quantitatively, wherever possible, and determine their significance in light of technical and regulatory concerns, as well as those relating to public perceptions, and
- ✓ Prepare an Initial Environmental Examination report presenting recommendations for effective implementation of the project in a manner that it does not compromise the environment existing at the project site or pose any environmental threat in the immediate foreseeable future.

In order to ascertain possible environmental impacts posed by the project, the study has been divided into the following sub-tasks:

- ✓ Identification of various legal and statutory requirements as set forth by the Pakistan Environmental Protection Act, 1997, and guidelines for preparation and review of environmental studies;
- ✓ Collection and scrutiny of data related to physical, ecological and socio-economic aspects of the project site and surrounding areas;
- ✓ Identification and evaluation of salient environmental impacts;
- ✓ Identification of mitigation measures required to minimise negative externalities of the project, and
- ✓ Preparation of an Environmental Management Plan and an Environmental Monitoring Programme.

The Environmental Examination is a tool to delineate all possible adverse environmental impacts that might result from a project and to measure their severity and risks associated. Mitigation measures are thereafter evolved for impacts that have minor or moderate adverse fallout. Identification of an adverse impact is the cornerstone of the environmental assessment matrix and its efficacy depends largely on professional expertise of the team carrying out the environmental examination in line with established guidelines. The significance of all adverse impacts is thereafter evaluated in terms of severity and possibility of occurring. The impact evaluation

process prioritises each potential impact and filters out those that are insignificant or of no consequence. The significance of impacts is then juxtaposed with likely effects on the natural eco-system, level of public concern and conformity with legislative or statutory obligations. The assessment of severity takes into account the nature, magnitude, extent and location, timing and duration, and reversibility of the potential impact.

Characterisation of the significant impacts provides the basis to formulate measures for mitigation and monitoring. During the course of this environmental examination, all impacts were identified and examined on the basis of field data, secondary data, expert opinion, and findings of other similar studies. Impact identification and classification of the impacts is a precursor to framing appropriate mitigation measures, which include practices, technologies or activities which avert, reduce, reverse or compensate for such impacts. Finally, the Environmental Management Plan provides for effective implementation of mitigation measures. The Environmental Management Plan features controls to minimise identified impacts, and suggests a monitoring regime to study residual impacts, if any, during operation of the project. It prescribes procedures to be followed and identifies roles and responsibilities during the operation, including post-project reporting

1.6. SCOPE OF EIA

Laws, rules, regulations and guidelines that were considered while formulating this report include:

- ✓ Pakistan Environmental Protection Act, 1997
- ✓ Guidelines for preparation and review of environmental reports;
- ✓ Guidelines for public participation;
- ✓ Guidelines for sensitive and critical areas;
- ✓ Sectoral guidelines for construction and urban development projects;
- ✓ Sectoral guidelines for housing estates and new town Development;
- ✓ Pakistan Environmental Protection Agency Review of Initial Environmental Examination and Initial Environmental Examination Regulations, 2000;
- ✓ Policy and procedures for the filing, review and approval of environmental studies by the concerned Environmental Protection Agency of the federal or provincial governments, and
- ✓ Rules and regulations of the Capital Development Authority, Islamabad, relating to development of housing projects.

This study evaluates environmental, social, physical and other aspects of the project, both during construction and operation, and identifies measures necessary to mitigate any environmental impact on any segment of local and surrounding

environment. It also provides information to assist the concerned government agency to reach a decision to issue the Environmental Approval applied for by the proponent. The study has specifically followed, to the extent possible “Guidelines for the Preparation and Review of Environmental Report” circulated in November 1997, and related instructions covering environmental reports.

1.7. EIA METHODOLOGY

Key steps followed while conducting the study were screening, scoping, data collection and compilation, environmental screening and impact assessment, documentation and consultation. Environmental samples were collected by laboratory technicians and analysed at a certified laboratory. Screening comprised compilation and review of information on the project. Most of this information was obtained from the proponents and added to data on relevant legislation, regulations, guidelines and standards. Scoping involved a review of collected information and identification of potential environmental issues. Data collection and compilation was necessary to develop an environmental baseline of the project area. Review of secondary sources as well as primary and field data was also carried out. Environmental screening and impact assessment process of this study determined potential impacts of the project through examination and testing of environmental, socio-economic, and project information.

Subsequently, potential impacts were characterised in order to analyse significance. Mitigation measures were identified where required to minimise environmental impacts. A management framework was also developed in the form of an Environmental Management Plan for implementation of identified mitigation measures.

Consultation with the proponents and other stakeholders, such as local residents and persons that might be affected by the project was carried out at the same time essentially to establish public concerns about the project and pinpoint any aspect that may have been overlooked during preparatory work.

Documentation was the last step of the study, which comprised collation of data and preparation of the report along with requisite appendices in proof of the study and its findings. Accordingly, this report includes a brief description of the project, an overview of environmental legislation relevant to the project, a description of baseline environmental and socio-economic conditions in the project area, and potential project impacts and mitigation measures. Findings from visits to a number of housing

estates of similar nature were examined to observe environmental concerns associated with operation of such projects in order to assess what adverse environmental impacts can be anticipated at Tele Town and to evolve tested mitigation measures.

The environmental consultants also remain in touch with all government agencies involved in regulation of projects of such nature. These include authorities responsible for traffic regulation, civil defence, water and sanitation, forestry, environment, traffic engineering and planning, housing and drainage in the Islamabad Capital Territory administration and the Capital Development Authority.

1.8. PROJECT JUSTIFICATION

The housing sector is considered one of the major indicators of socio-economic growth of a country. Development of housing has direct and indirect linkages with the construction sector and a horde of upstream and downstream industries. This sector has unfortunately been plagued for long by a myriad of issues. Some of the major features of the sector are:

- ✦ The country's population grew from 84.254 million in 1981 to 130.58 million in 1998, showing an overall increase of 54.98 percent. The estimated population currently stands at 188.02 million, growing at a rate of 1.95 percent. The growth rate for urban centres is higher. Accordingly, there is increasing pressure on housing in urban areas, particularly on fast-growing cities such as Islamabad, Lahore and Karachi;
- ✦ Total number of housing units in the country according to the last census held in 1998 was 19.3 million.⁴ A vast majority of 67.7 percent of the dwellings was in rural areas. Out of the housing stock, 39 percent were *kachha* houses, 40 percent were semi-*kachha* houses, and only 21 percent comprised constructed housing. The census of 1998 estimated that there was a housing backlog of 4.30 million housing units, which has grown to just over 30 million in 2014 as per historical growth of the shortage;
- ✦ There continues to be unchecked growth of squatter settlements (*kacchi abadis*), despite a strict government policy not to regularise tenements that developed after a certain cut-off date. Encroachment of state and private land is a direct outcome of both the housing shortage and unabated, unsystematic rural-urban migration. It is estimated that as much as 50 percent of urban population currently subsists in *kacchi abadis*, slums, tenements and squatter settlements, thereby leading to massive degradation of the environment. Accordingly, alternate housing for such residents is required at affordable prices or terms and conditions;

- ✗ Annual additional housing requirement is estimated to be around 570,000 housing units whereas annual production is estimated at around 300,000 housing units, thereby resulting in a recurring backlog of 270,000 housing units every year;
- ✗ Land suitable especially for communal housing is becoming scarce in and around urban centres, where the rate of growth of population is the highest. Land values continue to increase, mainly on account of speculation, with the result that the lower and middle-income groups find it increasingly difficult to buy land at affordable prices;
- ✗ The existing stock of housing is aging rapidly. Estimates suggest that as much as 50 percent of the housing units are more than fifty years old and deteriorating progressively because of lack of civic sense, wilful neglect, high costs of maintenance, low rental returns and non-availability of housing finance at affordable mark-up;
- ✗ The share of housing in the public sector development framework has remained negligible and continues to decline. It dropped from 10.9 percent in the First Five Year Plan to 5.9 percent in the Seventh Five Year Plan and continues to decrease steadily. Shortage of finance is the major constraint on not only the development of the sector but also on maintenance and growth. The financial sector has been unable to offer viable mark-ups for housing and the sector remains a confine mainly of the high-income group. The House Building Finance Corporation is the only formal public sector housing finance institution, and has its own constraints, the main being poor recovery from middle- and low-income segments of population;
- ✗ The cost of building materials has soared due to the rising spiral of prices. According to latest statistics, as many as 80 percent of households have a monthly income below Rs. 10,000 per month, which is indicative of growing income-shelter gap and deteriorating affordability for a majority of households comprising low-income groups;
- ✗ The project shall lead to increase in revenues for the government and the CDA from water charges, gas, electricity, income tax, property tax and other local levies;
- ✗ With full development of the project, the project area shall have access to full-scale facilities such as roads, water supply, sewerage, drainage, electricity, natural gas, telephone, and other modern facilities;
- ✗ Development of the housing scheme will create jobs and spur economic activity in a less developed part of the city and also open the project area for development of other housing projects;
- ✗ CDA estimates revenue generation of Rs. 10.13 billion from sale of residential plots and Rs. 0.57 billion from disposal of the commercial sites, which could add approximately Rs. 10.70 billion from the estate. This will help recover not only the cost

of project development but also enhance CDA income, thereby leaving a sufficient revenue surplus to cover additional needs arising from provision of civic amenities to the area.

A lack of adaptation of innovative technology and materials and negligible research carried out in housing is leading to extravagant and skewed investment patterns in construction and unreasonably high construction costs across the board, which cannot be sustained by middle income population or those in income brackets below. Quality housing facilities thus must be provided to the public by an established housing development authority that has expertise for town planning and development, but shall also ensure that all town planning parameters and regulations are followed strictly.

The housing situation is particularly severe in Rawalpindi-Islamabad due to ever increasing demand for housing resulting from urbanisation and significance of Islamabad's status as the national capital. Islamabad's picturesque landscape, higher quality of life, healthy atmosphere, modern infrastructure, increasing business and employment opportunities and better standards of urban facilities are a major attraction for people from all over the country, especially the surrounding areas. Demand for residential plots in Islamabad in particular is increasing at almost geometric progression, whereas the supply side is weak due to non-development of residential sectors by the CDA on account of various factors. The twin-cities are becoming more and more congested, leading to cramped living spaces, pressures on civic amenities and support services, and impacting adversely on the environment.

2. POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

2.1. GENERAL

This Chapter provides an overview of the policy framework and national legislation for environmental and social assessment guidelines that apply to the proposed project Tele Town, Mouza Goramast, Zone V, Islamabad for controlling the environmental consequences. The Tele Town is expected to comply with all national legislation relating to the environment and obtain all the required regulatory clearances.

2.2. NATIONAL POLICY AND ADMINISTRATIVE FRAMEWORK

The Pakistan National Conservation Strategy (NCS), which was approved by the federal cabinet in March 1992, is the principal policy document on environmental issues in the country (EUAD/IUCN, 1992).

The GoP promulgated PEPA in 1997. Two organizations, the Pakistan Environmental Protection Council (PEPC) and the Pakistan Environmental Protection Agency (Pak-EPA), are primarily responsible for administering the provisions of the Act. The PEPC oversees the functioning of the Pak-EPA. Its members include representatives of the government, industry, non-governmental organizations, and the private sector. The Pak-EPA is required to ensure compliance with the National Environmental Quality Standards (NEQS) and establish monitoring and evaluation systems. As the primary implementing agency in the hierarchy, it is responsible for identifying the need for, as well as initiating legislation whenever necessary. The Pak-EPA is also authorized to delegate powers to its provincial counterparts, the provincial Environmental Protection Agencies/Department (EPAs or EPD). One of the functions delegated by the Pak-EPA to provincial EPAs/EPD is the review and approval of environmental assessment reports of projects undertaken in their respective jurisdictions.

2.3. POLICIES AND LEGISLATION RELATED TO ISLAMABAD

This section provides an overview of the policy framework, national legislation and other guidelines regarding environment. The study is organized in light of laws, regulations and guidelines most relevant to scope of the project so that it becomes

compliant with national legislation relating to the environment and CDA development laws.

2.3.1. ICT DEVELOPMENT LAWS AND REGULATIONS

The Capital Development Authority (CDA) has the responsibility for the overall planning, provision and supervision of public health services, covering adequate sanitation and garbage disposal within the territorial limits of the Islamabad Capital Territory (ICT). It also has the responsibility for the coordination of public health services with other relevant agencies. This includes collection, transportation and safe disposal of liquid and solid waste collected from residential areas, commercial areas, open spaces etc.

The CDA operations are governed generally by the provisions of the Islamabad Capital Territory Municipal Bye Laws, 1968 as amended from time to time; and specifically by the Islamabad Regulations 1979 (Upkeep of Cleanliness) as amended from time to time.

Although CDA is responsible and authorized to work in whole ICT limits but CDA municipal operations limits are short of ICT limits, the remaining part is served through union councils.

2.3.2. ISLAMABAD CAPITAL TERRITORY (ZONING) REGULATION, 2005

For administration and land use characterization, through this regulation the Islamabad Capital territory has been delineated into following five zones;

Zone-1

This zone constitutes sectors up to the existing alignment of the G.T. road from the point of intersection of G.T. road with Shah rah-e-Kashmir to the point of the Nicolson Monument inclusive of sector H-14, H-15, H-16, H-17, I-14, I-15, I-16, I-17.

Zone -2

The zone consists of an area bounded by G.T. road in the north & north east, north of Shah rah-e-Kashmir and Capital limits in the west, comprising residential sectors G-15 (part), G-16, G-17, F-15 (part), F-16, F-17, E-15 (part), E-16, E-17, D-16, D-17, C-17, AND B-17.

Zone-3

Margalla Hills National Park as notified under section 21 of the Islamabad Wildlife (Protection, Preservation, Conservation & Management) Ordinance 1979, Other protected ranges, forest areas and un-acquired land falling between the Margallah Hills & north of Murree Road shall constitute this zone.

Zone-4

This zone comprises Islamabad Park and rural periphery wedged between Murree road towards north and Lehtrar road towards south and extending beyond Simly road up to the ICT limits in the north east. This zone excludes the part of Margalla Hills National Park and Rawal Lake.

Zone-5

This zone comprises areas falling south of Islamabad Park and extending up to outer limits of ICT towards south, south west and south east.

2.4. ENVIRONMENTAL LAWS AND REGULATIONS

The enactment of environmental legislation covering multiple areas of concern is a relatively newly initiated process in Pakistan. Whereas, a basic policy and legislative framework for the protection of the environment and biodiversity in the country is now in place, detailed rules, regulations and guidelines required for the implementation of the policies and enforcement of legislation are mostly formulated. The following sections present a brief overview of the existing national policies, legislation and guidelines as well as a few international conventions to which Pakistan is a signatory.

2.4.1. PAKISTAN ENVIRONMENTAL PROTECTION ACT 1997

The Pakistan Environmental Protection Act, 1997 (PEPA) is the fundamental legislation empowering the government to formulate regulations for protecting the environment. It is broadly applicable to air, water, soil, marine and noise pollution, as well as to the handling of hazardous waste. Penalties have been prescribed for those contravening the provisions of the Act. The powers of the federal and provincial Environmental Protection Agencies (EPAs) have also been considerably enhanced under this legislation. In addition, the EPAs have been empowered to conduct inquiries into possible breaches of environmental law either upon the registration of a complaint or on their own accord. Under section 12 of PEPA (1997), no project involving construction activities or any change in the physical environment can be undertaken unless an Initial Environmental Examination (IEE)

or EIA, as required, is conducted and a report submitted to the federal or provincial EPA.

2.4.2. NATIONAL ENVIRONMENTAL ACTION PLAN (NEAP-SP)

The Government of Pakistan (GoP) and United Nations Development Program (UNDP) have jointly initiated an umbrella support program called the National Environmental Action Plan - Support Program (NEAP-SP) signed in October 2001 and implemented in 2002. The development objective supported by NEAP-SP is environmental sustainability and poverty reduction in the context of economic growth.

2.4.3. NATIONAL ENVIRONMENTAL POLICY, 2005

The National Environmental Policy (NEP) was approved by the Pakistan Environmental Protection Council (PEPC) in its 10th meeting on 27th December 2004 under the chairmanship of the Prime Minister of Pakistan. Thereafter, it was approved by the Federal Cabinet on 29th June 2005. NEP is the primary policy document of Government of Pakistan that addresses Pakistan's environmental issues. The broad goal of NEP is, "To protect, conserve and restore Pakistan's environment in order to improve the quality of life of the citizens through sustainable development". The NEP also provides the sectoral and cross-sectoral guidelines, listed in following paragraphs, for various sectors to achieve its goal of sustainable development:

Sectoral Guidelines - are available in the following areas:

Water Supply and Management; Air Quality and Noise; Waste Management; Forestry, Biodiversity and Protected Areas; Climate Change and Ozone Depletion; Energy Efficiency and Renewable Energy Resources; Agriculture and Livestock; and Multilateral Environmental Agreements.

Cross- Sectoral Guidelines

All environment related policies, programs and projects would be gender sensitive, integrate Poverty, Population and Health. Incorporate effective environmental management in Trade, Local Governance and Natural Disaster Management.

In addition to these sectoral and cross-sectoral guidelines, the NEP 2005 also suggests the following policy instruments to overcome the environmental problems throughout the country;

- ✗ Integration of environment into development planning
- ✗ Legislation and regulatory framework
- ✗ Capacity building of various institutions
- ✗ Economic and market based instruments
- ✗ Public awareness and education
- ✗ Public-private-civil society partnership

While NEP 2005 is a policy document and does not regulate individual projects, however, adopting policy guidelines ensure that the project does not add to the environmental problems identified in NEP. Moreover, adopted mitigation measures will minimize or avoid any contribution to the already existing environmental problems in the project area.

2.4.4. ISLAMABAD ENVIRONMENTAL IMPROVEMENT ACT, 1995

Islamabad Environmental Improvement (Green Areas) Act, 1995 was proposed to (1) prevent the existing green area in the Islamabad Capital Territory from being used for purposes other than those for which they are reserved and (2) ensure that at least 20 % of the total area of any new scheme is reserved for the development of green areas. For the purpose of this Act, "green areas" means land in the Islamabad Master Plan, or other schemes, reserved exclusively for parks, playgrounds, forests, nurseries, vegetative cover, green belts and open spaces on which no construction is planned.

2.4.5. ISLAMABAD WILDLIFE ORDINANCE, 1979

The Islamabad Wildlife (Protection, Preservation, Conservation and Management) Ordinance 1979 provides the protection, preservation, conservation and management of wildlife in Islamabad Capital Territory. Main aim of this act is the preservation and conservation of wildlife, flora and fauna for sustainable development to comply with the concept of national parks internationally.

2.5. ASSOCIATED LAWS AND REGULATIONS

This section outlines the statutes apart from Pakistan Environmental Protection Act, 1997, which are relevant to the project.

2.5.1. LAND ACQUISITION AND RESETTLEMENT REGULATIONS

At present, the only legislation relating to land acquisition and compensation is the Land Acquisition Act (LAA) of 1894. The LAA is, however, limited to a cash compensation policy for the acquisition of land and built-up property, and damage to other assets, such as crops, trees, and infrastructure. The LAA does not consider the rehabilitation and resettlement of disrupted populations and the restoration of their livelihoods.

Experience with large-scale infrastructure development projects implementation has demonstrated the need for a cohesive national policy for resettlement due to reasons that the LAA does not consider the rehabilitation and resettlement of disrupted populations and the restoration of livelihoods and also does not provide any assistance to non-title holders and vulnerable groups. Following a national consultative process, a Draft National Resettlement Policy was prepared in 2002. Details of this policy are not under consideration as this policy is still in draft form. The Project may involve acquisition of private as well as government land. The land will be acquired under the LAA 1894.

2.5.2. FACTORIES ACT, 1934

The clauses of this Act relevant to the project are those that concern the health, safety and welfare of workers, disposal of solid waste and effluent, and damage to private and public property. The Factories Act also provides regulations for handling and disposing of toxic and hazardous materials. Given that construction activity is classified as 'industry' these regulations will be applicable to the project contractors.

2.5.3. PAKISTAN PENAL CODE (1860)

The Pakistan Penal Code (1860) addresses many offences that are liable to enforce levies, fines, imprisonment or both. The fouling of public springs or reservoirs that makes them less fit for ordinary use is also addressed as offensive. The current project is also to reduce violation of this code in case of surface water bodies.

2.5.4. THE BIODIVERSITY ACTION PLAN

Pakistan, being a signatory to the Convention on Biological Diversity (Rio, June 1992), is obligated to develop a national strategy for the conservation of biodiversity. The Government of Pakistan has constituted a Biodiversity Working

Group under the auspices of the Ministry of Environment, Local Government and Rural Development to develop a Biodiversity Action Plan (BAP) for the country. The project to protect water resources of Islamabad is quite supportive to conserve biodiversity in the downstream areas.

2.6. NATIONAL ENVIRONMENTAL QUALITY STANDARDS (NEQS)

The NEQS promulgated under the PEPA 1997 specify standards for industrial and municipal effluents, gaseous emissions, vehicular emissions, and noise levels. The PEPA 1997 empowers the Provincial EPAs to impose pollution charge in case of non-compliance to the NEQS.

2.7. REGULATIONS FOR ENVIRONMENTAL ASSESSMENT AND REPORTING

Under Section 12 (and subsequent amendment) of the 1997 Act, a project falling under any category specified in Schedule II require the proponent to file an EIA with the federal agency. Within ten working days of the IEE or EIA having been deposited, the federal agency will confirm that the document submitted is complete for the purpose of review. During this time, should the federal agency require the proponent to submit any additional information, it will return the IEE or EIA to the proponent for revision, clearly listing those aspects that need further discussion. Subsequently, the federal agency shall make every effort to complete an IEE review within 45 days and an EIA review within 90 days of filing.

2.7.1. PREPARING & REVIEW OF ENVIRONMENTAL REPORTS

The Guidelines for the Preparation and Review of Environmental Reports, Pakistan Environmental Protection Agency, 1997 specify:

- ☒ The nature of the information to be included in environmental reports
- ☒ The minimum qualifications of the EIA/IEE conductors appointed.
- ☒ The need to incorporate suitable mitigation measures at every stage of project implementation.
- ☒ The need to specify monitoring procedures.
- ☒ The terms of reference for the reports are to be prepared by the project proponents themselves. The report must contain baseline data on the project area, detailed assessment thereof, and mitigation measures.

2.7.2. GUIDELINES FOR PUBLIC CONSULTATION

These guidelines deal with possible approaches to public consultation and techniques for designing an effective program of consultation that reaches out to all major stakeholders and ensures that their concerns are incorporated in any impact assessment study.

2.7.3. SECTORAL GUIDELINES

The guidelines for major roads, oil and gas, sewage and water supply, Townships, major Thermal Powers, etc. are structured to assist in identifying key environmental issues related to development projects, as well as the various mitigation measures and alternatives that should be considered and applied accordingly. These guidelines are aimed at intermediate-level projects where the impact is likely to be more significant, as opposed to minor works such as the maintenance, repair, and improvement of existing roads and other infrastructure.

2.8. OTHER ENVIRONMENT-RELATED STATUTES

This section outlines the statutes apart from Pakistan Environmental Protection Act, 1997, which are relevant to the project.

2.8.1. NATIONAL RESETTLEMENT POLICY AND ORDINANCE

At present, the only legislation relating to land acquisition and compensation is the Land Acquisition Act (LAA) of 1894. The LAA is, however, limited to a cash compensation policy for the acquisition of land and built-up property, and damage to other assets, such as crops, trees, and infrastructure. The LAA does not consider the rehabilitation and resettlement of disrupted populations and the restoration of their livelihoods.

Experience with large-scale infrastructure development projects implemented by institutions such as WAPDA has demonstrated the need for a cohesive national policy for resettlement due to reasons that the LAA does not consider the rehabilitation and resettlement of disrupted populations and the restoration of livelihoods and also does not provide any assistance to non-title holders and vulnerable groups. Following a national consultative process, a Draft National Resettlement Policy was prepared in 2002. Details of this policy are not under consideration as this policy is still in draft form.

2.8.2. PROVINCIAL LOCAL GOVERNMENT ORDINANCE, 2001

This ordinance, issued following the devolution process, establish regulations for land use, the conservation of natural vegetation, air, water, and land pollution, the disposal of solid waste and wastewater effluents, as well as matters related to public health and safety.

2.8.3. REGULATION ON MINES & OIL FIELDS AND MINERAL DEV. ACT, 1948

This legislation on Regulation Mines and Oil Fields and Mineral Development Act, 1948 provides regulatory procedures for the quarrying and mining of construction materials on state-owned as well as private land.

2.8.4. EXPLOSIVES ACT, 1884

Under the Explosives Act, the project contractors are bound by regulations on handling, transportation and using explosives during quarrying, blasting, and other purposes.

2.9. RELATED INTERNATIONAL CONVENTIONS, TREATIES & GUIDELINES

This section outlines the international conventions, treaties and guidelines regarding Environmental Protection, which are relevant to the project. Pakistan, being a signatory to these international treaties and conventions on the conservation of the environment and wildlife protection, is obliged to adhere to the commitments specified in these treaties. The relevant international treaties and conventions and the provisions therein have been described in the following paragraphs.

2.10. IUCN RED LIST (2000)

The red list is published by International Union for Conservation of Nature (IUCN) and includes those species that are under potential threat of extinction. These species have been categorized as:

- ☒ **Endangered:** species that are considered to be facing a very high risk of extinction in the wild in near future, reduction of 50% or more either in the last 10 years or over last three generations, survive only in small numbers, or have very small populations.
- ☒ **Vulnerable in Decline:** species that are considered to be facing a risk of extinction in the wild, having an apparent reductions of 20% or more in the last 10 years or three generations.

- ✗ **Vulnerable:** species that are seen to be facing a high risk of extinction in the wild, but not necessarily experiencing recent reductions in population size.
- ✗ **Lower Risk:** species that are seen to be facing a risk of extinction that is lesser in extent than that for any of the above categories.
- ✗ **Data Deficient:** species that may be at risk of extinction in the wild but at present there is insufficient information available to make a firm decision about its status.

2.11. CONVENTION ON BIOLOGICAL DIVERSITY

The Convention on Biological Diversity was adopted during the Earth Summit of 1992 at Rio de Janeiro. The Convention requires parties to develop national plans for the conservation and sustainable use of biodiversity, and to integrate these plans into national development programs and policies. Parties are also required to identify components of biodiversity that are important for conservation, and to develop systems to monitor the use of such components with a view to promoting their sustainable use.

2.12. CONVENTION ON CONSERVATION OF MIGRATORY SPECIES

The Convention on the Conservation of Migratory Species of Wild Animals (CMS), 1979, requires countries to take action to avoid endangering migratory species. The term 'Migratory Species' refers to the species of wild animals, a significant proportion of whose members, cyclically and predictably, cross one or more national jurisdictional boundaries. The parties are also required to promote or co-operate with other countries in matters of research on migratory species.

2.13. IMPLICATION OF ABOVE LEGISLATIONS ON THE PROJECT

The implication of the above mentioned legislations to pre-development, development and operational phases of the Tele Town, Mouza Goramast, Zone V, Islamabad will be as follows:

- ✗ Section 11 of PEPA Act, prohibits discharge or emission of any effluent or waste or air pollutant or noise in excess of the NEQS, or the established ambient standards for air, water or land,
- ✗ The M/s Tele Town will be developed in accordance with Building Energy Code of Pakistan, 2008.

The proponent of the Project will ensure that the development and operational phases of the Project are in-line with the recommendations of the IEE report and the

Environmental Management Plan will be properly implemented. The Environmental Management Plan will make a part of agreement to be signed with the contractor.

3. DESCRIPTION OF PROJECT

3.1. GENERAL

This Chapter provides an overview of the project including main components, infrastructure and other related developmental activities to be carried out in the project area. The Master Planning, detailed designing of infrastructure and buildings in the Zone –V have been designed in compliance. Master Planning in conformity with the **“Modalities and Procedures framed under ICT (Zone) Regulations 1992” issued by Capital Development Authority (CDA).**

3.2. PROJECT DESCRIPTION

Tele Town is redefining the future of affordable stylish living. A lifestyle that exceeds imagination, where there's nothing short of harmony and inspiration. Living in Islamabad within a friendly ambiance and experiencing a comfortable lifestyle is a dream which Tele Town is making a reality.

Tele Town is aimed to serve the residents of Islamabad City hoping to make a home of their own in the serene environs of Islamabad, the beautiful. The concept revolves primarily to deliver the shared need for a balance between personal and communal space. Emphasis has been laid on developing a functional hierarchy of all proposed uses while catering for the best planning practices. The natural topography of the scenic Potohar Region has been exploited to its best, optimizing cost effective design solutions. The proposed layout enriches the sense of place while offering exceptional view and vistas. It augments economic stimulus, education, and most importantly – community pride. The project is not limited to volumes and façades, instead the quality of life of users, the quality of the environment generated is the design crux. The location of the housing estate has been instrumental in the genesis an development of the project. The project site is located 14 km east of Islamabad Highway in Moza Dhora Mast next to Gulberg Residencia. Bimber Tarar Road lead to the project site.

The sewerage treatment plant has been planned at the lower level and after the treatment; the effluent shall be made to flow in the nearby nallah. The grave yard has also been planned and is also accessible by 40ft roads. In short effort has been

made through circulation plan to achieve convenient and smooth flow of traffic with less risk of accidents. The roads shall be landscaped with ornaments type of trees and shrubs for healthy cool environment and for good aesthetic view along the roads. Majority of plots have been given well climately suited orientation i.e. north-south direction.

3.3. SILENT FEATURES

- ✕ Security
- ✕ Entrance Gateway
- ✕ Guarded Physical Surveillance
- ✕ Security Gates, Walls & CCTV

Modern City Infrastructure

- ✕ Underground Electricity Distribution Network
- ✕ Underground Drainage & Sewerage Network
- ✕ Sewerage Treatment Plants
- ✕ Underground WaterSupply Network TubeWells, underground & Overhead Water Storage Facilities.
- ✕ Water Filtration Plants
- ✕ Underground Telecommunication Networks
- ✕ Underground Gas Network

Other Public Building/Amenities

- ✕ Mosques, PoliceStation,
- ✕ PostOffice, Telephone Exchange,
- ✕ Fire Brigade, Grid Station,
- ✕ Transport Terminal, Graveyards etc

Civic & Recreational Facilities

- ✕ Auditoriam, Public Library & Community Centers
- ✕ Amusement Park, Totlots ,Open Spaces
- ✕ Jogging Tracks & Walkways
- ✕ Clubs & Gymnasium
- ✕ Planned Water Bodies/Lakes

- ✕ Sports & Cultural Complex
- ✕ Restaurants, Hotels & Resorts
- ✕ Theater & Ciniplex
- ✕ Golf Club

LandScaping

- ✕ Arboriculture and Horticulture planning of Roads Medians, Walkways, Road Shoulders, along water bodies.
- ✕ Soft & hard Land Scapingo Parks,RoundAbouts, Passive and Active Recreational Sites.

Commercial Facilities

- ✕ Business Avenue & Blue Area
- ✕ Central Commercial Center/Markaz
- ✕ Basic Needs Commercial Centers/Class-III Centers
- ✕ Petrol Pumps & CNG Stations
- ✕ Health Facilities
- ✕ Hospital
- ✕ Dispensaries
- ✕ Clinic & Pharmacies
- ✕ Institutional Facilities
- ✕ Nurseries & Schools
- ✕ Colleges & Universities
- ✕ Residential Facilities
- ✕ Standard Residential Houses (200-1000 Sq.Yds)

3.4. PROJECT COMPONENTS AND ACTIVITES

Key components and activities of the project are shown in the matrix overleaf and described in detail in the ensuing paragraphs. These range from project conception to project operation.

Table 3-1: Project Components

Project Components:	Salient Feature(s):	Purpose(s):
Land acquisition	Land measuring 499.5 kanals is available with the proponents	To develop residential spaces for city residents at an affordable price
Surveying and site Investigations	Included topographical survey, soil investigations, environmental testing etc., which are non-intrusive in nature	To obtain necessary information for detailed design of the project
Designing various components of the project	Included preparation of plans, maps, layout, specification, engineering details and tender documents, and conduct of an environmental study	To provide design and engineering details of the project
Selection of Contractor	Includes transportation of equipment, setting up of site office, construction camp, and assembly of project implementation team	To carry out construction at the site
Site preparation	Includes removal of wild vegetation and land levelling	To facilitate construction activities
Laying of services	Includes water supply system, drainage, electricity, sewerage, storm water disposal etc.	To provide necessary services at the estate
Construction of the housing estate	Includes roads and streets and major buildings, plantations, and landscaping of open areas	To provide necessary services for future residents
Operation of the estate	Includes regular maintenance by the proponents	To provide quality living for residents

3.5. LOCATION OF THE SITE

The location of the housing estate has been instrumental in the genesis and development of the project. The project site is located 14 km east of Islamabad Highway in Moza Dhora Mast next to Gulberg Residencia. Bimber Tarar Road leads to the project site. The location plan attached at Figure 3.1 shows the location of project site within the capital.

Another detailed location plan attached at Figure 3.2 shows the site location in relation to the existing settlements. Village Pharwala and Bagh Jogian are located in the north of project site, while villages Pindoi Hathyal and Narrala are located in the south of proposed project site.

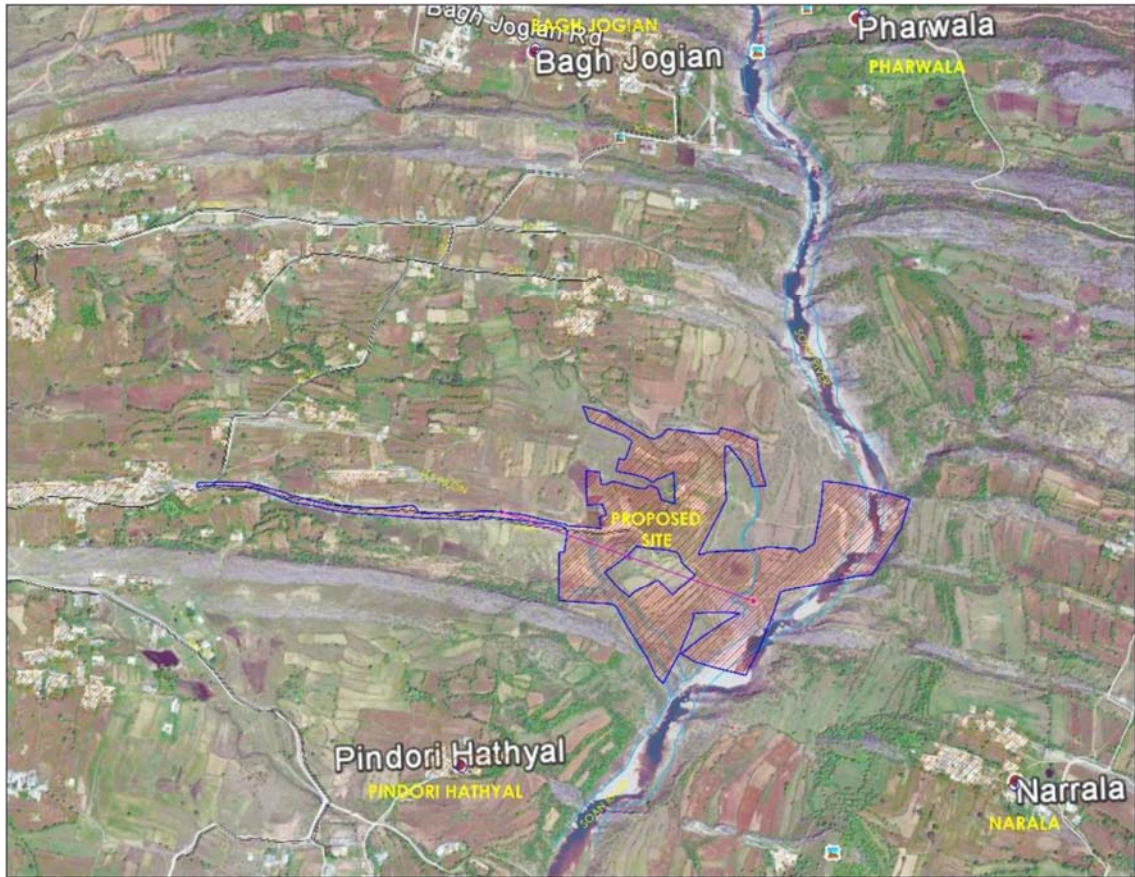


FIGURE 3-1: MICRO LOCATION PLAN

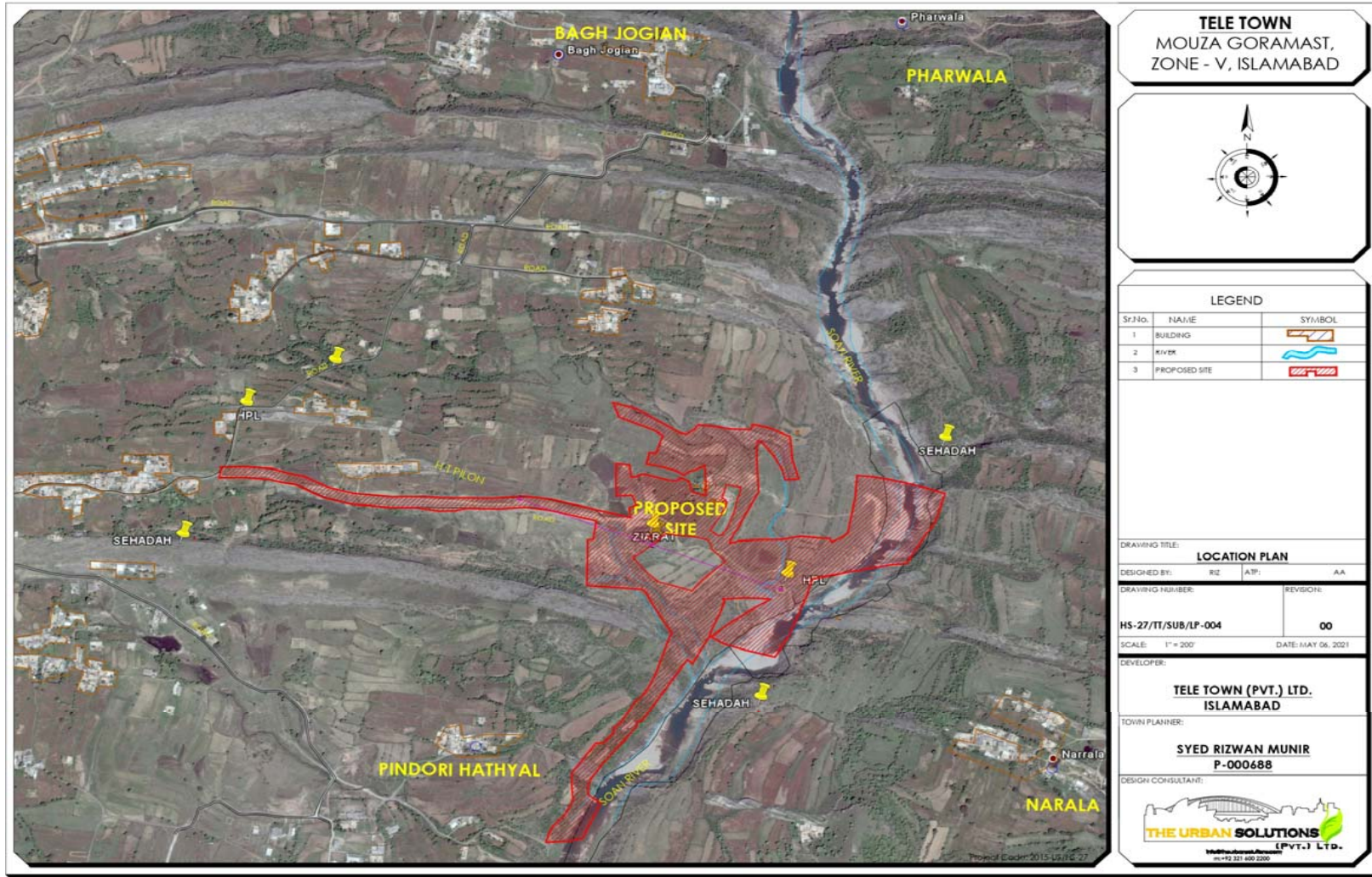


FIGURE 3-2: GOOGLE IMAGERY OF LOCATION OF TELE TOWN, MOUZA GORAMAST, ZONE-V, ISLAMABAD

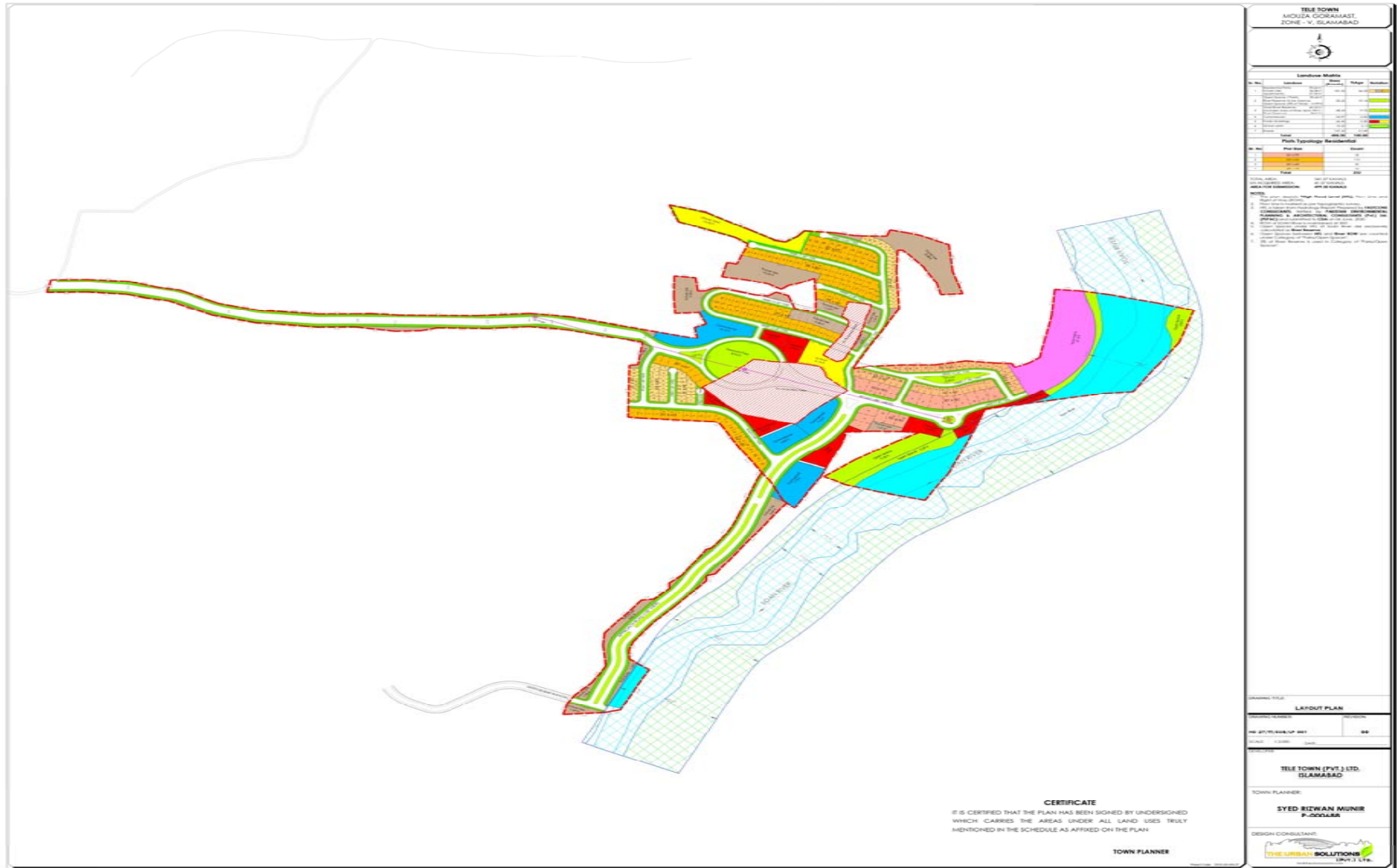


FIGURE 3-3: LAYOUT PLAN OF TELE TOWN, MOUZA GORAMAST, ZONE-V, ISLAMABAD

3.5.1. LAND USE PLAN

The land use plan evolves the general functional arrangement in terms of types of activities linkages and densities. The activities are grouped to perform functions in relation to each other. The area is designed with various type of facilities and amenities. Proper linkages within the area and other units of scheme are also ensured so that whole scheme acts as one body rather than segregated units. Planning principles of health, beauty and conveyance are given priority in every step of planning and designing of scheme.

The physical plan ensures equal distribution of land uses for various activities in the area required for balance physical growth and embraces the land use standards set forth in the zoning regulation of CDA as detailed below:-

TABLE 3-2 LAND USE STANDARDS SET FORTH IN THE ZONING REGULATION OF CDA

Landuse Matrix					
Sr. No.	Landuse	Area (Kanals)	%Age	Notation	
1	Residential Plots: Future Use: Apartments:	93.64 K 56.86 K 27.55 K	181.05	36.25	
2	Open Space / Parks: River Reserve to be Used as Open Space (3% of Total):	35.66 K 14.99 K	50.65	10.14	
3	Total River Reserve: (Includes Area of River Upto HFL*) River Reserve:	63.53 K 48.54 K	48.54	9.72	
4	Commercial		24.97	5.00	
5	Public Buildings		26.45	5.30	
6	Grave yard		10.52	2.11	
7	Roads		157.32	31.49	
Total			499.50	100.00	

3.6. SCHEDULE OF RESIDENTIAL PLOTS

3.6.1. RESIDENTIAL PLOTS

Tele Town comprises of superior neighborhoods designed to house over 12,477 uniquely designed plots.

Proximity to amenities such as schools, mosque, shops, parks and community center make this an ideal living for families. Superior neighborhoods, excellent schools, preserved green spaces, diverse parks and recreational offerings make this residential development unique. The detail typology and quantification of plots of residential land use are as following:

Table 3-3: Plots Distribution

Plots Typology Residential		
Sr. No	Plot Size	Count
1	50' x 90'	18
2	35' x 65'	110
3	30' x 60'	42
4	25' x 45'	62
Total		232

3.7. RETAIL FACILITIES AND COMMERCIAL CENTERS

Since the project is in isolation and no properly planned retail facility exists in it suburbs therefore a commercial hub is inevitable for the long terms sustainability of the project along with the convenience of its residents. Keeping in view the retail psychology and needs of the residents bulk commercial sites are provided within the site.

When it comes to the form of commercial areas, topography of the project leads to linear form of commercial along with Main Boulevards. However, wherever commercial activity is provided it is supported with its independent circulation and parking leaving minimum impact on Main Boulevards. Every plot owner will have liberty to design the internal spaces within prevailing bye laws; however the outer façade of the buildings will be strictly controlled in order to provide a harmony in the proposed development.

3.8. PUBLIC FACILITIES AND AMENITIES

The development is designed with good public amenities and facilities to ensure convenience for all residents. Mosque are disturbed throughout the site with sample space parking space. A school of international standard primary will cater the student population of the development. The sites for community centers and public amenities have been provided.

Figure 3-4: Details of Public Building

Sr.No	Name of Facility	Area Allocated (Kanal)
1.	Central Mosque	2.16
2.	Hospital	2.66
3.	School	4.50
4.	Community Club	3.15
5.	Mosque	1.81
6.	STP	2.76
7.	Graveyard	8.95
8.	Central Park and Mohallah Spaces	Varying sizes

3.9. EXTERNAL DEVELOPMENT WORK

External Development Work will include the following:

- ☒ Sanitary Sewerage Network
- ☒ Sewage Treatment Plant
- ☒ Storm Water Drainage Network
- ☒ Soft and Hard Landscaping
- ☒ Boundary Wall
- ☒ Electric Transmission Line

3.10. UTILITIES

Utilities provided will include the following:

- ✕ Water Supply Network
- ✕ External Electrification will be underground
- ✕ Gas Supply by SNGPL.

3.10.1. ROADS AND CIRCULATION

The proposed colony has been planned according to the contemporary principles of planning and design criteria of Capital Development Authority (CDA) for private housing schemes laid down in the Modalities and Procedures. Following three types of roads has been proposed.

- ✕ Major Road 60 Feet Wide
- ✕ Secondary Roads 60 Feet wide
- ✕ Streets 40 Feet wide

3.11. POPULATION DENSITY

Density plays a vital role in allocation of various land uses and provision of different amenities and infrastructure. To work out the total population of the Tele Town, household size has been considered as 6-persons per household. The total residential population and its density per acre is worked out as under.

Total Residential plot 232

House hold size 6 Person per H.H

Population $232 \times 6 = 1,392$

Net Density per acre $1,392/26.33 = 52.86$ PPA

Gross Density per acre $1,392/54.45 = 25.56$ PPA

3.12. EXTERNAL ELECTRIFICATION

The distribution system HT shall be 3 phase, 11 KV 50 Hz supply; whereas the secondary LT distribution system shall be 415 volt 3 phase 4 wire or 220 volts 1-phase 50 Hz supply including street light.

Electricity shall be installed by IESCO itself after approving electricity design on the payment by the society. The street lights and the house connection shall be done by the Society itself. The process of approval for the electricity connection is under process with IESCO.

3.13. GAS DISTRIBUTION NETWORK

Sui gas installation will be done by Sui Northern Gas pipeline department on payment by M/s Tele Town. The gas network system shall be designed by the department itself on payment of demand note to the department for installation of gas supply network in the scheme area.

3.14. WATER SUPPLY

The project site is located in the area where ground water potential is available, being close to Soan River. Resistively survey of the site has been conducted to establish water resistively within the project site. According to the finding of the resistivity survey, water to be available in all three locations where resistively survey has been conducted. The anticipation yield is about 15000 gallons per day.

3.14.1. AVERAGE DAY WATER DEMAND

The population in Tele Town would be 1,392 persons based on 6 persons per household. The average day water demand is worked out as under by using design criteria set forth for private housing schemes under ICT zoning regulations 1992.

TABLE 3-4 AVERAGE WATER DEMAND IN THE PROJECT AREA

Description	Water Demand (MGD)
Residential	10
Commercial	8
Sub Total	18

PVC pipe shall be used in the water supply network. These pipes are easy to lay, non corrosive and long life when compared with G.I. and MS pipe. Sluice valve, double air valve & washout shall be installed at appropriate location in the network

system. The loop system shall be designed in shape of network resembling a gridiron connected at interval to avoid dead ends. Water will be supplied from more than one direction for its circulation throughout the system. To maintain pressure of water, the supply shall be made from over head tanks to be built at adequately suitable location for better water head. Surface tanks shall also be built for water storage.

3.15. WATER REQUIREMENT FOR TELE TOWN, ISLAMABAD

The design population shall be computed by multiplying the ultimate number of household with household size of 6 people per household. Water demand for various uses has been estimated on the basis of CDA Modalities and Procedures. Water demands are mainly a function of water and sanitation service level provided in the community. A high service level will be provided for the project. It is also assumed that the consumers will be served through house connections and to public stand posts will be provided.

The consumer shall be served through house connection. Water shall be required for the following purposes:

- ☒ Domestic
- ☒ Nonresidential areas/green areas
- ☒ Institutional/ commercial water demand: school, college, hospital, offices, mosques, hotel, fire brigade need etc.

3.16. WATER SUPPLY NETWORK

For the water supply network, the society shall use PVC pipe. These pipes are easy to lay, non-corrosive and long life when compared with G.I. and MS pipe. Sluice valve, double air valve & washout shall be installed at appropriate location in the network system. The loop system shall be designed in shape of network resembling a gridiron connected at interval to avoid dead ends. Water will be supplied from more than one direction for its circulation throughout the system.



FIGURE 3-5: WATER SUPPLY NETWORK FOR TELE TOWN, MOUZA GORA MAST, ISLAMABAD

3.17. WATER CONSERVATION STRATEGY

The project is currently in the detail design phase and possibilities of ensuring water conservation and rainwater harvesting through efficient design and water management system are being explored. here are a number of strategies that can be employed to reduce the amount of water consumed at a facility. In general terms, these methods include:

- ✦ System optimization (i.e., efficient water systems design, leak detection, and repair);
- ✦ Water conservation measures; and
- ✦ Water reuse/recycling systems.

More specifically, a wide range of technologies and measures can be employed within each of these strategies to save water and associated energy consumption.

These include:

- ✦ Water-efficient plumbing fixtures (ultra-low-flow toilets and urinals, waterless urinals, low-flow and sensed sinks, low-flow showerheads, and water-efficient dishwashers and washing machines)
- ✦ Irrigation and landscaping measures (water-efficient irrigation systems, irrigation control systems, low-flow sprinkler heads, water-efficient scheduling practices, and Xeriscape)
- ✦ Water recycling or reuse measures (Gray water and process recycling systems), and
- ✦ Methods to reduce water use in HVAC systems.

While not a design specification or technology option, obtaining the participation of building inhabitants in the water conservation program is a key to achieving water use reduction goals, and is often one of the simplest and most cost-effective strategies to employ. One of the first steps in implementing a water conservation program is to train employees on the use of new water-efficient technologies, as well as maintenance staff on O&M procedures; technologies that are not properly used or maintained will not achieve their maximum savings potential. For example, double flushing of ultra-low flush toilets may result in more water consumption than older, conventional devices. The following bullets summarize some of the activities that can be incorporated into a public information and education program:

- ✦ Establish hot line or other reporting mechanisms to report leaks and waste;
- ✦ Place signs on new equipment on how to use;

- ✗ Initiate a suggestion or incentive program;
- ✗ Distribute flyers and pamphlets to increase awareness of the facility's water management plan and educate inhabitants on wise water use practices; and
- ✗ Develop a display on water management highlighting the practices in use at the facility (i.e., Xeriscape, ULF toilets, water reuse, etc.) and its resultant savings and benefits and place in a highly visible area of the building.

The human factor is critical to obtaining the desired results from water conserving strategies, and development of an information and education campaign can help your facility in making the human factor work in favor of water conservation initiatives.

3.18. SEWAGE & SEWERAGE DISPOSAL.

There exists no sanitation sewerage system in the vicinity of the project area. An independent sewerage system shall be planned for this scheme. The volume of sanitary from an area depends upon its population, the characteristics of the area, water usage and underground water conditions and material of joints etc. Per capita average daily sewage follow at 85% of water supply from residential area has been taken into account.

The scheme shall have its own sanitary sewerage system. The sewerage from houses shall be collected in house connection chambers for flow at adequate gradient in RCC pipes for its final collection at centralized location. The sewerage so collected shall be treated in the STP for disposal of effluent into the Nullah. The treatment of sewer shall be done in accordance with design criteria as per CDA zoning regulation. About 80% of total water supply quantum shall flow into the network system i.e. about 622766 gallons plus 10% infiltration 62277 gallon. The minimum pipe size shall be 9 inches in the system.

The hydraulic statement for determining the RCC pipe dia shall be worked out with the help of Manniny's formulas.

$$V = 1.486/N * R^{2/3} * S^{1/2}$$

Where

V= Velocity in Ft/ Sec

N= 0.013

R= Area/Perimeter

S= Slope per 1000 ft

3.18.1. SEWAGE COLLECTION SYSTEM

Disposal of sewage from individual plots will be through house connections which will lead into main sewer lines through a series of lateral and sub-main sewer lines connected through manholes as detailed below

- ✕ **House sewer connections:** Each individual plot will be provided with a separate house sewer connection. This will terminate into a manhole. Under no circumstances this sewer will have a smaller diameter than 6 inches. The house sewer connection will be located at the predestinated point near the gate of plot.
- ✕ **Lateral Sewer** will run across the streets connecting house sewer connection to the MAIN / sub-main sewers running on the other side of the road. They will start and terminate through manhole.
- ✕ **Main/ sub Main Sewers:** these will run on the side of the road collecting sewage from houses connection as well as Laterals conveying sewage from other side of the road in addition to this they will convey sewage from other sub mains converging onto it. All connections will be made through manholes.
- ✕ **Sewerage Pipes:** All main / sub/ laterals /house connection pipes will be RCC pipes. These pipes will be bell and spigot types, which will be connected with "O" rings. Prior to the backfilling, each section will be plugged and tested under 5ft head of water for minimum of 1 hour.

3.18.2. SEWERAGE NETWORK

The scheme shall have its own sanitary sewerage system. The sewerage from houses shall be collected in house connection chambers for flow at adequate gradient in RCC pipes for its final collection at centralized location. The sewerage so collected shall be treated in the STP for disposal of effluent into the Korang Nullah. The treatment of sewer shall be done in accordance with design criteria as per CDA zoning regulation. About 80% of total water supply quantum shall flow into the network system i.e. about 612,816 gallons plus 10% infiltration 61,282 gallons. The minimum pipe size shall be 9 inches in the system.

The detailed design for the water supply is under process and will be shared with the authority once it is completed. The location of STP is mentioned in the approved layout plan.

3.18.3. SEWAGE COLLECTION

The sewage would be collected at one point, the lowest point – at Sewage Treatment Plant. The sewage from the housing project shall be collected at

adequate gradient in RCC pipes and then concentrated at S.T plant for primary treatment then disposal to nallah passing nearby.



FIGURE 3-6: SEWERAGE SYSTEM OF TELE TOWN, MOUZA GORA MAST, ISLAMABAD

3.19. STORM SEWERAGE SYSTEM

For the effective Surface drainage, the RCC storm water drains are provided at one side of road along the shoulder at the lower side of the road. Grit chambers converted to drain manholes are provided in storm water network. For purpose of calculations maximum rainfall intensity has been taken as 3 inches /hour Run off has been calculated and details are under:

3.19.1. FLOW DIRECTION

Based on the Contour plan, the flow direction shall be specified.

3.19.2. DRAINAGE SYSTEM

The existing watershed drainage pattern of the scheme has been generated by HEC, GEO Software after detail hydrological study. The road side drainage system will be planned and designed accordingly to design parameters mentioned in the CDA's Modalities and Procedures 1993.

3.19.3. DISPOSAL OF SURFACE RUNOFF

The RCC storm water drains are provided at one side of the road along the shoulder at lower side of the road for effective surface drainage. Grit chambers connected to drain manhole are provided in the storm water network. Drain outfalls near the Nullah at appropriate locations are provided for storm water disposal. Manholes and drop manholes are constructed at appropriate distances and location to catch road water through grit chamber.

A number of methods are in use to estimate the runoff. Rational & Hydrographic methods are more common. All the main cross drainage structures on the main ravines will be based on 25 – 100 years return period discharge data whereas, the entire normal roadside drains will be based on CDA's Design Criteria. Rational method is used for relatively small areas up to 3 km². SCS Curve No Technique will be used for larger drainage areas.

Capital Development Authority (CDA) recommends using 3 in/hour as maximum rainfall intensity for calculation of discharge. However, to ensure safety and sustainability of system, Tele Town uses value of rainfall intensity as 4 in/hour. Intensity Duration Curves will be used where required.

The capacity of storm water drainage is calculated according to Rational Method which relates the flow to the rain fall intensity, the tributary area, and a coefficient which represents the combine effects of ponding, percolation, and evaporation.

The discharge shall be calculated from following formula

$$Q = CIA$$

Where,

I = Intensity of rainfall (inches/hr.)

A = Drainage area (Feet)

Q = Peak runoff (cusecs)

C = Runoff Coefficient

3.20. ESTIMATION OF POPULATION AND SEWAGE LOAD

Population is the main parameter to calculate sewage flows, which is required for the design of sewer system, treatment plants and other management tasks. Maps, socio-economic and physical survey carried out by the field teams and the GIS professionals.

For estimation of sewage flows, normally 70% to 80% of the domestic water supplied to households is taken as domestic sewage flow. The skew of design and actual figures of water supply in Islamabad is not recorded therefore sewage flow can't be based on design water supply figures.

In addition, domestic sewage, recreational and leisure time areas, schools, mosques, community center etc, also produce significant amount of sewage. These areas will be considered separately while estimating the sewage flows. The contains number of parks, play ground, clubs, play lands, restaurants and recreational resorts. The sewage generation from all these amenities is also calculated. Preliminary Design

In this chapter, conceptual design and proposed dimensions to meet with EPA requirements for effluent disposal in natural stream, shall be discussed. The sewage treatment plant for Tele Town, Islamabad, is conceptually designed to treat sewage water with the application of Aerobic and Anaerobic processes.

Estimated influent of 28 cusecs, as per calculations presented in previous chapter, is expected to be available at time of full occupation of living community. So, it is

appropriate to construct STP into phases as per requirements of providing treating facility with respect to change/increase in influent with passage of time.

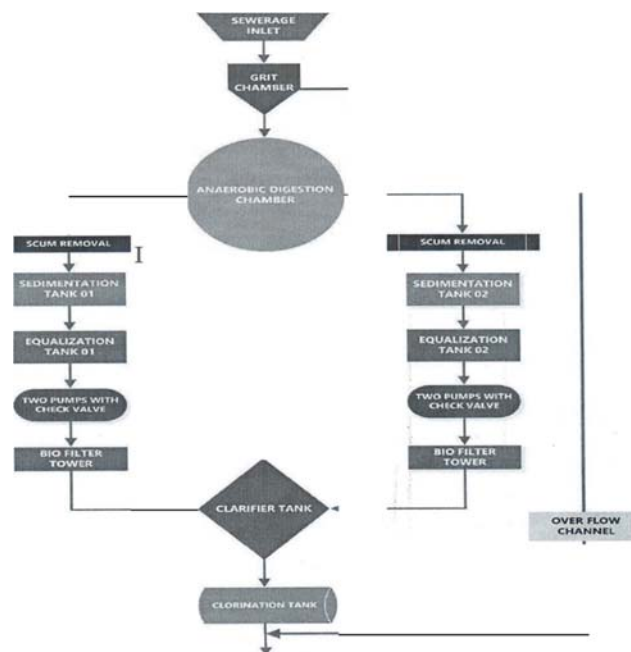
It is proposed to construct six STP units with each unit's capacity to treat influent of 2.4 cusecs. The following sections describe process diagram of single unit STP and dimensions, while all the units will have similar dimensions and processes. The sewage water shall be collected from the scheme, which will be treated, and part of effluent can be used for irrigation purpose and remaining will be discharge to nearby natural stream.

3.20.1. TREATMENT PROCESS

The treatment plant is mainly comprised of anaerobic and aerobic process.

The STP key treatment process shall be comprised of Preliminary Treatment (screening), Primary Treatment (grit removal), Secondary Treatment (anaerobic) and tertiary treatment (Aerobic trickling filter) to remove unwanted elements from water which may not efficiently remove through anaerobic process e.g. nitrogen and phosphorus.

Effluent from trickling filter shall be passed through clarifier and chlorination tank to settle particles (engaged from trickling filter) and disinfect treated water, respectively. Process/flow diagram is provided as under:



3.21. LANDSCAPING

A landscape Architect has been engaged by the Society to accord proper landscaping treatment to all the components like parks, play fields, Roads, Streets, Avenue, Medians of dual carriage way, Shopping center, Mosque etc. The landscaping plan is in process and as soon it is completed will be shared with Pak-EPA.

TABLE 3-5: SUMMARY OF PLANTATION

Sr No.	Plant Name	Quantity	Remarks
1.	Alu Bukhara	TBD	Fruit Tree
2.	Arru	TBD	Fruit Tree
3.	Apple	TBD	Fruit Tree
4.	Arjun	TBD	Shady Tree
5.	Black Pepper	TBD	
6.	Channar	TBD	Shady Tree
7.	Guvava	TBD	Fruit Tree
8.	Jacuranda	TBD	Shady Tree
9.	Japani Phal	TBD	Fruit Tree
10.	Kachnaar	TBD	Fruit Tree
11.	Khobani	TBD	Fruit Tree
12.	Meletonia	TBD	Shady Tree
13.	Pilkan	TBD	Shady Tree
14.	Malta	TBD	Fruit Tree
15.	Nashpati	TBD	Fruit Tree
16.	Silver Oaks	TBD	Shady Tree
17.	Sukhchain	TBD	Shady Tree
Total			

3.22. ESTIMATED COST OF THE PROJECT

The project is estimated to cost Rs. 200 million that include the cost of land and development.

3.23. TIME SCHEDULE

The development work of project will start after necessary approvals from CDA and environmental clearance from Pak EPA. The estimated time of development is three years.

3.24. STAFF

Staffing details are explained in the below table.

PROJECT SEGMENT	CATEGORY	NUMBER
CONSTRUCTION PHASE		
Site/off-site	Workers (skilled, semi-skilled, unskilled, engineers, managers) --- Project duration	Minimum: 25 Maximum: 152
	TOTAL	152 (maximum)
	Project Team (skilled and Semi-skilled) --- Project duration	11
	TOTAL	11
	GRAND TOTAL	163 (maximum)
OPERATIONAL PHASE		
Retail (35 establishments)	Salespersons	35
	Helpers (Permanent)	30
	TOTAL	65
CDA Management Office	Engineers	3
	Project Managers/Administrators	2
	Support and service staff	4

	Technicians, Plumbers, Labour	7
	Unskilled workers (Permanent)	4
	TOTAL	20
Residential Units	Domestic workers (Temporary/permanent (full-time/part-time)	1,172
	TOTAL	1,172
GRAND TOTAL	(OPERATIONAL PHASE)	1,257

In addition to these, operation of the project will also result in business and additional work opportunities for multiple upstream and downstream businesses and maintenance staff/technicians.

3.25. CONSTRUCTION ASPECTS

Various construction phase activities are briefed in the following sections.

3.25.1. SITE PREPARATION

For the proposed plant the following site preparation activities will be carried out:

- ✘ All surface vegetation will be removed from the construction sites. In areas to be excavated for foundations, all vegetation, roots, and other organic matter will be grubbed up and removed from the site. No organic matter will remain at the base of a foundation; any voids will be filled with suitable material.
- ✘ Isolated rocks and stones lying within the power plant site area will be removed and the voids will be filled with suitable material. Prior to placing the fill over existing terrain, all loose soil and all vegetation, roots, and other organic material will be dug up to a suitable depth.
- ✘ Earthworks will be carried out to provide a plain platform to the power plant plot and appropriately sized and lined drainage ditches will be provided to direct rainwater away from the plant.

3.25.2. PLANT CONSTRUCTION

Once the site sub-base has been prepared, the underground infrastructure will be installed and foundations laid for the process equipment and supporting infrastructure. The sealed site roads and paved areas will also be constructed. Typical activities that are conducted during the civil construction are listed below:

- ✕ Excavation for foundations
- ✕ Laying of foundations
- ✕ Masonry work
- ✕ Concrete work
- ✕ Asphalt work (pavement, roads, etc.)
- ✕ Finishing (plastering, painting, etc.)

The plant and ancillary equipment, brought to site by road in sections, will be erected on site and hooked-up. Typical activities that are conducted during plant erection are listed below:

- ✕ Site fabrication (equipment/pipe supports, equipment assemblies, etc.)
- ✕ Placement of the vessels and equipment on the foundations
- ✕ Laying of pipes
- ✕ Welding, joining, etc.
- ✕ Electrical installation (cabling, switchgears, transformers, etc.)
- ✕ Instrument installation (field instruments, control room instruments, instrument cabling, etc.)
- ✕ Painting

3.25.3. CONTRACTOR'S ARRANGEMENTS

As the Project is being considered as a state of art, so it is expected that Contractor will be selected through international contract bidding (ICB) and having the experience of construction of such type of quality and sophisticated projects.

3.25.4. LIST OF EQUIPMENTS

Following equipment will be used during the project construction period.

Table 3-6: List Of Equipment

Equipment	No.	Type
Plain Roller	2	Mobile
Grader	2	Mobile
Excavator/Jackhammer	3	Mobile
Dumper	6	Mobile
Water Bowzer	2	Mobile
Tractor with Blade	2	Mobile
Tractor with Trolley	2	Mobile
Generator 30 KV	3	Stationary
Block Factory	1	Stationary
Pipe Factory	1	Stationary
Concrete Plant	1	Stationary
Loader	1	Mobile
Transit Mixer	2	Stationary
Mixer Machine	4	Stationary
Bolan/Pickup/ Car	6	Mobile
Air Compressor	2	Stationary
Diesel Tank with Unit	1	Stationary
Welding Plant	1	Stationary
Motorcycle	1	Mobile

Note: The contractor shall be bound under the contract to employ the above equipment in order to ensure that the target completion date is met. The type and numbers of equipment or machinery could change or increase/decrease, subject to need.

3.25.5. CONSTRUCTION CAMPS

Camp sites will be located keeping in view the availability of an adequate area for establishing camps, including parking areas for machinery, stores and workshops, access to communication and local markets, and an appropriate distance from the sensitive areas in the vicinity. Final locations will be selected by the contractor with the approval of site Engineer's in-charge. While deciding the site for location of camp, all the measures will be kept in mind.

3.25.6. WORK FORCE

The Project involves many construction activities like excavation, construction of roads, general amenities, waste treatment plants, storm water drainage system, and other miscellaneous infrastructure. It is expected that project will involve a large number of professional, technical, skilled, semi-skilled and unskilled manpower directly and indirectly.

The total number of crew, skilled and unskilled labor to be employed will depend on the Contractor's activity schedule at the time when the contract is awarded. The Contractor will be advised to hire the skilled and unskilled labor from the local communities.

3.25.7. CONSTRUCTION MATERIAL

Extensive quantities of construction materials would be required for development of Tele Town. Since the development is going to take place over the years, a consistent supply of these materials would be required.

3.25.7.1. EARTH MATERIAL

Earth material will be required for road embankment and other filling works. Earth fill material of desired specification is locally available in vicinity of the Project. There are very limited 'borrow areas' earmarked by the local authorities for earth material. In most cases, the contractors will lease private land in the vicinity on short-term basis for the purposes of borrowing earth material. The existing layer of topsoil will be scraped and stockpiled to be used later to restore the borrow area for agricultural use.

3.25.7.2. FINE AND COARSE AGGREGATES

Fine and coarse aggregates will be required for all type of concrete works. The aggregate material required will have to be mined from specified existing quarries. The contractors will engage sub-contractors to supply the aggregate material needed. The suppliers of these materials are generally leaseholders of the quarry areas being mined. The coarse aggregate quarries are available at Sargodha, Chiniot and Marghalla Hills (near Taxila). Since these quarries are already functional and accessible from the project site, development of new haul roads will not be required.

3.25.7.3. CEMENT

Cement will be required for all building and structural works. Cement is available at Rawalpindi and Attock as cement factories exists in these cities.

3.25.7.4. STEEL

Steel will be required for all structural works and it is easily available at Islamabad, as major factories exist in this city.

3.25.7.5. WATER RESOURCES

Given that the Indus Basin groundwater regime extends near the project area, access to water for construction and campsite purposes is not expected to be a problem. The chemical content of the available water, however, may limit the use of local surface water, particularly for mixing cement concrete. However, groundwater is considered to be of acceptable quality for use in concrete works.

3.26. SITE RESTORATION

The estate shall be a housing complex and in order to ensure comfort of residents and visitors, it will be maintained according to the best health, sanitation, and maintenance standards. Constant maintenance, repairs and upgrading of services, such as roads and other permanent structures, would continue according to a carefully prepared work schedule and would be adhered to religiously. Since it is a housing estate, there is no question of restoration and rehabilitation of land under the scheme. However, some structures, such as roads and overhead water tank, shall be either removed altogether for upgrading or replacement. Dismantling shall be undertaken as per municipal procedures with special precautions to minimise if not totally avoid pollution and at the same time taking every safety precaution to protect life and property around worksites. Debris from demolition of structures will be disposed in environmentally sustainable fashion. Material capable of recycling or reuse will be either sold or shall be reused in the next plan. While dismantling structures, all applicable rules and regulations shall be observed strictly. While dismantling, it will be ensured that no damage is done to common infrastructure like sewer systems, power transmission lines, gas transmission lines, roads, and private property. Complete safety measures, according to secured, safe and effective norms of demolition, will be adopted to avoid harm to persons engaged in the demolition, public property around worksites or environment in the project area. Dust generated during demolition will be minimised by constant sprinkling of water and raising windshields. After demolition, all construction material, debris and garbage will be removed from the site immediately and disposed as per procedures approved by municipal regulations. Any minor spill over of such material will be cleared adequately. Pitted ground, if any, will be adequately levelled, subject to further use of the land

On completion of the construction phase the temporary infrastructure will be decommissioned and the sites restored. This will involve:

- ✕ Removing the temporary construction camp
- ✕ Closing all the temporary waste pits In areas where vegetation was either removed or damaged to establish temporary facilities, a vegetative cover will be reinstated.

4. DESCRIPTION OF BASELINE ENVIRONMENT

4.1. GENERAL

This chapter describes the baseline conditions, which covers the existing physical, ecological and socio-economic environment of the Project Area as well as the Study Area. Information on these aspects has been derived from the desk study of available data, field visits to the Project/Study Area and information obtained through the visits to the Government departments and other agencies.

4.2. PHYSICAL ENVIRONMENT

Topography, geology, soil, water resources and climate have been included in physical environment as detailed below:

4.2.1. TOPOGRAPHY

The detailed topography study at 5ft intervals has been done. The site topography ranges from 1670' to 1820'. In general the overall topography can be generalized existing ground.

4.2.2. GEOLOGY

Islamabad is located at the southern foothills of Margalla hill range. Geologically, the rocks in the Islamabad, range in age from Jurassic to Paleocene and are of sedimentary origin and comprises of sandstone, limestone and shale.

In the project area minor rocks fall on the escarpment side take place due to erosion of underlying shale beds. Project area is underlain by sedimentary rocks comprising limestone, sandstone, conglomerate, siltstone and clay of sedimentary origin, ranging in age from Miocene to Recent. The remaining area is mostly covered with alluvial soils generally comprising silty / lean clay. The thickness of the alluvial soils near rock outcrop is between 1-2 meters, while the soil deposits near streams are expected to be up to 6 meters thick. Sandstones represent deposits of levees, crevasse channels and splays, floodplain channels, and large sheet floods.

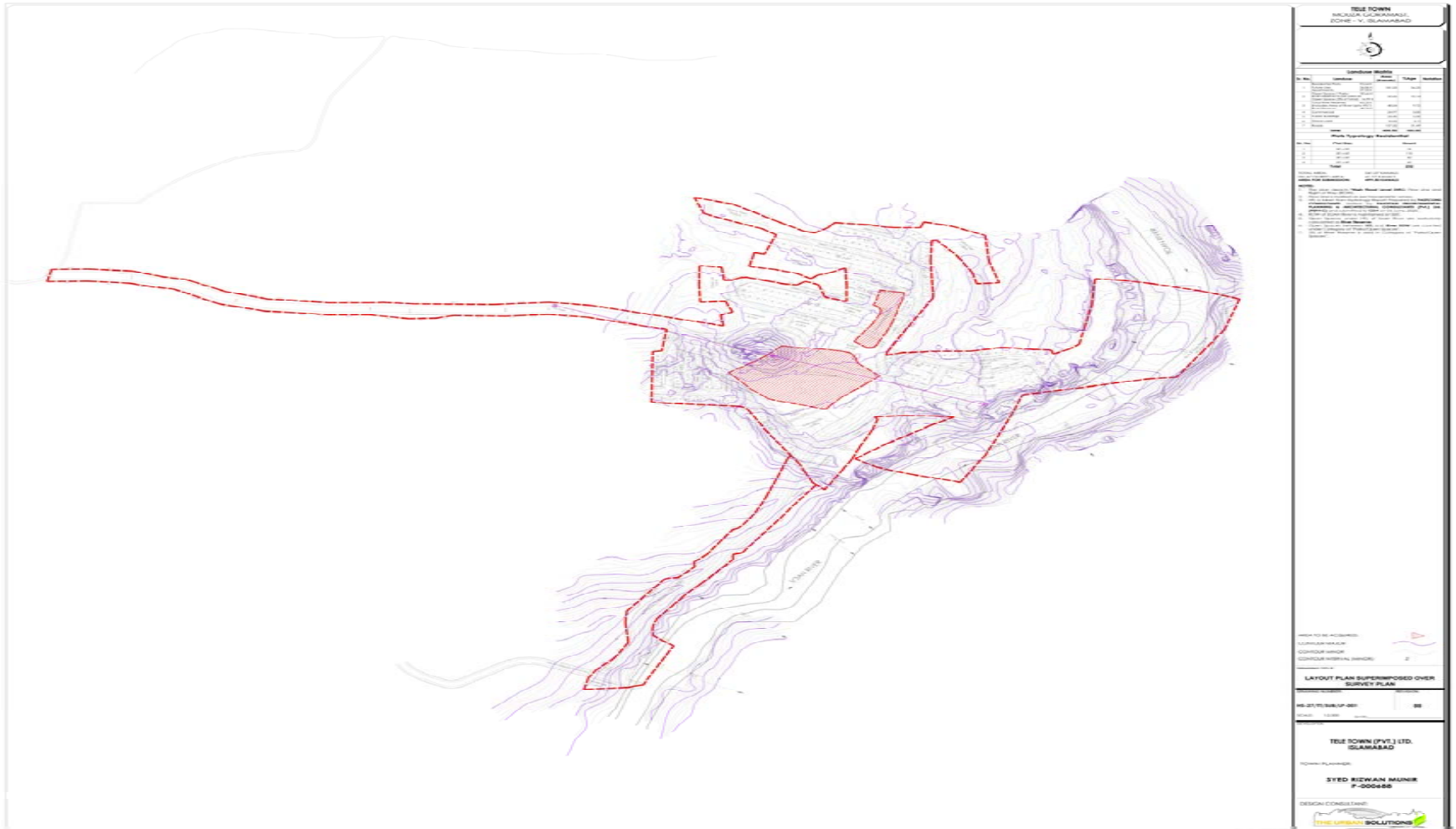


FIGURE 4-1: TOPOGRAPHIC PLA

4.2.3. **SOIL**

The soil in project area mostly consist lean clay/sandy lean clay, silty clay, poorly graded sand with silt and silty sand. Top layer consist of cohesive soil present up to maximum depth of 7m. This layer is followed by granular soil in loose to very dense state up to maximum investigated depth of 35m.

Soil at the site has been tested and field investigations included drilling of five exploratory boreholes, in-situ testing and soil sampling.¹ The site is plain and levelled. Sub-soil stratum varies from lean to silty clay and gravel down to seventy to seventy-five feet below the existing ground level. Gravelly bedding was noticed further down. Soil found at the project site has been classified by the Soil Survey of Pakistan as a mix of the Chakwal Series and miscellaneous land type. Chakwal Series soil is silty clay loams to silty clays with moderate structure. Soil classification in Rawalpindi-Islamabad region is indicated at Appendix "X". Most of the land within the project area has been colonised, whereas the few vacant plots are mostly rough, broken and stony, with minor vegetation. Lithology of the project area is shown below.

Table 4-1: LITHOLOGY OF RAWALPINDI-ISLAMABAD

Name	Type Locality	Lithology	Age
Rawalpindi Group	Not Designated	Sandstone, shale of fresh water origin	Miocene
Leh-Conglomerate	Leh Nullah, west Islamabad	Siltstone, Eocene rocks	Pleistocene
Soan Formation	Areas around River Soan	Conglomerate, siltstone	Villafranchian Late Astian

Source: Soil Survey of Pakistan

4.2.4. **SEISMICITY**

Study of literature seismicity shows that active or likely to be active faults is located close to the area. History has recently witnessed a major epicenter of event magnitude 7.6 occurs in the area. Thickness of alluvium over bedrock at Margalla Hills is shallow and structure may be placed possibly on rock. Structure designs are recommended to be built should be earthquake resistance.

4.3. WATER RESOURCES

4.3.1. SURFACE WATER

The Five (5) small seasonal water courses which are present in the project area have no such nomenclature and the approximate run-off (seasonal) is 2,500 cusec.



FIGURE 4-2 VIEW OF NALLAH MALAL KAS



FIGURE 4-3 KORANG RIVER IN THE PROJECT AREA

In the project area, water sampling and analysis was carried out to establish the baseline conditions for the ground water quality. The surface water sample was collected from Malal Kas nullah and Korang nullah. These sample were analyzed at ESPAK, Islamabad. Also on spot analysis was also conducted for Temperature, Total Dissolve solid, Electrical Conductivity, pH and Dissolve oxygen. All the parameters were within the permissible limits. Groundwater

The source of water for the proposed project and the existence of underground water reservoir is also an important consideration for a project. In this regard a geo-electric resistivity survey was conducted The following conclusions were drawn from the study:

- ✘ Siltstone/sandstone/conglomerates as bed rock have been interpreted in the area at different depths.
- ✘ Major lithological unit interpreted in the area are clay/shale, silty sandy clay, sand, gravel, Siltstone/sandstone/conglomerates.

4.3.2. GROUNDWATER

The second source which is as important is the groundwater. Hundreds of groundwater wells are operating in the area. The aquifers are again charged by the

Soan River system. The developments in the basin has led to other environmental problems as well, such as, river diversion, fragmentation of aquatic habitats, impoundment, soil erosion, and water pollution due to deforestation and discharge of municipal garbage and industrial waste. Moreover, hundreds of groundwater wells are operating in the area. The aquifers are again charged by the Soan River system. The developments in the area may lead to other environmental problems as well, such as fragmentation of aquatic habitats, impoundment, soil erosion, and water pollution due to deforestation and discharge of sewage and domestic solid waste.

4.4. CLIMATE

Climate of the region is classified into four major seasons, summer season (April to June), monsoon season (July to August or mid-September), post Monsoon season (mid-September to November) and winter season (December to March). June is the hottest and January is the coldest month of the year. The other climatic parameters are as follows:

4.4.1. TEMPERATURE

Mean monthly temperature is estimated at project area by analyzing metrological Department data of climate station located at Islamabad Airport. Mean monthly temperature varies from 14.1°C in January to 28.6°C in June at this station. The minimum temperature generally drops below freezing point, in the months of December and January. Highest maximum temperature at Islamabad was recorded 46.1°C in the month of June and lowest, -4°C was recorded in the month of December and January.

MONTHLY MEAN MAXIMUM TEMPERATURES (°C)

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
2000	17.6	18.6	25.0	33.7	39.7	39.9	34.8	34.0	33.0	32.9	26.5	22.0
2001	19.1	23.2	28.4	31.8	39.4	36.3	33.7	34.8	34.9	32.3	27.0	21.9
2002	19.8	20.4	27.4	33.1	39.0	39.0	39.0	33.6	31.6	31.0	26.3	20.6
2003	19.6	19.2	24.2	31.5	35.6	39.4	34.9	34.0	32.7	30.5	24.2	19.4
2004	17.2	21.5	30.1	33.2	36.4	36.7	36.7	33.6	35.2	27.9	25.4	19.7
2005	15.8	15.9	23.7	30.0	33.6	39.9	34.4	34.4	34.5	31.2	25.5	21.0
2006	17.7	24.7	25.0	32.6	39.1	37.8	34.5	33.0	33.5	31.3	24.1	18.1
2007	19.7	19.3	23.1	33.9	37.3	37.6	35.2	34.2	32.8	31.5	26.1	20.1
2008	14.8	18.9	29.3	29.3	36.4	35.5	34.4	33.7	32.6	31.7	31.0	21.1
2009	19.3	20.9	25.3	29.0	35.7	37.9	37.1	34.6	34.1	31.5	25.5	21.1
2010	21.5	21.1	29.0	33.9	36.4	38.2	35.7	32.8	32.5	31.0	26.8	20.9
2011	16.8	17.9	26.5	29.6	42.0	38.8	34.0	34.0	33.4	30.5	20.9	20.9
2012	16.9	17.8	25.1	30.6	35.6	40.3	37.7	33.5	31.5	29.7	25.2	20.1
2013	18.0	18.8	25.6	29.6	36.1	37.9	34.5	31.8	32.1	30.5	24.4	20.6
2014	18.8	19.3	21.6	28.5	33.0	38.8	34.9	33.9	31.6	28.7	25.0	20.7

Source: Pakistan Meteorological Department, Islamabad

MONTHLY MEAN MINIMUM TEMPERATURES (°C)

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
2000	4.0	5.0	10.3	17.2	24.6	25.6	24.7	23.3	21.0	15.9	9.7	4.4
2001	2.1	5.9	11.3	17.4	23.9	24.9	24.2	24.8	21.0	16.0	8.5	5.1
2002	3.0	5.7	11.7	18.0	23.1	25.2	25.6	24.8	19.8	15.0	9.3	5.3
2003	1.8	6.5	11.3	16.8	20.0	24.5	24.4	23.8	22.0	14.1	8.0	5.3
2004	5.1	6.2	12.8	18.3	20.7	23.6	25.0	23.0	22.1	14.2	8.8	5.4
2005	2.9	6.2	11.7	14.6	19.2	24.9	24.7	23.5	22.1	15.2	7.7	2.0
2006	3.8	9.9	11.4	16.2	23.7	23.8	24.9	24.2	21.0	16.6	10.7	5.5
2007	1.0	6.6	9.0	15.9	19.8	23.0	21.5	21.8	19.5	12.6	8.2	5.1
2008	1.8	5.4	13.8	16.5	22.6	24.8	24.7	24.2	20.8	16.9	12.2	6.3
2009	4.5	7.0	10.2	14.0	18.3	21.4	24.2	24.2	20.9	13.4	6.7	3.3
2010	2.9	7.0	12.6	16.9	20.5	22.5	24.5	24.4	20.7	15.4	8.0	1.7
2011	2.8	6.8	11.9	15.5	23.0	25.8	24.4	24.3	22.7	16.1	0.5	0.5
2012	1.2	3.4	9.3	15.6	19.3	23.2	25.5	24.3	20.8	13.8	7.5	4.0
2013	2.1	6.7	10.9	14.9	18.7	23.3	24.5	23.7	21.6	17.0	7.1	3.7
2014	2.0	5.7	9.7	13.9	18.3	22.7	24.9	23.2	21.1	15.9	7.1	2.8

Source: Pakistan Meteorological Department, Islamabad

4.4.2. HUMIDITY AND RAINFALL

The area has two distinct rainfall seasons, the summer season from July to September and the winter season from December to April. The bulk of monsoons precipitation occurs in July and August, with monthly averages of 267 and 309 millimeters respectively. Monthly heaviest precipitation of the project area was recorded 743 mm in the month of July and annual heaviest rainfall 1735 mm at Islamabad. The percentage of relative humidity is fairly high in the Project Area.

MONTHLY TOTAL RAIN (MM) [-1=TRACE]

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
2000	129.0	70.6	18.0	2.5	11.0	37.0	207.0	381.0	129.0	0.0	-1.0	14.0
2001	-1.0	4.0	40.0	24.2	16.5	153.0	647.0	207.0	44.0	33.0	7.0	2.0
2002	7.0	38.0	32.0	6.0	12.0	155.0	109.0	350.0	157.0	38.0	-1.0	26.5
2003	42.0	173.0	110.0	19.0	15.0	63.0	266.5	260.5	217.0	6.0	21.0	54.0
2004	146.8	48.0	-1.0	78.0	40.0	130.0	128.5	313.0	16.0	76.0	22.0	28.0
2005	97.0	213.0	87.0	13.0	33.0	16.0	181.0	211.0	86.0	36.0	6.0	0.0
2006	70.0	27.0	61.0	19.0	76.0	126.0	504.0	418.0	52.0	92.0	20.0	33.0
2007	0.5	93.6	143.2	19.6	79.6	99.6	262.4	486.3	200.1	0.0	10.0	1.0
2008	125.0	39.0	31.0	94.0	13.0	255.0	353.0	269.0	76.0	29.0	15.1	78.0
2009	74.5	75.3	63.4	126.5	27.6	14.5	84.4	120.7	63.6	9.0	15.6	1.0
2010	17.5	105.6	43.8	22.4	35.6	41.4	344.8	214.5	142.9	22.2	1.0	26.0
2011	9.0	109.6	68.2	71.4	17.0	145.0	299.0	193.0	130.0	34.6	0.0	0.0
2012	50.4	47.5	15.8	24.9	16.0	24.0	162.2	283.1	356.1	6.2	3.0	87.2
2013	9.0	297.9	54.4	39.1	13.8	94.0	334.4	664.0	176.6	38.6	7.6	3.0
2014	6.0	71.7	277.2	11.0	95.0	52.2	309.0	208.4	444.8	23.0	9.0	0.0

Source: Pakistan Meteorological Department, Islamabad

HUMIDITY AT 0500 HOURS (percent)

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
2000	86	83	71	55	53	59	85	89	85	78	80	80
2001	78	64	63	65	54	73	88	86	71	80	84	86
2002	81	77	76	60	46	60	68	87	88	83	82	87
2003	83	87	76	71	54	59	85	88	88	84	86	90
2004	91	88	73	62	60	70	76	89	79	85	87	92
2005	91	91	88	73	66	57	86	88	86	83	84	86
2006	86	79	81	62	56	61	87	87	85	85	89	91
2007*	36	58	51	29	32	44	59	63	54	42	44	49
2008*	88	80	68	74	59	74	85	83	82	82	87	87
2009	62	50	46	44	31	30	41	50	48	37	50	47
2010	89	89	87	74	68	67	81	93	92	92	93	91
2011	65	68	58	42	31	48	67	70	66	56	56	55
2012	69	65	54	52	35	32	54	74	77	67	72	74
2013	72	76	65	59	42	51	71	82	76	73	72	72
2014	90	86	90	86	81	73	84	91	91	92	93	92

*2007 figures are for 1400 hours, 2008 figures are for 0000 hours

Source: Pakistan Meteorological Department, Islamabad

4.4.3. WIND DIRECTION AND SPEED

Islamabad shows no prevailing wind directions in the mornings. Wind direction is evenly distributed throughout the year. Islamabad experiences westerly and north-westerly winds during winter and spring seasons, and southerly and south-easterly winds during summer and monsoon. Designs of the estate takes into account general wind direction so as to avail fresh air. Tables 27 to 29 at the end of this chapter show wind direction at various times of the day during recent years. Wind speeds are low during winters, pick up speed during the spring season, and peak over the summer months. Maximum wind speed has been recorded at 90 knots during June. Wind speeds at various times of the day are indicated in Tables 30 to 32. May, June and July are usually the windiest months of the year, whereas autumn and early winter are relatively less windy.

WIND DIRECTION AT 0500 HOURS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
2000	N30E	S	N19W	N36W	N78E	N50E	N44E	N74E	N53E	N66W	N45W	S45W
2001	S45E	N73W	E	S18W	N54E	N56E	S53E	E	S24W	C	S75E	N45W
2002	E	W	N52E	N25E	N15W	N62E	S75E	N65E	N40E	N45E	N	N45E
2003	CALM	N35E	N	N	N26W	N63E	N48E	N68E	E	N45E	N45E	N45W
2004	S32W	N45W	N45E	N36E	N20W	N73E	N25E	N45E	N30E	N51E	CALM	N
2005	N45E	N44E	N10W	N32E	N05E	N72E	N55E	N69E	E	N68E	N45W	C
2006	N45E	N28E	N12W	N31W	S79E	N71E	N80E	N41E	N49E	N77E	N18E	S55E
2007*	W	W	W	W	SE	W	E	W	W	W	W	W
2008*	255	46	21	13	195	70	29	229	60	1	NW	W
2010	N82E	S68W	W	N15E	N67W	N68E	N80E	N45E	E	C	C	C
2011	W	W	W	W	W	W	SE	E	W	W	W	VAR
2012	S59W	S43W	S53W	S20W	S89W	S55W	S03E	S36E	S45W	S27W	N	S38W
2013	S66W	W	S70W	S69W	S66W	S19W	S33E	S25E	N08E	S16W	W	S79W
2014	C	S23E	C	W	N	N45E	N45E	E	C	N45E	C	C

*2007 figures are for 1400 hours, 2008 figures are for 0000 hours in degrees

Source: Pakistan Meteorological Department, Islamabad

WIND SPEED AT 0500 HOURS (KNOTS)

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
2000	1.2	1.2	2.8	3.4	1.6	5.9	4.2	6.1	1.5	0.8	0.3	0.3
2001	0.2	1.1	1.2	2.7	4.2	2.0	4.6	2.6	0.7	1.2	2.1	0.3
2002	0.7	2.7	2.1	2.9	3.9	2.4	3.6	4.8	1.6	1.9	0.5	0.5
2003	0.0	2.1	3.0	3.6	4.4	3.7	6.3	3.8	3.2	0.5	1.5	1.1
2004	1.5	2.3	0.8	4.7	4.4	3.3	4.2	5.2	2.0	2.3	0.0	0.5
2005	1.0	3.6	2.8	2.5	5.7	4.7	4.1	11.6	1.2	0.8	0.7	0.0
2006	2.1	1.3	2.3	4.0	3.7	6.1	3.9	2.4	2.7	1.4	1.5	1.2
2007	0.2	1.1	1.7	1.8	3.0	2.1	1.9	1.4	1.1	0.3	0.0	0.03
2008*	1.2	1.0	2.0	5.1	3.6	6.9	7.9	2.7	0.7	1.4	0.6	0.90
2010	0.4	0.3	0.1	1.3	0.7	0.3	1.5	0.3	0.5	0.4	0.0	0.00
2011	0.9	1.1	1.3	1.3	1.4	2.3	1.2	1.5	0.6	0.9	0.6	1.1
2014	0.0	0.1	0.6	0.3	0.1	0.2	0.3	0.3	0.4	0.1	0.0	0.0

*2008 figures are for 0000 hours

Source: Pakistan Meteorological Department, Islamabad

4.5. EXISTING BASELINE ENVIRONMENTAL CONDITION

4.5.1. WATER QUALITY

In the project area the groundwater samples were collected from two different locations. These samples were analyzed by ESPAK, Islamabad. The water sample tested for different parameters and the sample was safe for drinking. See [Annexure-C](#) for detail laboratory results

- ☒ **Test methodology:** Standard Methods for the Examination of Water & Wastewater by American Public Health Association (APHA), American Water Works Association (AWWA), USA.
- ☒ **Test equipment:** Atomic Absorption Spectrophotometer (Flame AAS Technique with detection limit 0.1 ppm). Model Analyst-100, Perkin Elmer, USA. Flame Photometer AFP-100, BIOTECH, UK
- ☒ A 24 hours environmental monitoring was conducted in the Project area. The ambient air quality was monitored for priority pollutants (Carbon monoxide, Nitrogen dioxide, Sulfur dioxide and particulate matter PM10 & PM 2.5). The monitoring was at individual sampling points. The study identified that PM10 and PM 2.5 were found in the permissible limits. Among the Nox, Cox and Sox were below detecting limits and are not of immediate concern. See [Annexure-C](#) for detail laboratory results.

4.5.2. NOISE LEVEL

Noise is a significant environmental problem and originates from many sources such as vehicular traffic (termed as roadway noise), aero planes, heavy machinery employed in construction work etc. See [Annexure-C](#) for detail laboratory results.



FIGURE 4-4: RECORDING OF ENVIRONMENTAL BASELINE

4.6. ECOLOGICAL ENVIRONMENT

In this section, the baseline environmental conditions pertaining to biological environment have been described on the basis of primary and the secondary data. An initial reconnaissance of the project area was carried out followed by a detailed biological survey by ecological experts.

4.6.1. FLORA

The project area and its surroundings are devoid of any significant flora. The common vegetation includes kao (Wild olive), phulai (Acacia modesta), Sanatha (Dodonaea viscosa), Shisham (Dalbergia sissoo), toot (Morus Alba) and paper mulberry.



FIGURE 4-5: ACCACIA NOLITICA



FIGURE 4-6: PARATHENIUM



FIGURE 4-7: CALOTROPIS PROCERA



FIGURE 4-8: CANNABIS SATIVA

There are a number of species of shrubs and grasses are common in the area including *Cenchrus Cilliris* (Dhaman), *Cannabis Sativa* (Hemp), *P. Julifora* (Meskeet) and *Parathenium*.

4.6.2. **FAUNA**

Mammals were observed in the project area including Wild Boar, Asian Jackal, Indian Hare/Wild Hare, Jungle Cat, Indian Porcupine and Indian mongoose. Species of reptiles including Garden Lizard, Indian Monitor, and Snake were also observed.



FIGURE 4-9 DOMESTIC CAT



FIGURE 4-10: LOCAL DOG

The birds sited in the project area are Collared Dove, Black Partridge, House Sparrow, House Crow, Little Brown Dove, White Cheeked Bulbul, Owl, Myna, Rock Pigeon, Crow and bulbul. None of species found were listed in the IUCN Red List.



FIGURE 4-11: HAWK



FIGURE 4-12: MOUNTAIN CROW



FIGURE 4-13: BULBUL



FIGURE 4-14: MYNA



FIGURE 4-15: HOUSE SPARROW



FIGURE 4-16: WHITE CHEEKED BULBUL

4.7. SOCIO-ECONOMIC AND CULTURAL ENVIRONMENT

This section describes the socio-economic and cultural environment of the project area. It presents information on the pertinent socio-economic parameters of the area and includes inter alia its location, major settlements, religious and cultural heritage sites, and economy and lifestyle of the people residing within and in the close proximity of the project sites. The baseline environmental conditions pertaining to socio-economic and cultural environment have been described using the secondary and the primary data. The secondary data were obtained either from published sources or from various departments while the primary data were obtained through surveys conducted in the project area. The information was collected with the purpose of obtaining a clear and complete understanding of the socio-economic conditions of the local residents, assess the vulnerability of the local communities and identify the concerns of local residents regarding the proposed project activities. These baseline environmental conditions have subsequently been used to identify the potential impacts on socio-economic environment that are likely to arise from the project activities. In addition, the mitigation measures that need to be adopted to reduce or minimize these impacts have also been spelled out.

4.8. HISTORY AND BACKGROUND

Islamabad was developed during the 1960's as the new federal capital of the country in place of Karachi. The Site Selection Commission was formed in February 1959 and in June 1959 the Government accepted the recommendations of the commission. In September 1959, the Federal Capital commission was formed to produce a master plan. The master plan was prepared in October 1960 which demarcated the site for successive stages of development, in relation with the surrounding areas, and division into various sectors. On May 24, 1960 preliminary master programme and master plan designed by the consultant were presented to

the Government. After a meeting of the federal cabinet on Shakar-parian Hills, formal approval of the plan was accorded. Capital Development Authority (CDA) came into being on June 14, 1960 under the CDA Ordinance 1960 and ground breaking finally took place in October, 1961.

Since its inception, Islamabad has undergone phenomenal development. During the early years, it was a small, quiet city with minimal commercial or business activity. However in the recent years, business activities have significantly increased and today Islamabad, apart from being the federal capital, is a city active economically, commercially as well as industrially.

4.8.1. ADMINISTRATIVE SETUP

Under Article 1 of Constitution, Islamabad Capital Territory (ICT) is laid down as a Constituent of the state, along with the four provinces. Under the President's order No.18 of 1980, executive authority of the Federation is exercised by the President through an administrator (now Chief Commissioner). The Chief Commissioner's Office is performing its administrative and day to day activities through three Directorates, namely, Directorate of Administration, Directorate of Development and Finance and the Directorate of Industries, Agriculture and Labor.

The Capital Development Authority (CDA) in ICT is mandated to plan and execute the developmental activities in the capital. The municipal administration as well as the maintenance and upkeep of the physical infrastructure are also under the purview of CDA. The CDA Ordinance constituted the authority, laid down its charter and defined its power, duties, functions and responsibilities. Need of municipal services was felt acutely with the increase in population and the CDA Ordinance was amended in 1966 to vest the Authority with municipal powers. The project site by virtue of its locations falls under the administrative and technical control of CDA.

4.8.2. POPULATION AND HOUSING

The total population in ICT and Rawalpindi District is about 3.4 million (based on the 1998 census). According to the 1998 Census, the total population of Islamabad city was 529,180. The average annual growth rate was 5.75 percent. The average household throughout the district consists of 6 persons per household. In the surveyed area near the proposed project site, the house structures are mostly concrete structures.

Table 4-2: Demographic Profile of Islamabad Administrative Units

Administration Unit	Area (Sq. km)	Population Density (Per Sq. km)	Population
Islamabad District	906	889	805,235
Islamabad Urban	440	1203	529,180
Islamabad Rural	466	592	276,055

Source: City Report 1998, Islamabad

4.8.3. EDUCATION AND LITERACY

Islamabad is a modern metropolitan city which is center of wide range of ethnic, linguistic and racial groups each with significant requirements of special and well-equipped educational institutions. In the field of education it was again the CDA which took an early lead by establishing Islamabad Model Schools, and the Federal Government Schools and Colleges. All these institutions have now come of age and are imparting quality education of the highest standards. A detail of these institutions is presented in Table 4-3. As expected, Islamabad enjoys a high literacy ratio of 77.25. Besides, there are 14 universities in the public and private sector. Uswa College is located near the project area and a campus of University of Lahore is also located near the project area.

Table 4-3: Educational Institutions in Islamabad City

No.	Level	Total	Boys	Girls
1	Primary Junior Model	37	-	-
2	Primary Urdu Medium	29	-	-
3	Middle	07	02	05
4	Secondary Model	17	08	09
5	Secondary Urdu Medium	13	05	08
6	Higher Secondary	06	02	04
7	Degree College	07	04	03
8	Model Colleges	19	10	09

Source: City Report 1998, Islamabad

4.8.4. INSTITUTIONAL FACILITIES

Following institutional facilities are located in Islamabad.

4.8.4.1. HEALTH FACILITIES

A large number of health facilities exist in Islamabad, which serve the urban population of the city as well as that of the nearby suburban and rural areas. The health of the people primarily depends upon the quality and availability of public health facilities. CDA provides good quality medical and health care for residents of Islamabad through the Directorate General of Medical and Health Services established in 1986. Primary health care and public health function are carried out by the DHS while diagnostic and treatment facilities are provided by the hospital, clinic and health centers under CDA.

4.8.4.2. POST OFFICES

Postal facilities like Post Office and money order, etc. are currently available in the villages in the peripheral area of the project. The major service centers are available in developed sectors of Islamabad.

4.8.4.3. TRANSPORTATION

Public transport is available in the vicinity of Project Area. During the field visits, buses, coasters, wagons, etc. were observed on the nearby road. Population doing business on local routes and small roads stressfully complained about the traffic congestion and dust problems. People said that the condition of roads in the Project Area is not satisfactory and these roads are not sufficient to accommodate such a huge traffic and demanded the widening of the existing roads and construction of new roads, bridges and bus terminals.

4.8.4.4. ROAD NETWORK

The road network of Islamabad is designed to provide maximum accessibility of motorized vehicles to every remote corner of the city. All topographic features have been effectively used for efficient storm water drainage along the road. The federal capital is connected to other parts of the country through Kashmir Highway with a right of way of 366 meters. The Islamabad-Peshawar and Islamabad-Lahore Motorway and GT. Road can then be accessed through this highway. These highways provide access to the capital from Murree, Peshawar, Jhelum and Lahore. The Islamabad International Airport is connected to the main city through Islamabad Express-way and various sectors.

4.8.4.5. SPORTS AND OUTDOOR ACTIVITIES

Islamabad has no dearth of sports and games facilities. The National Institute of Sports and Culture has taken the lead in providing modern and up-to-date facilities for sportsmen of the capital. This institute boasts modern stadium called Jinnah Stadium for track and field events, Lquat Gymnasium for all indoor games and Gymnastics, swimming pools for water sports and auditorium for cultural activities. This area is a truly impressive venue for holding national and international tournaments and athletic meets. The Government of China has provided generously for developing this institution of national importance.

4.8.4.6. PARKS AND HORTICULTURE

Islamabad is a city with a lot of green and open spaces. Green belts and buffer zones are provided along the main arteries. The city is filled with parks, botanical and flower gardens. These factors make the city one the greenest cities of the world.

4.8.5. UTILITIES SERVICES

4.8.5.1. WATER SUPPLY

Easy access to safe drinking water is one of the basic human needs upon which the health of people largely depends. According to 1998 Pakistan Census, the availability of water inside the house including piped water (Tap), hand-pumps and wells was reported to be 83% of the housing units in the city.

4.8.5.2. ELECTRICITY

Again, according to 1998 census, 91 percent housing units in the city are connected to the main power grid viz-a-viz 71 percent in 1971. This indicates a marked rise in the energy supply to the city within less than two decades. In the project area electricity is provided by the Islamabad Electrical Supply Company (IESCO).

4.8.5.3. NATURAL GAS

Gas supply pipelines have already been laid in the project area for the supply of natural gas. All the units, specially students and staff accommodations will soon be connected to the gas supply grid.

4.8.5.4. TELEPHONE

Special Communication Organization (SCO) operates an extensive telephone network in the Project area and all main towns in the district have telephone connectivity. Cellular phone services, with strong coverage in all major settlements.

4.9. CULTURAL AND ARCHAEOLOGICAL SITES

There exist no documented or known sites of archaeological, historical, cultural or religious significance at or in the immediate vicinity of the project area. There is no tomb or Ziarat located within the project boundaries. Structures of religious significance (mosques) are also not located in the area. Moreover, a meeting with the Archaeological Conservator, Department of Archaeology and Museums, Islamabad has also confirmed the non-existence of any archaeological sites, monuments, antiquities, cultural heritage within the study area.

5. PUBLIC CONSULTATION

5.1. GENERAL

Public consultation is a systematic process which provides an opportunity for citizens, planners, managers and elected representatives to share their experience, knowledge and concerns and perceptions about the proposed Project. The objectives of the public consultation are as follows:

- ✘ Share information with stakeholders on proposed improvement works and expected impact on the socio-economic environment of the Project Area.
- ✘ Understand stakeholders concerns regarding various aspects of the Project, including the existing condition of the Project Area, upgrade requirements, and the likely impact of construction related activities and operation of the Project.

In order to meet the above mentioned objectives, at different locations, consultations including scoping sessions and focus group discussions were held. During consultations with the local community, main contents of the project were shared with community; they expressed their apprehensions about the Project in detail.

5.2. CONSULTATION WITH STAKEHOLDERS

The consultations were also held with Pak-EPA, Administration, ICT, Forest Department, Tourism Department, and Health Department, Contracts, Project designers/Developers (UPDL), Project Proponent (Tele Town) etc.

5.2.1. ENVIRONMENTAL PROTECTION AGENCY (EPA) OFFICIALS

A meeting held with Pak-EPA officials for discussion on the project components. They have hinted a few important issues that need special attention during the project execution. The important issues are:

- ✘ The Pak-EPA officials were very keen on the development of a well established sewerage system and sewerage treatment plant.
- ✘ Water consumption and availability analysis must be done as there is acute shortage of water in Islamabad.
- ✘ A solid waste management plan for the operation period must be prepared.

- ✗ The plantation of shrubs and ornamental trees should be executed keeping in mind the seasons. Trees must be planted at the embankments of drains to reduce soil erosions.
- ✗ Roads layout planning and design should be executed keeping in view the natural drainage pattern and slope
- ✗ Alternate energy (solar geysers and photovoltaic cell) must be introduced in the campus
- ✗ Buildings must be designed in a way, to utilize maximum daylight and fresh air and make them more energy efficient
- ✗ Proper landscaping and vegetation must be done by local plant species to make campus green and lively.
- ✗ Concept of segregation of waste must be introduced and separate waste collection bins should be installed for different types of waste i.e. recyclable and non-recyclable.

5.2.2. CAPITAL DEVELOPMENT AUTHORITY (CDA) OFFICIALS

Several meetings held with CDA officials regarding the project components and activities. The expected impacts on the physical, biological, and socio-economic environment of the project study area were discussed during the meetings. The main concerns are listed below;

- ✗ Solid and liquid waste management is a major issue deteriorating the natural resources.
- ✗ Plantation Plan should be provided.
- ✗ Local women should be involved in developmental Projects.

5.3. CONSULTATION WITH COMMUNITY

Community representatives from the neighboring villages were also discussed about the project to have an informed judgment about their possible response on this project. Salient findings of the group discussion and main concerns of the community are summarized below;

- ✗ Noise level will be highly irritating during the construction stage of the Project due to the operation of construction machinery and vehicular movements.
- ✗ General mobility of local residents will be disturbed during the construction phase of the Project.
- ✗ Insecurity and theft problems may generate during construction stage of the Project.

- ✗ Health of the nearby community may be suffered due to dust during the construction stage.
- ✗ Solid waste should be properly managed.
- ✗ Width of drains must be design keeping in view the climate change.
- ✗ Developer must utilize the concept of rainwater harvesting wherever possible.
- ✗ Trees must be planted at the embankments of drains to reduce soil erosions.

5.3.1. MAJOR FINDINGS OF PUBLIC CONSULTATIONS:

- ✗ The respondent were mainly concerned about dust pollution and were of the opinion that it should be controlled. They have also lodged complaints in CDA office.
- ✗ There was no significant Flora cutting, as it was barren land, according to respondents it a positive impact.
- ✗ Local people were happy as large no. of job were created due this project during the construction phase. And they are also hoping to get more jobs during extension phase of this project. Main jobs were created in skilled, non skilled and labor category. They were also hoping for permanent employment during the operation phase of he project.
- ✗ The respondents were also complaining about noise and vibration due heavy works of the project.
- ✗ The local people were also happy because of the increase in the property value of the surrounding areas, due to this project.
- ✗ As there is no government school in nearby vicinity and they project includes the facility of Gov. School, so local people were happy that they can avail the opportunity.
- ✗ People of the surrounded areas were also holding an opinion that due to this project their current business has been improved. As the contractors buys the daily commodities and food for contractors mess from local market/vendors.
- ✗ They project personnel/company staff has also rented houses in project vicinity.
- ✗ The local people will also be benefited by commercial area of the project, like park, mosque, school, hospitals.
- ✗ General mobility of local residents will be disturbed during the construction phase of the Project.
- ✗ Solid waste should be properly managed.

6. SCREENING OF POTENTIAL ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

6.1. GENERAL

This chapter identifies the potential impacts due to the implementation of the proposed project on the physical, ecological and socio-cultural environment of the Project Area. The chapter also identifies measures that will help to mitigate the Project's adverse environmental effects and enhance the positive impacts.

6.2. APPROACH ADOPTED FOR IMPACT IDENTIFICATION

Tele Town is at the planning stage & detailed design for all the proposed amenities has to be carried out at later stages. To identify the potential impacts, checklists were developed for physical, ecological and socio-cultural environment by the experts keeping in view the type of proposed facilities and the existing setup of the Project Area.

6.3. IMPACTS DURING PROJECT DESIGN & PRE CONSTRUCTION PHASE

6.3.1. PHYSICAL ENVIRONMENT

Following is the description of the impacts envisaged during the design & pre-construction phase of the project:

6.3.1.1. TOPOGRAPHY

- ✗ Topography of the area will change, due to the construction of the Project related infrastructure, such as roads, sewerage network and infrastructure. Generally, slopes in the area are mild.
- ✗ The sites selected for the development of the Tele Town Housing Scheme are mostly flat pieces of land available in the area. However, slight trimming of the land may be required during development and cut and fill procedure will be followed. Therefore, there will not be any significant adverse impact on the topography of the area.

Mitigation Measures

- ✗ Maximum efforts should be made to follow the natural topography of the Project Area. However, if it is unavoidable, disturbance should be minimum without damaging the aesthetic view of the area. Slope stability should also be considered.
- ✗ Natural drainage of the Project Area should not be disturbed.

6.3.2. ECOLOGICAL ENVIRONMENT

Project Area particularly along roads contains good vegetative cover. Provision of new facilities may require clearing of vegetative cover that are present in spaces and this will cause an adverse environmental impact on the existing vegetation.

Mitigation Measures

Along with developmental activities, a tree plantation program should also be carried out to compensate the tree cutting, vegetative clearing and to enhance the beautification of the Project Area. For this purpose, extensive plantation will be carried out at proposed parks, along existing & proposed roads and nullahs etc.

6.3.3. SOCIO-CULTURAL ENVIRONMENT

- ✗ One of the major impacts related with the location of the proposed Project facilities and to be dealt at Design Stage level i.e. prior to construction activities is the acquisition of land. It is estimated that about 19,667 Kanals of land is acquired.
- ✗ Due to the proposed Project activities, no infrastructure may get disrupted.
- ✗ Due to the proposed Project activities, no religious properties may get disrupted.

Mitigation Measures

Utmost efforts should be made to minimize the acquisition of land. However, for acquisition of land, compensation would be made as per market value. For this purpose, a land acquisition committee should be organized in consultation with the potential PAPs.

6.4. IMPACTS DURING CONSTRUCTION PHASE

6.4.1. CONTRACTING ARRANGEMENTS

The success of a construction project depends to a very large degree on selection of an experienced construction contractor who possesses the necessary expertise, has machinery and equipment, and has access to sufficient financial resources, in addition to a reliable, experienced workforce.

Mitigation Measures

The contractor was appointed by the proponents after a thorough screening process in line with the procedures laid down by the government. All efforts were made to ensure that the selected contractor has established track record and would be able to complete the assigned tasks within the stipulated time-frame and has sufficient experience to ensure that there is no adverse impact on the environment. Contractors for subsequent construction works, if necessary, shall be appointed similarly at an appropriate time during project execution. A maximum of about one hundred and fifty workers would be required at the site at peak of construction. Skilled workers shall include project manager, engineers, quantity surveyor, Autocad Operator, surveyors, lab technician, accountant, storekeepers, drivers and machinery operators, masons, carpenters, steel fixers, labour workers, cooks, security guards and helpers of skilled workers. The contractor has been directed to employ maximum number of casual labour locally to generate employment opportunities for local labour and provide them with training and experience. Since workers engaged so far are mostly local, a construction camp has not been necessary at the project site.

6.4.2. CONSTRUCTION MATERIALS

Procurement of construction materials and knowing beforehand about the sources and quantities required is another major factor vital for the success of a construction project.

Mitigation Measures

Construction materials will include cement, sand, crush, bricks, steel bars for bridges, some paints, asphalt, tar, and glass etc., which shall be transported to the project site in bulk quantities on need-basis. The proponents are aware of the Green Building regime for use of environment-friendly construction materials, and fire-resistant materials, to the extent possible, if available in the market. Quarry material, meeting technical requirements and quality, will be procured from the nearest licensed quarry, which shall mean less transport costs as well as lesser

emissions from trucks carrying the load. Materials such as cement shall be purchased either directly from manufacturers or their authorised agents. Noise absorbent materials, if available in the market and if cost-effective, shall also be considered for use. All construction materials to be procured for the project shall be subject to testing and prior approval by the Project Manager in order to maintain quality standards and ensure these are procured from the nearest source.

6.4.3. OTHER SUPPLIES

Projects do not require construction materials alone and acquisition of other supplies well in time is as important as procuring sand and cement.

Mitigation Measures

Main supplies required during the construction phase of the project shall include water, fuels, power and routine construction accessories. Requirement of water shall vary according to the quantum of work during construction. Peak consumption could reach 5,000 gallons per hour. A study conducted by the Japanese International Cooperation Agency in 1988 estimated that the groundwater potential of Islamabad region is about 236 million litres per day. There is thus sufficient groundwater in the region and consequently depletion of groundwater is unlikely. Fuels for construction equipment and vehicles, comprising mainly diesel and petroleum, are available at nearby locations. Peak consumption will be about 500 litres per day. Temporary electricity connection has been obtained from Islamabad Electricity Supply Company, which will augment diesel generators. Construction foremen shall ensure that all supplies either for construction or for personal consumption of construction crew are procured regularly and on timely basis so that there are no delays and that workers are not inconvenienced.

6.4.4. VEHICLES AND EQUIPMENT

Vehicles and equipment deployed at a project must be in good condition and not become detrimental to the local environment in terms of noise and emissions. These must also be of good quality to ensure there are no breakdowns that can disrupt the process of project implementation.

Mitigation Measures

The contractor has been directed by the proponents to take all possible measures to see that works do not impinge on the environment. Construction vehicles and

equipment at the project site. The exact number of vehicles and equipment in use at the site at any given time will vary according to work schedules and work momentum, and shall be bound by traffic regimes within the city. The contractor shall be advised to use new vehicles, machinery and equipment to maintain emissions and noise at lowest possible levels. During early phase of construction, two or three truckloads of different types of construction material shall be delivered to project site per day, increasing to about five to eight at peak of construction activity. Arrival timing of such equipment and construction materials will not be concurrent and shall take place when there is minimal disturbance for local population. In any case, Islamabad Capital Territory's commercial traffic regime forbids entry of trucks during daylight hours on working days without a permit, more recently due to security concerns.

6.4.5. EMISSIONS AND DISCHARGES

Construction equipment and vehicles can discharge exhaust emissions containing CO₂, CO, NO_x, SO₂, and particulate matter and generate dust emissions from earthwork. The primary source of emissions to air during construction activities will be diesel engine-driven generator exhaust. Other emission sources include construction machinery and project vehicles. Dust from construction activities and movement of vehicles could be another main source of air emissions.

Mitigation Measures

Since vehicles and equipment in use shall be in good working condition and under due maintenance, as per instructions to construction contractor from the proponents, emissions shall be within acceptable limits, as is evident from environmental testing carried out at the project site at a time when work was in progress. The proponents shall monitor pollution levels regularly and instruct contractors to cover the perimeter with cordons to minimise dust pollution and sprinkle the grounds frequently to prevent dispersal of dust. Results of laboratory tests for ambient area whilst excavation was in progress indicate that the local area has not been impaired in terms of air quality due to dust dispersal.

6.4.6. NOISE

Unwanted noise can likewise be generated by machinery and equipment deployed during construction, causing annoyance and discomfort for users and neighbours.

Mitigation Measures

Noise levels were tested on March 25 and 26, 2018 while some works were being carried out and machinery was under deployment. Noise readings indicate that no excessive noise is being created from machinery, primarily because the equipment was new and under good maintenance. The construction crew assured that all machinery to be used during construction would be of high quality and thus prevent creation of excessive noise. Vehicles especially will be of recent vintage and fitted with silencers that reduces noise during operation.

6.4.7. WASTE STREAMS

Waste generated at site can be liquid as well as solid waste. Liquid waste consists of oils and oily water from maintenance of equipment and vehicles, accidental leakage or spillage from vehicles, equipment or storage, wastewater from construction activities and domestic sewerage from the project office and construction camp.

Mitigation Measures

No vehicles and equipment shall be repaired at the project site, thus eliminating spillage of oils or oily water that can damage sub-soil. The contractor has issued instructions to foremen and workers that any leaks from machines and equipment during use must be scooped up immediately and placed in dedicated bins. Alternatively, grey water will be sprinkled on unpaved sections within the construction site. Sieved substances, which will be dumped at municipal waste disposal sites, will not be of character injurious for the environment. Solid waste will consist of excavated earth, excess or used or rejected construction materials, scrap, warehouse waste, workshop waste and domestic solid waste from the project office and construction camp.

It will be ensured that liquid and solid waste is minimised and that all form of waste is carried away from the project site and disposed in a manner whereby it does not impinge on local environment. All solid waste will be collected at the site at designated spots from where it shall be removed to municipal skips on a regular basis by the waste management contractor. Excavated earth will be used for landscaping or sold for reuse. No excavated earth shall be dumped either on adjoining properties. Complaints from neighbours, if any, regarding inappropriate disposal of solid waste shall be attended to on top priority. Recycling or reuse of

waste material shall be the preferred option but when not practical, solid waste will be treated and disposed of appropriately.

6.4.8. WASTE MANAGEMENT CONTRACTOR

Construction projects involving estate development create a great deal of liquid as well as solid waste that can impair local environment. Steps thus need to be taken to ensure appropriate collection and disposal of all forms of waste.

Mitigation Measures

A waste management contractor shall be prearranged to carry away all forms of waste from the project site for disposal in an environment-friendly manner at the nearest garbage disposal sites, identified by municipal authorities.

6.4.9. GENERATION OF EMPLOYMENT

A substantial number of site and off-site, direct and indirect jobs shall be created during implementation and operation of the project. A brief explanation of anticipated job creation is as follows:

- ✕ Several temporary jobs for skilled and semi-skilled workers have been created by the proponents to assemble a project implementation team;
- ✕ Twenty permanent jobs shall be created during operation of the project, including both skilled and unskilled workers;
- ✕ During full-fledged construction, project implementation will involve just over one hundred and fifty workers, with a minimum of twenty-five;
- ✕ The estate shall have seven hundred and eighty-one residential units. Abiding by resident profile, there are expected to be at least 1.5 domestic workers (driver/cook/maid/valet/ayah/chowkidar as the case may be) on full-time/part-time basis for each household, which translates into about 1,172 domestic workers skilled and semi-skilled workers;
- ✕ Thirty large retail units shall have at least two full-time employees, while the smaller five shall have at least one employee each;
- ✕ The number of jobs likely to be created at the school and the club has not been taken into account as yet since this is dependent on the ultimate profile of the two sub-projects, and

- ✗ The total number of jobs expected to be generated thus comes to approximately twelve hundred and fifty-seven.

In addition to these, operation of the project will also result in business and additional work opportunities for multiple upstream and downstream businesses and maintenance staff/technicians.

6.5. ENVIRONMENTAL IMPACTS DURING PROJECT OPERATION PHASE

6.5.1. PHYSICAL ENVIRONMENT

- ✗ The Project operation will result into generation of substantial quantities of solid waste from the residential and commercial activities. This waste may have significant impact on soil if a proper arrangement for its disposal is not made. In addition it will enhance aesthetic pollution and unhygienic conditions. In order to assess the impacts and proper designing of disposal system, it is imperative to quantify the solid waste generation, to assess its characterization and preparation of waste management plan. Similarly, unmanaged disposal of liquid waste will also cause the contamination of land resources.
- ✗ On account of increased population (both local as well as visitors), there will be a significant increase in the sewage. It shall lead to further pollution of the available surface water resources.
- ✗ With the establishment of new neighborhood centers, new schools, colleges, hospitals and recreation centers, there will be an increased stress on the already scarce drinking water resources.
- ✗ Surface run-off from the impervious surface of the carriageway or hillside slopes can aggravate the flooding of embankment during the operation stage.
- ✗ If cross-drainage structures like culverts are not adequately maintained and cleaned, natural streams/nullahs tend to become choked with debris and eroded soil, adversely affecting the quality of surface water and ponding in the Project Area.
- ✗ Increased traffic load as a result of project operation will result in the emission of exhaust gases. This will in turn rise to some extent, the level of particulates and gaseous pollutants in the ambient air.
- ✗ The noise pollution will be lesser than the construction phase. However, it will definitely be more than pre-construction stage on account of increase in traffic on the newly constructed and widened roads there will be an increased noise. However, it is expected that resultant sound level will remain well within the NEQS limits.

Mitigation Measures

- ✘ To cater the existing and future solid waste management of the town, a separate solid waste management system needs to be developed and implemented.
- ✘ Proper monitoring of the soil erosion and landslide prone areas should be carried out during operation phase and soil conservation measures (if needed) will be carried out like provision of physical structures e.g. retaining walls, etc.
- ✘ Central wastewater treatment plant should be provided having the capacity for treatment of sewage of entire town and industrial estate.
- ✘ For air and noise quality, a monitoring system will be established by Tele Town to ensure that ambient air and noise levels are within permissible limits.
- ✘ To reduce noise levels, if deemed necessary, provision of thick tree plantation, noise barriers and double glazed windows will be assessed as per site conditions.

6.5.2. ECOLOGICAL ENVIRONMENT

- ✘ There will be no further damage to the vegetation of the tract during operation stage.
- ✘ As the flora and fauna are interdependent, improvement of the flora through plantation shall be a source of attraction for the fauna, especially the avifauna or the birds. The birds, who were scared away during the construction stage, shall return to the Project Area during this stage.

Mitigation Measures

- ✘ In order to rectify the loss of habitat due to cutting/removal of trees, extensive planting shall be carried out along the both sides of existing and proposed roads, in the compounds of buildings, play grounds, parks and recreation centers, along nullahs and in all other available open spaces
- ✘ Fauna depends upon flora of a place. With the improvement of flora the fauna and especially the avi-fauna shall be attracted again to the site and negative impacts on fauna shall be mitigated to a great extent.

6.5.3. SOCIO-CULTURAL ENVIRONMENT

- ✘ Increased number of people will be a positive impact regarding the local business of the shopkeepers, hotels and food stalls. However, this increased number of visitors may become a threat to the available natural resources including water, fire wood, etc. This will also create uneasiness to the locals.

- ✗ There may be some cultural conflicts due to the visit of the Project Area by the outsiders particularly foreigners.

Mitigation Measures

- ✗ Provision of water supply and other resources should be made by assessing the potential visitors at operation stage.
- ✗ To protect the forest and other plantation of the Project Area, it is recommended that gas cylinders should be provided by the town management at subsidized rates.

7. ENVIRONMENTAL MANAGEMENT AND MONITORING PLAN

The goal of the Environmental Management and Monitoring Plan (EMMP) is to ensure that all the necessary corrective actions are carried out to counter any adverse environmental impacts and that enhancement measures are used where feasible and practical. One of the aims of the monitoring program is to actually observe and analyze these impacts, thereby providing the information to help in the modification of mitigation measures to reduce the risks, hazards and associated with this development Projects.

7.1. GENERAL

For the effective implementation and management of the proposed mitigation measures, it is necessary to develop an EMMP which basically provides a delivery mechanism to address the potential impacts of the Project activities and to develop a monitoring program in order to minimize the potential impacts during the construction and operational stages of the Project. The EMP has been prepared with an objective of:

- ✕ Outlining the mitigation measures required for avoiding or minimizing the potential impacts assessed in this study.
- ✕ Developing a monitoring mechanisms and identifying the requisite monitoring parameters to confirm effectiveness of the mitigation measures recommended in the EIA.
- ✕ Defining roles and responsibilities of the Project proponent for the implementation of EMP and identifying areas where these roles and responsibilities can be shared with other parties involved in the execution and monitoring of the Project.
- ✕ Defining the requirements necessary for documenting compliance with the EMP and communicating it to all the concerned regulatory agencies.
- ✕ Prescribing the mechanisms with which consultation with stakeholders during the Project will be maintained.

7.2. STRUCTURE OF EMMP

The EMMP consists of the following sections:

- ✘ Legislations, guidelines and Environmental Standards
- ✘ Organizational structure and roles and responsibilities
- ✘ Mitigation Management Matrix (MMM)
- ✘ Environmental monitoring program
- ✘ Communication and documentation
- ✘ Change management plan
- ✘ Training program

7.3. LEGISLATION, GUIDELINES AND ENVIRONMENTAL STANDARDS

The main environmental legislations concerned for this Project are the Pak-EPA, 1997, LAA, 1894, the Forest Regulations, 1930, Wildlife (Protection, Preservation, Conservation and Management) Act, 1975.

7.3.1. EFFLUENTS

The NEQS of Pakistan will be used for effluents. The NEQS for municipal effluents define the maximum allowable concentration of pollutants in effluents released into different types of receiving bodies. This standard will apply to all effluents from Project facilities. *Annexure-B for NEQS*

7.3.2. GASEOUS EMISSION

The NEQS of Pakistan for gaseous emissions define the maximum allowable concentration of pollutants. This standard will apply to all gaseous discharges from Project facilities. *Annexure-B for NEQS*

7.3.3. AMBIENT AIR QUALITY

Standards for ambient air quality are prescribed under the NEQS of Pakistan and will be followed. *Annexure-B for NEQS*

7.3.4. NOISE

Standards for vehicle-generated noise are prescribed under the NEQS of Pakistan and will be followed. [Annexure-B for NEQS](#)

7.3.5. DRINKING WATER

In addition to the NEQS that apply to effluents released from construction camps, WHO drinking water quality guidelines will be used as reference points for determining water quality. These are outlined in [Annexure-B](#)

7.3.6. SURFACE WATER

The surface water quality standards have been established under Pakistan NEQS and will be followed and have been attached at [Annexure-B](#)

7.4. ROLES AND RESPONSIBILITIES

The following organizations would be involved in the implementation of the proposed Project: District Heads of various departments, such as CDA, Highways, Buildings, Public Health Engineering, who will be the executors of the EMMP, through the Project Contractors.

- ✕ Supervisory Consultants at Execution Stage as the monitor of the EMMP.
- ✕ Contractor (s) responsible for implementation of the EMMP.

7.4.1. M/S TELE TOWN

The M/s Tele Town Project Proponent will be responsible for ensuring the overall implementation of EMMP during the Planning, Designing and Construction stages of the Project.

During the Construction stage of the Project, Contractors, working under various heads of the departments will make sure that the Project activities are being executed as per provisions of EMMP and other applicable laws and regulations. It is proposed that an Environmental Officer (EO) should also be deployed by Pak-EPA to ensure that design and implementation activities are being carried out as per provisions of the EMMP.

During the operational stage, concerned departments will be responsible for implementation of mitigation measures and CDA will be responsible through EO for

monitoring of O&M activities being carried out by different departments are in compliance with EMP. Specific responsibilities at all project stages are as follows:

7.4.1.1. PLANNING AND DESIGN STAGE

- ☒ Setting up systems for environmental management.
- ☒ Ensuring that the terms of reference for each Project contractor adequately cover environmental and social issues and participate in short listing where appropriate.
- ☒ Ensuring that the Contractors develop and carry out environmental implementation plans that are consistent with the EMMP.
- ☒ Supervising environmental assessments, and providing substantial inputs and guidance.

7.4.1.2. PRE-CONSTRUCTION PHASE

- ☒ Identifying any problems due to restricted access during construction and verifying whether ramps/diversions have been provided where required.
- ☒ Establishing a grievance readdressal committee to ensure fairness and transparency during the resettlement process.
- ☒ Ensuring that the Contractor has prepared video of constructions sites as well as areas selected for establishing construction camp and other facilities like asphalt plant, etc. and copies of the same duly received.

7.4.1.3. CONSTRUCTION PHASE

- ☒ Liaising between Project staff of different departments including Capital Development Authority, Highway Department, Public Health Department, etc. and the Supervision Consultant's staff to monitor environmental compliance during construction.
- ☒ Supervising and providing technical support to Project and operations staff to help ensure compliance with the EMP.

7.4.1.4. OPERATION STAGE

- ☒ Coordinating with the operations staff working under the different departments including Health, Education, Forest and other relevant departments to monitor environmental compliance during operation of Project facilities.
- ☒ Reporting on the progress of environmental compliance to the Environmental Officer, EPA.

- ✘ Assessing the long-term environmental impact of operation of the Project facilities.

7.4.2. SUPERVISORY CONSULTANTS

Supervisory Consultant (SC) will be responsible for following activities:

- ✘ Supervising the Project's Contractors and ensuring that all contractual obligations related to design and construction, as well as environmental and social compliance are met.
- ✘ Ensuring that day-to-day construction activities are carried out in an environmentally sound and sustainable manner.
- ✘ Assisting the Project management for coordinating with officials, community groups, government departments, etc. on environmental issues and obtaining the necessary clearances from the regulatory authorities.
- ✘ Monitoring of the environmental aspects of Projects during construction to ensure that the environmental requirements of the contract and the mitigation measures proposed in the EMP are implemented.
- ✘ Supervising contractors and preparing environmental input to the quarterly progress report.
- ✘ Developing guidelines and a code of good practice describing low-cost environmental measures that can be implemented in the construction and maintenance programs.
- ✘ Developing and conducting environmental training activities for contractors and the supervision consultant staff.
- ✘ Ensure that asphalt plants, construction camps and other facilities are properly sited and installed in accordance with the contract.
- ✘ Determine the timing and exact locations of both baseline and routine air, noise and vibration, and water quality monitoring in accordance with the contract provisions (if any).
- ✘ Undertake critically important routine visual monitoring of construction, waste disposal and overall environmental management practices by the Contractors. Effective environmental management during construction will require frequent site visits and observation skills.
- ✘ Devise solutions to environmental issues as they arise. Developmental Projects inevitably give rise to problems of excessive dust, noise levels and other impacts that

are in some instances unavoidable. Good construction supervision requires that every effort be made to minimize these impacts. A team approach is essential. Environmental issues are entwined with those of safety, traffic management and community relations. Circumstances will arise that will require creative solutions based on circumstances as they are encountered.

- ✗ Check that the Contractor backfills, compacts, and leaves the ground in the original condition after excavation of pits for subsurface investigations/borrow pits.
- ✗ Keep checks and controls so that the pollution of land and water resources due to the spills of lubricants, fuel, chemicals, and other wastes does not take place.
- ✗ To see that the Contractor keeps the damages to the minimum while making tracks for accessibility and that the damage is rectified properly.
- ✗ Monitor that the Contractor uses such working methodology so as not to cause disturbance to the communities by fugitive dust, noise, fumes, etc.
- ✗ Monitor that the Contractor adjusts his working hours during the construction activities in such a manner that it causes least inconvenience to the local population.
- ✗ To keep the working site/camps tidy so as to avoid unhealthy impacts on the work force.

7.4.3. CONTRACTOR

As referred earlier, implementation of the EMP will be the sole responsibility of the Contractor. All the environmental measures related with construction activities will be implemented by the contractors.

7.5. ENVIRONMENTAL MITIGATION MANAGEMENT MATRIX

The environmental protection and enhancement are achieved in various ways. These approaches should begin right at the embryonic stage, i.e. i) Project location, ii) Design, specifications, iii) Construction activities and iv) Post completion activities i.e. operation and maintenance stage. Appropriate environmental management measures are required to be exercised in a cascade order by the Project proponent at each stage of the Project.

In this way, it is envisaged that the Project will achieve maximum ongoing cost-effectiveness, environmental sustainability and social soundness, far beyond the end of implementation of the Project. All the stages of the Project have to be managed by

adopting the proposed environmental mitigation measures, where, besides engineering aspects, due importance is to be accorded to mitigation measures which make a perfect blending with the surrounding ecosystem.

The key environmental and social issues, which have already been discussed, are as under:

- ✕ Contamination of air, water and soil during the construction and operation stages
- ✕ Soil erosion and soil contamination at construction and operation stages.
- ✕ Impact of noise generated by vehicles, machinery and equipment during the construction activities
- ✕ Impact on community and work force safety as a result of accident hazards during the construction and operation of the project
- ✕ Gender Issues.

MMM is provided below, which establishes the linkages between the environmental and social impacts, mitigation strategy and the agencies responsible for execution.

The MMM identify:

- ✕ The required mitigation measures recommended in EIA.
- ✕ The person/organization directly responsible for adhering to or executing the required mitigation measures.
- ✕ The person/organization responsible for ensuring and monitoring adherence to the 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.

ENVIRONMENTAL MANAGEMENT PLAN

Sr. No.	Project Component or Impact	Target	Action	Responsibility/ Action taken, if any
A. PRE-PROJECT STAGE				
1.	Selection of a project	To construct a Farm houses	<ul style="list-style-type: none"> ▪ Construction of a gated farm houses at a suitable site 	Proponents (M/s Tele Town)
2.	Site selection	To find a site suitable site to meet the proponents' objectives	<ul style="list-style-type: none"> ▪ Identification of a suitable site at a reasonable location, preferably away from congested parts of the city 	Proponents (M/s Tele Town) The proponents viewed a number of sites around the city and selected a site in Zone V with a rural setting
3.	Arrangement of financing for the project	To launch and implement the project without possibility of delays in execution due to funding issues	<ul style="list-style-type: none"> ▪ Line up finances for the project beforehand 	Proponents (M/s Tele Town) Funds are available with the proponents from advance sale of residential plots, which would be sufficient for completion of the project within the expected time-frame of the project
4.	Acquisition of land	To arrange land for the proposed project	<ul style="list-style-type: none"> ▪ Alternate sites should be considered 	Proponents (M/s Tele Town) Project site has been found as feasible. All other sites viewed by the proponents were not considered viable for a variety of reasons, mainly congestion and high cost of land and development. There has not been any adverse environmental impact on the local environment as a result of project location and there has not been

				any dislocation of previous owners of the project site. No important land-use or economic activity has been lost as a result of siting of the project
5.	Payment of compensation	Payment of compensation to landowners from whom the land has been acquired or purchased through private negotiations	<ul style="list-style-type: none"> Payment of compensation or price 	Proponents (M/s Tele Town) The land was acquired in 1968 and compensation was paid to the original owners as per yardstick approved by the government. There are no pending claims
6.	Change of land-use	To change of land-use of the site	<ul style="list-style-type: none"> Permissions to change the land-use 	Proponents (M/s Tele Town) Town planning of the city permits residential colonies in the project area subject to CDA permission. There was no change made to the landuse.
7.	Selection of a designer for the project	To design the project in a fully environment friendly manner	<ul style="list-style-type: none"> Selection of a project designer with sufficient expertise to design environment-friendly projects 	Proponents (M/s Tele Town) The proponents have in-house capability to design the project
8.	Selection of Contractor	To execute development works at the site without damaging the environment	<ul style="list-style-type: none"> Selection of a Contractor with sufficient experience, equipment and workforce to execute the project within the target date 	Proponents (M/s Tele Town) Selection of the Contractor has been carried out after careful screening and abiding by government procedures.
9.	Surveys and investigations	To conduct surveys and investigations to ensure that project activities do not	<ul style="list-style-type: none"> Surveys and investigations be carried out to determine existing conditions relating to waste generation, quality of air, water, noise, soil, soil erosion and collect data 	Environmental Consultants/Project Designer (The Urban Solutions)

		impinge on the environment	relating to climate of the project area, wind speed and direction	Investigations have been carried out in respect of soil, ambient air, groundwater quality, traffic load and noise at the project site. No aberration has been found during environmental testing. Soil tests indicate that the project site is suitable for construction of roads and bridges, and the overhead water tanks
10.	Social impact of the project	To find out whether any social impacts would result from locating the proposed project at the selected site	<ul style="list-style-type: none"> A survey be carried out to assess what sort of social impacts can take place as a result of development works 	<p>Proponents (M/s Tele Town)</p> <p>This environmental study has indicated that there shall not be any adverse social impact from project activities. On the contrary, it shall have a horde of benefits for the city as explained at various places in the report</p>
11.	Measures for surrounding areas	To identify any measures that must be taken as mitigation for adverse effects resulting from locating the project at the proposed site	<ul style="list-style-type: none"> A study should be conducted to suggest measures that should be taken to compensate local population or environment in case the proposed project alters the environment. If considered expedient, the proponents should make contributions towards socio-economic uplift of the project area to the extent possible 	<p>Proponents (M/s Tele Town)</p> <p>This environmental study concludes that no specific measures are necessary for surrounding areas</p>
12.	Environmental study	To preserve the existing environment at the project site	<ul style="list-style-type: none"> Commission a study for environmental examination by experienced environmental consultants 	<p>Proponents (M/s Tele Town)</p> <p>An environmental study has been prepared by experienced environmental consultants. The study has been completed in consonance with prescribed guidelines and after consultation with stakeholders</p>

ENVIRONMENTAL MANAGEMENT PLAN

Sr.	Project Component or Impact	Target	Action	Responsibility/ Action taken
B. DESIGN STAGE				
13.	Designing of the proposed project	To design the proposed project in such a manner that the existing environment is disturbed to the least possible extent	Engage a team of professional architectural firm having experience of developing environment-friendly buildings	Project Designer (The Urban Solutions) Designing has been completed. Modifications in the designs shall be carried out on need basis with prior approval of the competent authority
14.	Intrusions on the privacy of residents surrounding the project site	To ensure privacy of the residents in the vicinity of the project site	<ul style="list-style-type: none"> ▪ There should be no intrusion on privacy of adjoining areas 	Project Designer (The Urban Solutions) The design has preserved privacy of nearby properties in line with the relevant building regulations
15.	Soil Tests	To test the soil for sustainability of structures	<ul style="list-style-type: none"> ▪ A soil survey should be carried out by qualified consultants to determine soil characteristics and suggest foundations for large structures, if any 	Proponents (M/s Tele Town) Soil testing has been carried out. The soil has the requisite bearing capacity to sustain load of the proposed structure. The geo-technical consultants and structural engineers have accordingly proposed a suitable design for all foundations

16.	Seismic hazard Analysis	To protect structures from seismic hazard	<ul style="list-style-type: none"> ▪ The roads, bridges and public buildings should be designed to withstand seismic hazards 	<p>Project Designer</p> <p>The structures have been designed to withstand seismic activity typical of the project area</p>
17.	Traffic congestion and disturbance to people	To mitigate the traffic problem	<ul style="list-style-type: none"> ▪ A traffic count be taken to be aware of measures that need to be taken due to additional traffic load ▪ There should be ample parking space to cater for vehicles of residents as well as visitors ▪ Traffic emerging from the estate should meet traffic in an orderly manner by constructing proper on ramps and wide entrance 	<p>Environmental Consultants</p> <p>Traffic counts carried out by the Environmental Consultants shows that there is low traffic on local roads. Impact of additional traffic on these roads during design phase was virtually zero. Impact of traffic during construction shall be negligible whereas impact when the estate comes into operation shall be less than one percent at the most</p> <p>Project Designer</p> <p>There shall be sufficient parking spaces at all public facilities. All houses shall be built in line with building regulations so that residents' vehicles and those of visitors are parked inside dwelling units</p> <p>Project Designer /Proponents</p>

				Project Designer has designed a wide entrance with a main gate, and wide access roads to Park Road and Kurri Road. Proponents shall post security guards to regulate movement of traffic into and out of the compound
18.	Safety measures	To ensure safety of the premises	<ul style="list-style-type: none"> Project design must incorporate all possible measures to ensure safety of the premises, including fire-fighting and security arrangements 	<p>Project Designer</p> <p>Adequate arrangements have been made for security, including perimeter fence, and fire-fighting in compliance of the town planning regulations and as described in this report</p>
19.	Flora and Fauna	To protect the fauna and flora of the Project Site	<ul style="list-style-type: none"> Trees and plants should be added to the site to enhance the environmental value of the area 	<p>Proponents (M/s Tele Town)</p> <p>The proponents intend to plant a sufficient number of trees towards completion of development works.</p>
20.	Services	To ensure that all applications are made for connections for services required during construction and operation of the project	<ul style="list-style-type: none"> Applications and arrangements for all utility connections and services, such as water, electricity, wastewater disposal, natural gas and solid waste disposal should be made well in time 	<p>Proponents (M/s Tele Town)</p> <p>Most of the services are to be extended by the proponents themselves. Applications for utility connections shall be made at the appropriate time in consultation with the project designers to avoid delays in project implementation and project operation</p>
21	Reflection	To minimise reflections from all structures	Public buildings should be so designed that there is minimal reflection and that it does not cause inconvenience for	Project Designers

			residents or neighbours	The building designs shall be in conformity with parameters laid down in the building regulations and by-laws relating to reflection and privacy of neighbours. Accordingly, all windows shall be placed where there is minimal intrusion for neighbouring properties. Moreover, it shall be ensured that the glass used does not create reflections that can cause a nuisance for neighbouring properties
22.	Heat	To adopt innovative techniques introduced under the Green Building and Sustainable Building regimen	Adoption of as many features of Green Building and Sustainable Building concepts to absorb heat during winter and protect buildings against heat during the summer	Project Designer As many features of the Green Building and Sustainable Building have been incorporated into the design as was possible keeping availability of green materials and resources in view

ENVIRONMENTAL MANAGEMENT PLAN

Sr.	Project Component or Impact	Target	Action	Responsibility /Action Taken
C. CONSTRUCTION STAGE				
23.	Employment of labour	Offer employment opportunities to local population	Maximum efforts should be made to ensure that ample employment opportunities are offered to the local workers	Contractor /Project Manager The contractor shall engage local labour to the maximum possible extent
24.	Traffic congestion and disturbance to the local people	To mitigate traffic problems during construction	Traffic count be taken to find the impact of construction-related vehicles on local roads Transportation of raw material and heavy machinery will be done at times convenient to local residents	Environmental Consultants Traffic count shows that there is low traffic on local roads. The upper limit of additional traffic on these road during construction will be insignificant. Moreover, the contractor is bound the terms of his awarded contract to ensure that there is no interference with local traffic patterns. Moreover, vehicles are not being parked on the main roads Contractor All deliveries of equipment and materials are

ENVIRONMENTAL MANAGEMENT PLAN

Sr.	Project Component or Impact	Target	Action	Responsibility /Action Taken
C. CONSTRUCTION STAGE				
			<p>As much as possible, raw material and equipment shall be brought to project site through main roads</p> <p>Construction vehicles should not blow horns at the project site</p> <p>Vehicles to be used at the project site should be in good working condition, if not new, to minimise noise pollution and smoke emissions</p>	<p>being during off-peak hours and never at night</p> <p>Contractor</p> <p>Only main roads are being used and heavy project traffic is not passing through any residential area unless unavoidable</p> <p>Contractor</p> <p>Contractor has issued issue strong instructions to concerned drivers to abide by traffic laws and rules and to observe road courtesies</p> <p>Contractor</p> <p>Contractor is using vehicles, machinery and equipment that are in good condition</p>

ENVIRONMENTAL MANAGEMENT PLAN

Sr.	Project Component or Impact	Target	Action	Responsibility /Action Taken
C. CONSTRUCTION STAGE				
25.	Transportation of Construction material	To ensure that transportation of material does not cause inconvenience	The contractor should transport construction material, as much as possible, without obstructing local traffic	Contractor Contractor is ensuring that local traffic is not put into inconvenience due to movement of project vehicles and is using routes that bypass local traffic
26.	Stocks of Construction material	To avoid soil erosion and pollution by an unnecessary stockpile of construction material	It should be ensured that construction materials are ordered subject to need only so that surplus material does not create an environmental hazard	Contractor Contractor is ordering construction materials strictly on need basis and these are not being unnecessarily piled up at the project site or on adjoining properties
27.	Health and safety of workers and local public	To minimise health and safety related negative impacts on the project	Construction labour be trained in safety procedures for all relevant aspects of construction Hard hats be worn by workers at all time of work and everywhere on the project site	Contractor Contractor has imparted requisite training to foremen and workers Contractor

ENVIRONMENTAL MANAGEMENT PLAN

Sr.	Project Component or Impact	Target	Action	Responsibility /Action Taken
C. CONSTRUCTION STAGE				
			<p>Regular checks be made so that the contractor follows safe working procedures and practices</p> <p>Formal emergency procedures must be developed for construction site in case of an accident. First aid kits and other necessary equipment should be kept available at the project site along with a list of emergency phone numbers to be contacted in case of any emergency or accident. Arrangements be made with the local clinics for help in the event of an urgent need</p>	<p>Hard hats are being worn at all times by the workers</p> <p>Contractor/Project Manager</p> <p>The contractor's work is being monitored on a regular basis to ensure that healthy and occupational safety standards are being enforced at all times</p> <p>Contractor/Project Manager</p> <p>All such arrangements have been made by the Contractor under supervision of the Project Manager through regular monitoring of the work executed</p>

ENVIRONMENTAL MANAGEMENT PLAN

Sr.	Project Component or Impact	Target	Action	Responsibility /Action Taken
C. CONSTRUCTION STAGE				
28.	Disturbance to the local people	To minimise disturbance to everyday life of local people, especially immediate neighbours	<p>Residents of the area be informed about the detail of work, likely disturbances and their duration and to whom they should report complaints</p> <p>The local population to be advised on safety hazards posed by encroaching at the project site</p> <p>Good community relationship be established so that any disruption can be resolved with due consideration for and involvement of local community</p>	<p>Contractor/Project Manager</p> <p>A sign has been posted at the project site for information of the public of project activities. The proponents have been advised by the Environmental Consultants through this Environmental study to institute a Complaints Redressal Mechanism, preferably through their website</p> <p>Contractor/ Project Manager</p> <p>Public is not allowed entry to project site as a safety measure</p> <p>Contractor/Project Manager</p> <p>The Project Manager is available to entertain</p>

ENVIRONMENTAL MANAGEMENT PLAN

Sr.	Project Component or Impact	Target	Action	Responsibility /Action Taken
C. CONSTRUCTION STAGE				
				<p>public objections, if any, about project activities. No complaints whatsoever have so far been received regarding project activities</p>
29.	Surface and ground water contamination	To prevent surface and ground water contamination from oil based products and construction waste	<p>Proper arrangement to be made for collection and disposal of oil-based products and construction waste</p> <p>Surface and groundwater quality be monitored every month during construction</p>	<p>Contractor/ Project Manager</p> <p>A sub-contractor has been engaged for disposal of all forms of waste and eventual disposal in an environment-friendly manner at the municipal garbage disposal site</p> <p>Contractor/Project Manager</p> <p>Groundwater samples have been taken and tested. Further tests shall be carried out in due course to find out whether project implementation is in any way impacting on characteristics and quality of ground water. There is no surface water in the near vicinity of the project site that is under</p>

ENVIRONMENTAL MANAGEMENT PLAN

Sr.	Project Component or Impact	Target	Action	Responsibility /Action Taken
C. CONSTRUCTION STAGE				
				threat from project activities
30.	Wastewater discharges	To minimise wastewater discharges at worker's camps and prevent pollution from sanitary waste at site	Proper drainage of wastewater	Contractor/Project Manager Wastewater is being drained into the Nullah after appropriate sieving and the residue is being disposed separately through the sub-contractor. Portable toilets have been arranged for workers' camp
31.	Disposal of mucking material	To dispose of excavated material in an environmentally friendly manner	Transportation of mucking material be done in closed containers <ul style="list-style-type: none"> ▪ Mucking material be filled in layers and properly rolled and sprinkled to avoid any negative environmental or visual impacts ▪ Utilisation of mucking material be done for construction of temporary 	Contractor/Project Manager Excavated earth is being re-used at the site for landscaping and roads Contractor/Project Manager All mucking material is being covered and sprinkled with water to minimise dust dispersal

ENVIRONMENTAL MANAGEMENT PLAN

Sr.	Project Component or Impact	Target	Action	Responsibility /Action Taken
C. CONSTRUCTION STAGE				
			<p>access</p>	<p>Contractor/Project Manager</p> <p>Excavated material is being re-used at the site for landscaping</p>
32.	Dust	To avoid problems resulting from dust pollution	<ul style="list-style-type: none"> ▪ Excavation work be sprayed with water ▪ Stockpiles of excavated material be covered with tarpaulins ▪ Construction workers be provided with masks and trained in their use 	<p>Contractor/Project Manager</p> <p>The Contractor/Project Manager have ensured that there has been regular spraying of water on excavated materials</p> <p>Contractor/Project Manager</p> <p>All excavated material was well covered before disposal or re-use</p> <p>Contractor/Project Manager</p> <p>Dust masks are available at the site for use by</p>

ENVIRONMENTAL MANAGEMENT PLAN

Sr.	Project Component or Impact	Target	Action	Responsibility /Action Taken
C. CONSTRUCTION STAGE				
				workers whenever required or whenever the nature of work warrants
33.	Air Pollution	To minimise degradation of ambient air quality	<p>Solid waste from the contraction camp and project site should not be burnt on site</p> <p>Appropriate measures to minimise exhaust emissions from construction machinery, vehicles and generators</p> <p>Air quality monitoring to be carried out on a monthly basis to assess if project implementation activities are impinging</p>	<p>Contractor/Project Manager</p> <p>Solid waste is not being burnt at the site and is being carried away for appropriate disposal by a waste contractor</p> <p>Contractor/Project Manager</p> <p>Use of good quality equipment, machinery and vehicles has ensured that there are minimal emissions and noise</p> <p>Contractor/Project Manager</p> <p>Environmental testing for ambient air has shown that there is no alarm for concern in this behalf in</p>

ENVIRONMENTAL MANAGEMENT PLAN

Sr.	Project Component or Impact	Target	Action	Responsibility /Action Taken
C. CONSTRUCTION STAGE				
			on the environment	respect of project activities. Air monitoring shall be repeated at suitable intervals throughout project implementation
34.	Noise	To avoid noise pollution	<p>Selection of new plants, machines, equipment and hand tools to be used for containing noise levels</p> <p>Noisy work be confined to normal daylight hours</p> <p>Suitable hearing protection and training be provided to construction workers</p> <p>Noise monitoring will be carried out</p>	<p>Contractor/Project Manager</p> <p>The contractor is using good quality equipment and machinery that create minimal noise</p> <p>Contractor/Project Manager</p> <p>No noisy work is being undertaken after normal working hours. In fact, noise from the project activities are well within acceptable limits</p> <p>Contractor</p> <p>Ear-muffs are available for workers if demanded</p> <p>Contractor/Project Manager</p>

ENVIRONMENTAL MANAGEMENT PLAN

Sr.	Project Component or Impact	Target	Action	Responsibility /Action Taken
C. CONSTRUCTION STAGE				
			every month	Noise monitoring has been carried through the environmental consultants and shall be repeated whenever deemed necessary or should there be public complaints
35.	Solid waste	To remove solid waste from site before it damages the environment	<ul style="list-style-type: none"> ▪ Measures to be taken to ensure that solid waste does not remain at the project site and that it does not mar either the soil or the surface environment 	<p>Contractor/Project Manager</p> <p>Solid waste is being removed regularly through arrangements with a sub-contractor for disposal in an appropriate manner.</p> <p>No complaints have so far been received about inappropriate disposal of solid waste</p>
36.	Liquid effluents	To dispose of all liquid effluents in an environment friendly manner	<ul style="list-style-type: none"> ▪ It must be made sure that there are no liquid effluents on account of leakages from equipment and vehicles or the construction camp and that all such effluents are removed from the site before seeping into the ground 	<p>Contractor/Project Manager</p> <p>There have not been any such leakages, mainly because no repairs are being undertaken at the project site. Use of good quality machines and vehicles has reduced the possibility of such leakages. Liquid waste from the construction</p>

ENVIRONMENTAL MANAGEMENT PLAN

Sr.	Project Component or Impact	Target	Action	Responsibility /Action Taken
C. CONSTRUCTION STAGE				
				camp is being sieved and disposed of in the <i>Nullah</i>
37.	Working hours	To avoid over-work	<ul style="list-style-type: none"> ▪ Construction workers should not be coerced to work beyond normal daylight hours 	<p>Contractor/Project Manager</p> <p>The contractor is required to observe all labour laws regarding wages and working hours. Any work beyond normal working hours shall be voluntary and subject to payment of overtime as per rates specified under the relevant labour laws</p>
38.	Gender issues	To avoid any gender issues created by influx of construction workers	<ul style="list-style-type: none"> ▪ Construction workers should not be allowed to enter adjoining areas unless absolutely necessary 	<p>Contractor/Project Manager</p> <p>Workers have been advised not to loiter in adjoining residential areas without sufficient cause. However, freedom of movement of the workers cannot be restrained beyond reasonable limits</p>
39.	Flora and Fauna	To protect the fauna and flora of the Project Site	<ul style="list-style-type: none"> ▪ Trees and plants be planted to enhance the environment 	Proponents

ENVIRONMENTAL MANAGEMENT PLAN

Sr.	Project Component or Impact	Target	Action	Responsibility /Action Taken
C. CONSTRUCTION STAGE				
				Plantation shall be carried out after major development works have been completed so that there is no damage to fresh plantation
40.	Vibrations	To reduce vibrations, if any, from use of machinery	<ul style="list-style-type: none"> ▪ It should be ensured that there are minimum vibrations from construction work so that no damage or inconvenience is caused to adjoining properties 	<p>Construction Contactor/Project Manager</p> <p>The Project Manager proponent is monitoring the work of the contractor regularly. There have not been any complaints about vibrations resulting from project activities</p>
41.	Environment-friendly building construction materials	To maximise use of green materials	<ul style="list-style-type: none"> ▪ Maximum efforts should be made to use Green Materials during construction and to use environment-friendly construction materials, such as lead-free paint etc. 	<p>Proponents</p> <p>Use of Green Materials shall be subject to availability and cost-effectiveness. Environment friendly materials, such as lead-free paint etc., shall be used to the extent possible subject to availability in the market</p>
42.	Visual and physical impact of electric sub	To preserve visual impact in the project	<ul style="list-style-type: none"> ▪ It should be ensured that the electric sub-station and transformer(s) are constructed/installed in an 	Proponents

ENVIRONMENTAL MANAGEMENT PLAN

Sr.	Project Component or Impact	Target	Action	Responsibility /Action Taken
C. CONSTRUCTION STAGE				
	station and transformers	area	environment-friendly manner	It shall be ensured that all electric installations are erected in compliance of all safety and environmental standards and IESCO stipulations.

ENVIRONMENTAL MANAGEMENT PLAN

Sr.	Project Component or Impact	Target	Action	Responsibility
D. OPERATION STAGE				
43.	Overall Environmental impacts	To reduce overall negative impact of the project on the environment and conserve natural resources	<ul style="list-style-type: none"> ▪ The proponents should take all possible measures to ensure that operation of the estate does not harm the local environment 	<p>Proponents</p> <p>The project is located in a rural area. There will thus be an adverse impact in terms of loss of green area. However, development of parks and other green areas and massive plantation shall compensate for the change in the nature of the project site The proponents shall ensure that local residents are not inconvenienced in any manner as a result of project operations</p>
44.	Water Conservation	To conserve water	<ul style="list-style-type: none"> ▪ Obtain access to piped water supply from municipal sources ▪ Residents be regularly advised on important of water conservation so as to preserve water 	<p>Project Manager</p> <p>It is planned to install tube-wells to mine groundwater as piped water is presently not available in the project area</p> <p>Proponents</p> <p>All residents shall be duly informed of the</p>

ENVIRONMENTAL MANAGEMENT PLAN

Sr.	Project Component or Impact	Target	Action	Responsibility
D. OPERATION STAGE				
				importance of water conservation through circulars on a regular basis
45.	Air Quality	To ensure that the pollution levels do not exceed the limits	<ul style="list-style-type: none"> ▪ No waste should be burnt at the site ▪ Residents be advised to keep their vehicles and machines in good working order to minimise noise and emissions 	<p>Proponents</p> <p>No solid waste whatsoever shall be burnt at the estate. All solid waste shall be carried away by municipal services</p> <p>Proponents</p> <p>Residents shall be advised in this behalf through regular circulars</p>
46.	Noise	To minimise noise levels	<ul style="list-style-type: none"> ▪ Residents be advised to keep all forms of noise levels down 	<p>Proponents</p> <p>Residents shall be advised in this behalf through regular circulars</p>
47.	Traffic congestion	To mitigate traffic congestion problems	<ul style="list-style-type: none"> ▪ There should be prohibition on roadside parking 	<p>Proponents</p> <p>Residents shall be advised in this behalf through</p>

ENVIRONMENTAL MANAGEMENT PLAN

Sr.	Project Component or Impact	Target	Action	Responsibility
D. OPERATION STAGE				
			<ul style="list-style-type: none"> ▪ Parking space to be provided at all public buildings 	<p>regular circulars. Security guards shall ensure that there is no long-term roadside parking and that all vehicles are parked inside compounds</p> <p>Proponents (M/s Tele Town)</p> <p>There shall be ample parking spaces at all public places, such as parks and shops, and near the public buildings</p>
48.	Vibrations	To reduce vibrations from equipment installed in public buildings	<ul style="list-style-type: none"> ▪ Measures be put in place to control vibrations from equipment installed inside public buildings, such as tube-wells, motor pumps and generators 	<p>Proponents (M/s Tele Town)</p> <p>The equipment shall be properly clamped and under regular maintenance to eliminate possibilities of vibrations</p>
49.	Energy Conservation	To conserve energy and use of environmental-friendly energy sources	<ul style="list-style-type: none"> ▪ Efforts should be made to ensure that energy is conserved and that environment-friendly techniques are adopted 	<p>Proponents (M/s Tele Town)</p> <p>Maximum number of energy-savers shall be installed at public buildings and street lights. Secondly, colour schemes that require lighting</p>

ENVIRONMENTAL MANAGEMENT PLAN

Sr.	Project Component or Impact	Target	Action	Responsibility
D. OPERATION STAGE				
				shall be avoided. Residents shall be encouraged to use maximum amount of sunlight to reduce dependence on lights
50.	Air Pollution	To minimise degradation of ambient air quality	<ul style="list-style-type: none"> ▪ Solid waste from the estate should not be allowed to pile up at the temporary storage site before it is ultimately removed through arrangements with the municipality 	<p>Proponents (M/s Tele Town)</p> <p>Proponents shall make necessary arrangements for quick disposal of solid waste</p>
51.	Flora and Fauna	To protect the fauna and flora of the project site	<ul style="list-style-type: none"> ▪ Trees and plants will be planted to enhance the environment 	<p>Proponents</p> <p>The proponents intend to plant a sufficient number of trees at the site after completion of structures.</p>
52.	Environmental Monitoring	To ensure that periodic reports on environment at the building are furnished to the Pakistan Environmental Protection Agency in pursuance of conditions of	<ul style="list-style-type: none"> ▪ A mechanism should be employed for Environmental Monitoring at the project when it comes into operation 	<p>Proponents (M/s Tele Town)</p> <p>While the proponents shall be responsible for implementing this Environmental Management Plan, the environmental approval to be issued by the Pakistan Environmental Protection Agency</p>

ENVIRONMENTAL MANAGEMENT PLAN

Sr.	Project Component or Impact	Target	Action	Responsibility
D. OPERATION STAGE				
		the environmental approval		invariably requires environmental monitoring when the project comes into operation. Accordingly the proponents shall entrust the responsibility for environmental monitoring in line with instructions of the Pakistan Environmental Protection Agency.

7.6. ENVIRONMENTAL MONITORING PROGRAM

EMP provides important information that allows for more effective planning and adaptive response based on the assessment of the effectiveness of mitigation measures. This is extremely important in a development Projects.

Environmental Monitoring is required to assess, whether the various mitigation measures are effective in attaining the goals of environmental protection. Without any environmental monitoring program, it is not possible to determine, whether the environment is being protected or not.

Therefore, EMP must form an integral part of all the phases of the Project cycle.

7.6.1. OBJECTIVES

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

- ☒ To check compliance with the requirements of the EMP by monitoring activities of the Project Contractors on a daily basis. This will be called Activity Monitoring.
- ☒ To monitor actual impacts of the Project Activities on physical, biological and socio-economic receptors of the Project Area so that any impacts not anticipated in the EIA or impacts which exceed the levels anticipated in the EIA can be identified and appropriate mitigation measures can be adopted in time. This objective will be achieved through effects monitoring.
- ☒ To ascertain residual impacts of the operation. This will be achieved by post-Project monitoring.

To achieve these objectives the following monitoring program will be implemented.

7.6.2. ACTIVITY MONITORING

Activity monitoring will be carried out to ensure compliance with the requirements of the EIA. Inspection will be done using checklists developed specifically for the Project.

Activity monitoring will be the responsibility of all organizations involved in the implementation and operation i.e. CDA/EPA, line departments i.e. highway, public health, building and works, etc., SC and the Contractors and hence

it will be done at three levels.

- ☒ Activity Monitoring by Capital Development Authority, Islamabad
- ☒ Activity Monitoring by SC field monitors
- ☒ Activity Monitoring by the Contractors officers

The Contractors will report compliance with the MMM to SC and Capital Development Authority, Islamabad for verification.

One field monitor from Capital Development Authority, Islamabad will visit the Project regularly during construction. SC will supervise the monitoring through full time supervision. Any non-compliance observed by SC will be recorded in non-compliance recording forms and discussed during the environmental meetings. In addition, compliance monitoring protocol for physical environment is given in TABLE 7-1.

7.6.3. EFFECTS MONITORING

For Effects Monitoring, Capital Development Authority, Islamabad will be responsible to monitor the effects as described in monitoring requirements. Outline monitoring requirements have been recommended in the EMMP; however, a detailed monitoring program will be prepared by the EO of Capital Development Authority, Islamabad to be deployed. The monitoring program will describe in detail the resources and methodology that will be adopted for the purpose of Effects Monitoring.

7.6.3.1. PHYSICAL ENVIRONMENT

This monitoring will be targeted at identifying project impacts on:

- ☒ Soils
- ☒ Water
- ☒ Air

Effects monitoring protocol is provided in TABLE 7-2

7.6.3.2. BIOLOGICAL ENVIRONMENT

Effects on biological environment will be monitored by Capital Development Authority, Islamabad along with the help of forest department, who will conduct

quarterly survey during construction and subsequently during the operation of the Project. For the monitoring purpose, wildlife and flora surveys will be conducted to determine the effects of different project activities on wildlife and flora. A compliance register will also be maintained for the effects and compliance monitoring.

7.6.3.3. SOCIOECONOMIC ENVIRONMENT

Effects on the socio-economic environment will be monitored by conducting quarterly survey during construction and a final post Project survey by EO. The surveys will be structured to ascertain the level of impacts during the course of the project and the implementation of mitigation measures prescribed in the EIA such as hiring of local employment, payments of land compensation, health and safety of communities, mobility of local women etc. The EO will also verify the maintenance of a Social Complaints Register by SC.

7.6.4. POST-PROJECT MONITORING

After completion of the construction, Post-Project monitoring will be carried out. The objective of this monitoring will be to determine the level of residual impacts of the Project on physical, biological and socio-economic receptors of the Project Area. The monitoring may be carried out within one month after the end of all activities in the Project Area. The Post-Project survey report will be submitted within two weeks after completion of the survey.

As part of the Post-Project monitoring field monitors will also check restoration of sites restored at that time according to the requirements of the EIA.

TABLE 7-1 RECOMMENDED COMPLIANCE MONITORING PROTOCOL FOR PHYSICAL, BIOLOGICAL AND SOCIAL ENVIRONMENT

Receptor	Location	Monitoring Mechanism	Monitoring and Reporting Frequency
Water Quality	Points where control of effluents can be easily implemented Surface drainage channels Concrete preparation plants Workers camp sewage treatment facility Disposal areas of earth fill or solid waste Fuel (Petrol. Oil and	Discrete grab sampling and laboratory testing of water samples.	Sampling and laboratory testing should be done on 6 month basis during the construction and monthly during operational time. Discharges from construction sites should be tested for temperature, pH, electrical conductivity, dissolved oxygen. Treated effluent discharges

Receptor	Location	Monitoring Mechanism	Monitoring and Reporting Frequency
	Grease) products storages Vehicle and machine repairing and servicing yards Discharge points from commercial establishment, hotels and restaurants. Discharge points from residential areas.		from workers camp to be tested for faecal coliforms, total coliforms, Ammonia, Biochemical Oxygen Demand (BOD5). Concrete production effluents to be tested for pH and temperature. Outlet and drains from mechanical repair units. include testing for pH, turbidity, lead, hydrocarbons, and oils.
Dust Emissions	Tracks along the earth roads. At communities close to the access roads.	Visual checks	Weekly during routine monitoring by activity monitors and reported on a monthly basis during the construction period
Noise Levels	Camp sites, Selected locations along the access tracks Construction sites of health, education and commercial buildings. Sensitive receptors like schools, hospitals and community centers along roads and commercial buildings during operation stage	Noise meter	Once prior to the start of construction and then on a monthly basis throughout the construction period. Quarterly Once during the operational stage.
Fumes and gases	Ambient air (w.r.t. proposed land use plan of Master Plan), Silencers of heavy machinery, trucks and other vehicles.	LANCOM-III emissions monitoring system. Monitoring of ambient air quality in ppb.	Monthly monitoring of air pollution parameters including the NOX, SOX, COX, Lead, Hydrocarbons during construction period and quarterly during operation stage.
Biological Environment			
Hunting of animals and birds	In all Project Area generally and at construction sites particularly.	Periodic visits of Project Area and in consultation with community to get feed back on hunting by Contractor as well as outsiders	Monthly during routine monitoring and reported monthly basis during the construction period and quarterly monitoring and reporting during operation period.
Socio-cultural Environment			
Relocation of private and public infrastructure	In all Project Area generally and roads at particularly before construction activities started	Consultations with PAPs	Monthly during relocation of infrastructure and reporting on monthly basis.
Inconvenience to community	All around the Project Area at near by communities	Consultations with community to get feed back for inconvenience due to construction activities	Monthly during construction period and monthly reporting only during construction period

Receptor	Location	Monitoring Mechanism	Monitoring and Reporting Frequency
		to perform their daily routine matters	

TABLE 7-2 RECOMMENDED EFFECTS MONITORING PROTOCOL

Receptor	Location	Monitoring Mechanism	Monitoring and Reporting Frequency
Water Quality	Sampling from points located at a greater distance from the construction sites to ensure they show the influence on wider range of receiving body.	Sampling and laboratory testing of water samples from the receiving body.	Sampling and laboratory testing should be done on quarterly basis. Parameters to be monitored should be as per standards.
Air Quality	Hotels premises, residential colonies, schools, hospitals, etc. along roadsides	Ambient air quality monitoring in ppb.	Quarterly air quality monitoring for NOX, SOX, COX and Hydrocarbons.
Tree Cutting	Construction sites and near camp site at construction stage and plantation sites during operation stage	Visual checking and consultations with locals Generation rate of new plantation	Monthly during construction and quarterly during operation stage.
Compensation, resettlement and dispute resolution	Construction sites and restoration of borrow areas	Consultation with affected persons and owners of the land	Monthly during construction

7.7. COMMUNICATION AND DOCUMENTATION PLAN

7.7.1. KICK-OFF MEETING

One kick off meeting will take place at the main camp of the respective Contractor before the start of construction. The purpose of the kick off meeting will be to demonstrate to the regulator and monitors that all requirements prior to the start of the individual Project activities have been met and the Capital Development Authority, Islamabad EO and concerned department, SC, and contractors are ready to start the Project as per the requirements of the EIA/EMP.

7.7.2. MEETINGS AND REPORTS

Monthly meetings will be held during the construction stage. The meeting will be held at the construction camp during construction. The purpose of the meeting will

be to discuss the conduct of the operation, non-compliances noted by SC/EO and their remedial measures. The meeting will be chaired by the representative nominated by Capital Development Authority, Islamabad. The meeting will be recorded in the form of a Monthly Environmental Report (MER) prepared by SC. The report as a minimum will include:

- ✕ Summary of Project activities during last month;
- ✕ SC monitors and Capital Development Authority, Islamabad and contractors environmental representatives present onsite;
- ✕ Summary of monitoring activities;
- ✕ Non-compliances observed and mitigation measures taken or required.

7.7.3. MONTHLY ENVIRONMENTAL REPORT

A MER will be prepared by SC summarizing the Project activities and results of activity and effects monitoring. The MER as a minimum will include the following:

- ✕ Summary of Project Activities
- ✕ Schedule of SC activity monitoring and effects monitoring team
- ✕ Summary of activity and effects monitoring activities
- ✕ Statistical record of non-compliances observed during the month
- ✕ Summary of the results of Effects Monitoring
- ✕ Record of mitigation measures taken or pending
- ✕ Record of social complaints
- ✕ Record of change managements
- ✕ Record of water consumption
- ✕ Record of fuel consumption

The MER will be prepared by the SC and communicated to the Capital Development Authority, Islamabad. They will submit a quarterly environmental report to Pak-EPA with a copy to concerned departments. A hard copy of the report will be retained at the Capital Development Authority, Islamabad office.

7.7.4. SOCIAL COMPLAINTS REGISTER

The SC will maintain a register of complaints received from local communities and measures taken to mitigate these concerns. EO will check the register on monthly

basis and will report the status of complaints in his monthly report to the Capital Development Authority, Islamabad, for information and further action. Quarterly environmental report to be submitted to Pak-EPA will also reflect the status of social complaints.

7.7.5. CHANGE RECORD REGISTER

All changes to the EMP or the Project will be handled through the Change Management Plan.

7.7.6. NON-COMPLIANCE RECORD REGISTER

The SC will maintain a non-compliance record register to record all non-compliances observed during construction activities. A copy of the register will be appended with each MER.

7.7.7. FINAL MONITORING REPORT

A final monitoring report will be prepared by SC after the completion of construction activities. The report should address the following:

- ☒ Introduction;
- ☒ Scope, Methodology, and Monitoring Team;
- ☒ Details of the Project Activities;
- ☒ Natural Resource Use by the Project;
- ☒ Record and Statistical Analysis of Non-compliances;
- ☒ Effects of the Project on Wildlife, Communities and Physical Resources;
- ☒ Recommendations for future Projects.

7.7.8. PHOTOGRAPHIC RECORD

SC will maintain a photographic record of all areas to be used during the Project. As a minimum the photographic record will include the photographs of residential and commercial structures relocated/compensated, parking areas, access track, camp sites, and activity monitoring of different categories during construction stage.

7.8. CHANGE MANAGEMENT PLAN

The EIA for the proposed operation recognizes that changes in the operation or the EMP may be required during the 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.

7.8.1. ADDITIONS 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 Project, additional mitigation measures based on the findings of environmental monitoring during construction and operation may have to be included in the EMP. In such cases following actions will be taken:

- ✕ A meeting will be held between Capital Development Authority, Islamabad, SC and the concerned Contractor. 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 final at the site office. A copy of the report will be sent to Capital Development Authority, Islamabad, Contractor and SC head offices. Prior to start of activities as per changes made in EMP, approval will have to be taken from Punjab-EPA.
- ✕ All relevant Project personnel will be given information of the addition. These additions will be reported in the MER by SC.

7.8.2. CHANGES TO THE OPERATION

The change management system recognizes three orders of changes:

7.8.2.1. 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. Action required in this case will be that the environmental impacts of the proposed change will be reassessed by EO and SC and sent to the Pak-EPA for approval.

Examples of such change include:

- ✗ Changes in the waste disposal methods such that contamination of soil or water in the protected areas may be anticipated.
- ✗ Deviations from the minimum requirements for Effects Monitoring specified in the EMP.
- ✗ Changes in the documentation, communication, or stakeholders consultation program such that the overall objective of documenting compliance with the EMP and its communication to Capital Development Authority, Islamabad, SC and the Project Contractors or interested stakeholders at regular intervals is not being met.

7.8.2.2. SECOND ORDER

A second order change is one that does not result into change in the Project description or impacts that are significantly different from those in the EIA.

Action required for such changes will be that EO will reassess the impact of the activity on the environment and specify additional mitigation measures if required and report the changes to the Capital Development Authority, Islamabad.

Examples include:

- ✗ Change in the location of Project components like parks, location of schools, commercial centers or any other important project component.
- ✗ Increase in natural resource usage particularly water such that the increase can be accommodated without having any effects on the natural resource or the local communities which are using that resource.
- ✗ Increase in the area or change in levels of the camp sites or access track such that it does not significantly change the assessment made in the EIA with regards to impacts on vegetation, wildlife and communities.
- ✗ Changes in the waste disposal methods such that contamination of soil or water will not occur.
- ✗ Changes in the documentation, communication, or stakeholder's consultation program such that the overall objective of documenting compliance with the EMP and its

communication to Capital Development Authority, Islamabad, SC and the Project Contractors or interested stakeholders at regular intervals is being met.

7.8.2.3. 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 on site to minimize the impact of an activity such as re-alignment of a particular road section to avoid cutting of a tree, relocation of construction camp sites to minimize clearing of vegetation etc. The only action required for such changes will be to record the change in the Change Record Register.

7.9. TRAINING PROGRAM

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

7.9.1. 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.

7.9.2. ROLES AND RESPONSIBILITIES

EO will primarily be responsible for arranging environmental training to all Project personnel on potential environmental issues of the Project. Contractors will be responsible to arrange trainings and ensure the presence of targeted staff. EO will prepare a Project specific training manual for this purpose. Contractors on their part will be required to provide induction training/briefing to all their staff before the start of any activity in the Project Area. This will be followed by trainings arranged by EO to all the targeted staff.

7.9.3. TRAINING LOG

A training log will be maintained by EO. The training log will include;

- ✗ Topic
- ✗ Date, time and location
- ✗ Trainer/Resource person
- ✗ Participants

7.9.4. **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

7.9.5. **TRAINING MATERIAL**

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

TABLE 7-3 TRAINING PROGRAM

Staff	Contents	Timing
Selected management staff of CDA concerned departments, SC staff and the construction Contractor staff	Environmental sensitivity of the Project area Wildlife, vegetation issues and related mitigation EMP communication, documentation and monitoring requirements Air and noise pollution control Waste disposal	Prior to the start of any major Project activity
Construction supervisors and survey crew	Environmental sensitivity of the Project Area Wildlife, vegetation & community issues and related mitigation EMP communication, documentation and monitoring requirements. Good construction practices Preservation of flora and fauna Community relations Air and noise pollution control	Before the start of construction activities, daily during tool box meeting
Drilling supervisors	Drilling waste disposal	Prior to start of drilling

Staff	Contents	Timing
	Landfill site operation Air and noise pollution control during the drilling operation	operation
Drivers	Road safety Road restrictions Vehicle restrictions Waste disposal Defensive driving	Prior to start of drilling operation
Mechanics and Vehicle Repair Personnel	Environmental control of vehicles and equipment Waste disposal	Prior to start of the operation
Camp Staff	Camp operation Waste disposal Water consumption House keeping	Prior to start of the operation
Restoration and Clean-up team	Restoration requirements	Prior start of restoration activity

7.10. ENVIRONMENTAL MANAGEMENT AND MONITORING COST

7.10.1. ENVIRONMENTAL MANAGEMENT COST

Environmental management cost related with the mitigation measures of environmental parameters related to the location of camp site facilities, construction activities, borrow material, etc. will be the sole responsibility of the Contractor and he will take care of cost implications as it will be the part of his contract agreement.

The Project's environmental management cost related with the construction of environmental mitigation infrastructure like waste water treatment plant, solid waste management, storm water drainage, etc. are being carried out separately will be the part of Project estimate.

Operation and Maintenance cost of the environmental mitigation infrastructure will be borne by the CDA as well as concerned departments responsible for operation and maintenance of the concerned facilities.

7.10.2. ENVIRONMENTAL MONITORING COST

The environmental monitoring at pre-construction stage and other in-house monitoring to be carried out by the Contractor(s) will be a part of his contract agreement. Similarly, the environmental monitoring to be carried out during the

construction stage by the SC will be the part of their contract agreement. The environmental monitoring cost for the complete project will be PKR 0.8million.

7.10.3. TRAINING COST

The Project training will be imparted at different stages and different staff levels. A lump sum amount of Rs. 2,180,000 may be allocated for this purpose.

ESTIMATED BUDGET COST FOR THE IMPLEMENTATION OF EMMP OF THE PROJECT

Investment and Recurrent Cost	Units/ No. of Samples	Unit Cost specification	Cost (Rs)
A – Institutional Setup Cost			
Environment Officer @ 60,000 pm	12months	Monthly investment and operation cost	720,000
Equipment for field inspection	Lump sum	1 Digital Camera, 1 laptop and accessories	200,000
Recurrent cost	Lump sum	O&M for vehicle, telephone and printing	150,000
Sub Total A			710,000
B - Environmental Monitoring Activities (Base Line Sampling)			
Ambient Air Quality Monitoring	-	Lump sum	100,000
Ambient Water Quality Monitoring	-	Lump sum	100,000
Noise Levels	-	Lump sum	10,000
Sub Total B			210,000
C. External Monitoring	2	@ 150,000	300,000
D. Environmental Training	3	@ 50,000	150,000
E. Tree Plantation Cost	3,000	@ 150 per Plant	450,000
Sub Total (B-E)			1,000,000
Grand Total (A-E) Rs.			2,180,000

8. ENVIRONMENTAL PLANS

8.1. SOLID WASTE MANAGEMENT PLAN

Domestic and commercial solid wastes include all non-gaseous, non-liquid wastes resulting from the wide range of community and commercial activities. Effective solution to problems of solid waste collection, treatment, conversion, reuse and disposal, are basic necessities from the perspective of sound public health. Otherwise, indiscriminate dumping of solid waste within the limits of populated areas can cause severe health hazards and at the same time impact on aesthetics. The amounts of solid waste generated by a community depend upon its socio-economic characteristics. Generation of per capita solid waste is on the rise on account of social, economic and technological changes. Solid waste in Pakistan generally comprises plastic and rubber, metal, paper and cardboard, textile waste, food waste, animal waste, leaves, grass, straws and fodder, bones, wood, stones, excreta and fines to various extents.

Findings of a study conducted by the Pakistan Environmental Protection Agency in cooperation with the Japanese International Cooperation Agency in October 2004 state that about 55,000 tons of solid waste is generated each day in urban areas of Pakistan and only about sixty percent is collected by municipal authorities.¹ These figures would not have changed much since then because of absence of initiatives in Islamabad especially for garbage collection and disposal on commercial basis. Solid waste generated at the proposed estate shall be substantial, and both project development and operation will generate large quantities of waste. Besides being an eyesore, solid waste can also pose serious health hazards if disposal is either absent or is improper. The city has limited landfill facilities and garbage is invariably dumped in open spaces by the public and outside the city by municipal authorities in improvised garbage dumps where there are no arrangements for segregation of waste, compaction or run-off control.

Environmental impact of poor waste disposal not only at a s project in operation or within or outside an urban centre can be categorised into two groups, namely impact due to poor waste disposal practices, and stress on natural resources due to excessive waste generation. Impacts caused by poor waste disposal practices include:

- ✗ Exposure of waste collectors and municipal administration to potentially hazardous stockpiles if hazardous waste is mixed with municipal waste. Waste collectors and municipal employees handle hazardous waste without proper personal protection clothing or equipment;
- ✗ Pollution of water resources, contamination of soil, and generation of hazardous fumes from uncontrolled and inappropriate disposal of hazardous waste;
- ✗ Nuisances such as odours, flies, mosquitoes and rats and rodents;
- ✗ Health issues due to provision of breeding ground for disease vectors;
- ✗ Effects on aesthetic qualities of an area due to scattered, and airborne trash, and
- ✗ Blockage and consequent overflow of drains and sewers due to indiscriminate dumping of solid waste.

Excessive waste generation results in stress on natural resources. Any production process requires fuel, electricity, land, water, chemicals and other mineral or agricultural inputs. Pressures on these resources can be minimised if production of unnecessary goods is avoided, for instance by using substitutes that are environmentally sound. This can also be achieved by maximising recycling and reuse of materials, promoting products and practices involving less use of natural resources, especially non-renewable resources. Proper and environment-friendly disposal of solid waste requires development of scientifically-designed landfill sites with by-product features. Even though large parcels of land, which itself is a vital natural resource, are required for landfills, this land is later reclaimed and green-topped when the landfill is exhausted. However, minimisation of solid waste at the same creates less demand for such landfills. Impact of solid waste from the project will depend on the quantity of waste generated, nature of such waste, arrangements for disposal and receptors in surrounding areas. As it is desirable to prevent any significant impact, a waste management plan must be developed for all phases of a project. Such a plan, when developed and implemented in earnest, will be the main tool to avoid any significant adverse impact from solid waste. Potential source of waste from construction activities include but are not necessarily limited to:

- ✗ Vegetation (grass, brush, shrubs, trees etc.) removed to clear the land;
- ✗ Cardboard and paper (packaging, office waste, cement bags etc.);
- ✗ Wood (lumber, planer waste and scrap, scaffolding waste, packaging crates etc.);
- ✗ Masonry and ceramics;

- ✗ Excess construction materials (aggregate, bricks etc.);
- ✗ Metal (scrap, containers, tins, cans, bottles, workshop waste, galvanised iron wires, steel bars etc.);
- ✗ Plastics (containers, bottles, wiring, bags, sheeting etc.);
- ✗ Styrofoam (containers, roofing etc.);
- ✗ Glass (electric lights, bottles, packaging, window pane waste etc.);
- ✗ Insulation materials;
- ✗ Excess soil and sand;
- ✗ Organic waste (kitchen waste);
- ✗ Waste oil and grease;
- ✗ Chemicals and paints;
- ✗ Batteries (lead batteries, dry and rechargeable cells etc.);
- ✗ Cotton and textiles (oily rags, cleaning cloths, rags etc.);
- ✗ Contaminated soil;
- ✗ Electric cables, and
- ✗ Clinic and medical waste.

It is anticipated that this solid waste during operation would consist of mainly the following:

- ✗ Organic waste (kitchen waste, leftovers etc.);
- ✗ Newspapers, magazines, and paper;
- ✗ Cotton and textiles, rags;
- ✗ Floor sweepings;
- ✗ Cardboard and thick paper cartons;
- ✗ Wood packaging;
- ✗ Disposable paper plates and cups;
- ✗ Various other forms of packaging, and
- ✗ Obsolete appliances from residential units.

Considering the purpose for which the project is to be employed, solid waste generation will be in the range 0.5 kg to 0.8 kg per capita per day, following the

yardstick for solid waste generation in urban centres. Assuming total presence of an average of about seven thousand six hundred and sixty-two people per day generating solid waste, including residents, visitors, retail employees, and management office, minimum quantity of solid waste likely to be generated is indicated in the following two tables.

TABLE 8-1: SOLID WASTE GENERATION (0.8 KGS PER DAY)

Persons in Premises	Number	Number Reduced for Time Spent at the Premises	Total Solid Waste Per Day (Kg)
Residents	1,392	1,392	1113.6
Domestic workers	323	323	258.4
Visitors	500	500	400
Retail employees	65	65	58
Management office	20	20	16
Commercial waste (shops)	---	---	150
Club waste (tentative)	---	---	200
School waste (tentative)	---	---	100
Total		2300	2296

The above table indicates that the maximum amount of solid waste that can be generated per day at Tele Town at the rate of solid waste generation of 0.8 kg. per capita per day is 2296 kg, after accounting for actual time spent in respect of all people who shall have a footprint at the premises through a single day.

TABLE 8-2: SOLID WASTE GENERATION (0.5 KGS PER DAY)

Persons in Premises	Number	Number Reduced for Time Spent at the Premises	Total Solid Waste Per Day (Kg)
Residents	1,392	1,392	696
Domestic workers	323	323	161.5
Visitors	500	500	250
Retail employees	65	65	32.5
Management office	20	20	10
Commercial waste (shops)	---	---	150
Club waste (tentative)	---	---	200
School waste (tentative)	---	---	100
Total		2300	1500

The above matrix shows that maximum amount of solid waste that will be generated at Tele Town at the rate of 0.5 kg. per capita per day according to rationalised footprint is 1500 kgs.

- ✕ The following measures shall be adopted for minimisation of solid waste and appropriate disposal:
- ✕ During construction, the contractor shall engage a waste management contractor for disposal of solid waste;
- ✕ The appointed waste management contractors shall be bound contractually to dispose of solid waste carried from the premises in an environment-friendly manner, both during transit and at the time of final disposal;
- ✕ The proponents shall extend the existing solid waste collection service to the project as soon as it comes in top operation;
- ✕ Residents shall be encouraged to dump their garbage in dumps that shall be built around the estate;
- ✕ In procurement of supplies for the project, the size and nature of packaging shall also be taken into consideration;
- ✕ Wherever possible, packaging shall be returned to manufacturers for reuse;
- ✕ Solid waste collected in the rubbish depots shall be carried away from the site on a regular basis for disposal at the municipal landfill;
- ✕ All solid waste will be segregated appropriately for safe disposal;
- ✕ The proponents shall encourage residents to move towards a paperless environment and reuse paper to the extent possible;
- ✕ Signs shall be posted in washrooms of public buildings advising minimisation of solid waste, and

Special attention would be paid to solid waste that can be recycled. All recyclable solid waste shall be kept separate for disposal through special arrangement with recycling industries and contractors that collect such solid waste for onward sale to industries engaged in recycling and production of environment friendly products.

A solid waste sub-contractor will be engaged by the contractor for disposal of all forms of solid and liquid waste in an environment-friendly manner. Waste shall be properly sorted and disaggregated for recyclable materials and thereafter disposed at the nearest landfill/garbage disposal site of the municipality. Recyclable waste may be sold to licensed recycling industries.

8.2. TRAFFIC AND TRANSPORTATION MANAGEMENT PLAN

There shall be increase in vehicular traffic in the project area and around the project site as construction commences. These vehicles could possibly include excavators, bulldozers, tractors, graders, rollers, dumpers and loaders, wheel loaders, heavy duty vehicles, water tankers, and jeeps and cars for project supervisors and engineers. The exact number of such vehicles shall vary according to pace of construction. However, using the rule of thumb for projects of such size, there shall be a maximum of five to ten vehicles visiting the site per day at the peak of construction. Traffic Police will be approached to obtain counsel for movement of oversized vehicles carrying equipment to the project site. It will be ensured that such movement takes place during off-peak hours or on holidays and never at night. The proponent shall instruct the contractor that least possible disturbance is created from operation of construction vehicles. Measures to reduce disturbance shall include:

- ✕ Separate parking space shall be demarcated at the project site for parking of construction vehicles;
- ✕ Construction vehicles shall not park or queue up on any road close to the project site;
- ✕ All vehicles carrying construction materials and supplies shall reach the project site from the north via Murree Road, or from the south through Lehtrar Road, so that vehicles do not affect city traffic;
- ✕ The drivers shall be under strict instructions to bypass heavily populated areas;
- ✕ Such vehicles shall time their arrivals and departures during off-peak hours, and
- ✕ Drivers of these vehicles shall be barred from blowing horn at the project site or on the roads.

The project site is in close proximity to two forty feet wide four-lane dual carriageways with broad hard shoulders, and which will ultimately be widened further when need arises. The area is thus well covered in terms of access and ability to absorb additional traffic load. Traffic count at the project site and nearby locations on a twenty-four hour basis is shown in table below. The counts included all mechanical vehicles, such as cars, buses, trucks, vans, and motor-cycles etc., and did not include bicycles or other forms of non-mechanical traffic.

Traffic counts were carried out on March 21, 23 and 25, 2023, which were working days and enjoyed clear weather. The only component of the proposed project is residential, and thus vehicular activity at the estate shall be more or less constant

throughout, with vehicular activity increasing during peak traffic hours of the day corresponding to school and office times. Tele Town impact on local traffic has thus to be reckoned mainly according to usual daylight hours, early morning, afternoon and early evening. It is not possible at this stage to assess how many vehicles shall frequent the estate during a day and how long they shall remain at the premises. An accurate traffic count can only be taken when the project is fully colonised. As such, only an estimate based on various assumptions can be attempted at this stage of the project. Secondly, there is no scientific yardstick to determine how many times vehicles of residents shall enter, leave and re-enter the premises. Thirdly, it cannot be assessed either as to how many people shall visit the project area. If there is a high standard school within the project area, the number of vehicles entering from outside during school hours can throw any estimate way off the target.

The starting point to calculate additional traffic load as a result of project operation is the number of maximum residential units. The layout plan caters for 12,477 residential units for single family homes. Based on plot price and profile of future residents, each dwelling is expected to have at least 2.25 vehicles per family after factoring in some houses that may have independent ground and first floor residents. Then the question arises as to how many visitors there shall be at the estate during a normal day. There is no way to predict the number of visitors and an accurate count can be made only on operation. Further, some visitors may come again and again. The best way to estimate the number of visitors at a housing estate and the number of times that residents leave and come back is to take a traffic count at fully colonised housing colonies of similar nature.

Based on data collected, vehicular activity during a normal working day at the proposed project, worked out by a management specialist, is shown in the following table. The calculations are not conservative and based on the following assumptions:

- ✕ 232 residential units are likely to have 2.25 vehicles per dwelling at an average;
- ✕ It is expected that the residents shall make at least 1.5 per day at an average from the premises;
- ✕ It is anticipated that 232 dwellings shall receive at least 1.5 visiting vehicles per day;
- ✕ It is expected that visitors shall make at least 1.25 per day at an average to and from the scheme;
- ✕ The total number of retail units is 25, each of which is likely to have at least 1.5 vehicles, leaving the scheme at the same rate per day;

- ✗ Each employee at the management office is likely to have a vehicle, adding twenty to the local pool, and entering the scheme at the rate of 1.5 times per day;
- ✗ At least two vehicles from the utilities service shall frequent the scheme daily, and
- ✗ Service deliveries shall add at an average five vehicles per day to the scheme traffic.

Based on the aforesaid assumptions, vehicular activities generated by the project at full colonisation would be as under:

TABLE 8-3: VEHICULAR ACTIVITY AT THE PROJECT

Description	Number of units	Rate	Number of vehicles	Frequency of visits	Traffic added
Dwellings	232	2.25	522	1.5	783
Visitors					
Retail Units	25	1.5	38	1.5	42
Management Office Staff	20	1	20	1.5	30
Management Office Vehicles	2	---	2	2	4
Utilities Services	2	---	2	4	8
Service Deliveries	5	---	5	2	10
TOTAL	---	---	589	---	877

The following measures shall be taken by the proponents to manage additional traffic added as a result of the operation of the proposed project:

- ✗ Security guards shall make sure that vehicles leaving the scheme join traffic on the access roads in an orderly manner and do not obstruct oncoming traffic;
- ✗ Employees arriving on public transport shall not insist on being dropped at the mouth of the access roads and shall alight at designated bus stops;
- ✗ Management Office shall advise residents and retail units to instruct their drivers not to blow horn indiscriminately;
- ✗ Visitors shall park their vehicles within the compounds of residential units so that there is minimal street parking;
- ✗ Taxis shall not be permitted to linger or loiter outside or close to the main entrance of the estate;
- ✗ Residents shall be encouraged, through circulars and notices from Management Office to keep their vehicles tuned so that these vehicles do not generate unwanted emissions;
- ✗ Residents shall also similarly be encouraged to pool vehicles to curtail the number of vehicles that frequent the estate on a permanent basis;

- ✗ Security guards shall regulate incoming traffic in such a way that vehicles intending to enter the estate do not generate long queues on the access roads, and

In order to facilitate the above, vehicles belonging to residents and retail establishments shall be provided with stickers so that stickered vehicles are flagged through without delay.

8.3. HEALTH AND OCCUPATIONAL SAFETY

Inconvenience and discomfort for workers and accidents resulting from careless construction practices can result in disruption of project implementation, as also socio-economic issues. Although it is the responsibility of the construction contractor to ensure occupational safety for workers, the proponents have given explicit instructions for observance of occupational safety and to abide by labour and safety standards.

These work-related hazards are universally-accepted and although subject to review and updating, these have been catalogued by the International Labour Organisation. There are no health hazards at the site that can impact unfavourably on the workers or immediate neighbours. Nonetheless, the following measures shall be taken by the contractors, under the supervision and inspection of the proponents, to enforce compliance of health and safety standards:

- ✗ Workers will be briefed about health hazards and all precautions that must be taken during construction;
- ✗ Wages shall be disbursed on time;
- ✗ Wages shall not be below minimum wage;
- ✗ There shall be no bonded labour;
- ✗ There shall be no child labour;
- ✗ Women workers, if any, shall be paid standard market wages, at least equal to minimum wage;
- ✗ The contractor will maintain a register of wages, which shall be open for inspection by the proponents;
- ✗ No deductions shall be made from wages unless prior arrangement in writing has been made with workers regarding provision of services and benefits;
- ✗ All labour and occupational safety laws and regulations shall be fully observed;
- ✗ Working hours shall be according to the law of the land;

- ✗ In case labourers, masons and other employees are made to work beyond normal hours, they shall be paid overtime according to the law of the land;
- ✗ Workers shall be insured against accidents under the relevant labour laws;
- ✗ Hard hats shall be worn by all workers and foremen at all times at the project site;
- ✗ The contractors will prepare an emergency plan so as to be fully prepared for an emergency situation;
- ✗ All medicinal needs of the workers, if any, will be attended to on top priority;
- ✗ Adequate first-aid arrangements shall be made at the project site as immediate relief in case of an accident;
- ✗ No worker shall be exposed to dangerous work;
- ✗ A number of fire extinguishers and other fire-fighting equipment shall be present at the premises;
- ✗ If female workers are engaged and require camping facilities, there shall be segregation and adequate arrangements shall be made for female workers at a construction camp;
- ✗ In such case, there shall be a strict code of conduct regarding interaction with female workers;
- ✗ Masks will be available for workers to avoid dust inhalation;
- ✗ The construction contractor is contractually bound to show labour wages (returns of labour) accounts to the proponents, and
- ✗ There shall be no night, Sunday or holiday work without prior permission of the proponents and without payment of applicable wage rates.

8.4. EMERGENCY AND FIRE-FIGHTING PROTOCOLS

Tele Town would be susceptible to a fire hazard and other emergencies. A fire could be caused through negligence or accident within the project area or igniting nearby trees and shrubs because of heat or accident, negligence or criminal intent. Since the size of the housing scheme is not such that a separate fire brigade service must be established at the site, other fire-fighting measures would be sufficient to manage a fire threat. Other emergencies could be an earthquake, flood, health epidemic and terrorist activity, or any other unforeseen calamity. Therefore, appropriate protocols would be employed to reduce the risk and manage an emergency situation in order to ensure safety of residents.

7.3.1 Fire-fighting Regimes

Capital Development Authority's building and town planning regulations specify that every public facility must be provided with sufficient means to extinguish fire. Sufficient fire prevention and fire-fighting measures have been incorporated into the project design. The proposed project shall be equipped with adequate fire-fighting measures in the form of fire hydrants at appropriate places within the scheme, from where fire tenders can access water to counter a fire situation. The fire hydrants shall draw water from the overhead and underground water tanks. A central alarm shall signal fire alerts whenever there is a fire situation within the proposed housing scheme. The nearest fire brigade is located close to Zero Point in Islamabad, which can be called upon in the event of a fire emergency. Fire-proof clothing and fire-fighting equipment shall be placed at maintenance offices and guard rooms.

7.3.3 Other Emergencies

There could also be other emergencies, such as earthquakes, epidemic, pest attack or terrorist activity. The Management Office shall devise a list of all possible emergencies and prescribe reaction, response and evacuation procedures for all such contingencies. Security Guards shall also be trained to act in case of all possible emergency situations and shall follow protocols defined within the evacuation plan. The fire alarms can be activated to signal evacuation. At the same time, communication shall be made with hospitals, emergency services and police for urgent support.

9. CONCLUSIONS AND RECOMMENDATIONS

9.1. CONCLUSIONS

This comprehensive environmental assessment has meticulously adhered to the guidelines set forth by the Government of Pakistan. Its primary goal was to precisely scrutinize the potential environmental and social impacts stemming from the Tele Town Housing scheme. The report offers an in-depth analysis, encompassing intricate project specifications, the existing environmental baseline, foreseeable environmental ramifications, and well-thought-out mitigation strategies.

During both the construction and operational phases, the project may have a moderate impact on air quality. This could be due to the emission of dust, exhaust gases, and elevated noise levels. However, these concerns are not ignored; rather, the assessment suggests practical measures to curb these impacts. These solutions include employing silencers, tuning vehicles and equipment for reduced noise emissions, avoiding the use of pressure horns, and implementing practices like sprinkling water on soil to minimize dust generation.

Another crucial aspect evaluated is the potential pollution of existing surface water resources and spring water. Contamination from construction materials such as cement components, oil, grease, and toxic chemicals could lead to water pollution. The report addresses this by proposing a robust wastewater treatment system as an integral part of the project. Additionally, a comprehensive solid waste management plan is outlined, emphasizing the importance of responsible disposal methods.

To effectively mitigate these concerns, a meticulous Environmental Management Plan (EMP) has been developed. This plan not only identifies the proposed mitigation measures against negative impacts but also clearly delineates the roles and responsibilities of each organization involved. Furthermore, the EMP establishes stringent monitoring requirements for compliance and effects monitoring of the project. It encompasses communication and documentation protocols, site restoration procedures, and necessary staff training. By diligently enforcing the EMP at every stage of the project, the adverse impacts are expected to be either greatly

minimized or rendered negligible, while positive impacts are anticipated to be enhanced significantly.

9.2. RECOMMENDATIONS

In light of the comprehensive assessment, it is imperative to emphasize the significance of the recommended mitigation measures outlined in this report. These measures, if diligently implemented, have the potential to substantially reduce, if not entirely eliminate, the aforementioned impacts, ensuring they remain well within acceptable limits.

The study underscores the essence of Section 12 of the Pakistan Environmental Protection Act, 1997, which mandates environmental approval prior to the commencement of any project with potential adverse environmental impacts. This underscores the reality that any economic activity, no matter how beneficial, does have environmental repercussions. However, the overall evaluation of the reviewed project unequivocally indicates that, with the implementation of suitable mitigation measures, it is unlikely to cause any significant adverse impact on the social, physical, and biological environment of the area.

In conclusion, this meticulous environmental assessment has not only identified potential challenges but also provided effective solutions. Through the dedicated application of the proposed mitigation measures and the stringent enforcement of the Environmental Management Plan, the Tele Town project is expected to proceed without significantly detrimental effects on the environment, thus ensuring sustainable and responsible development in the region.

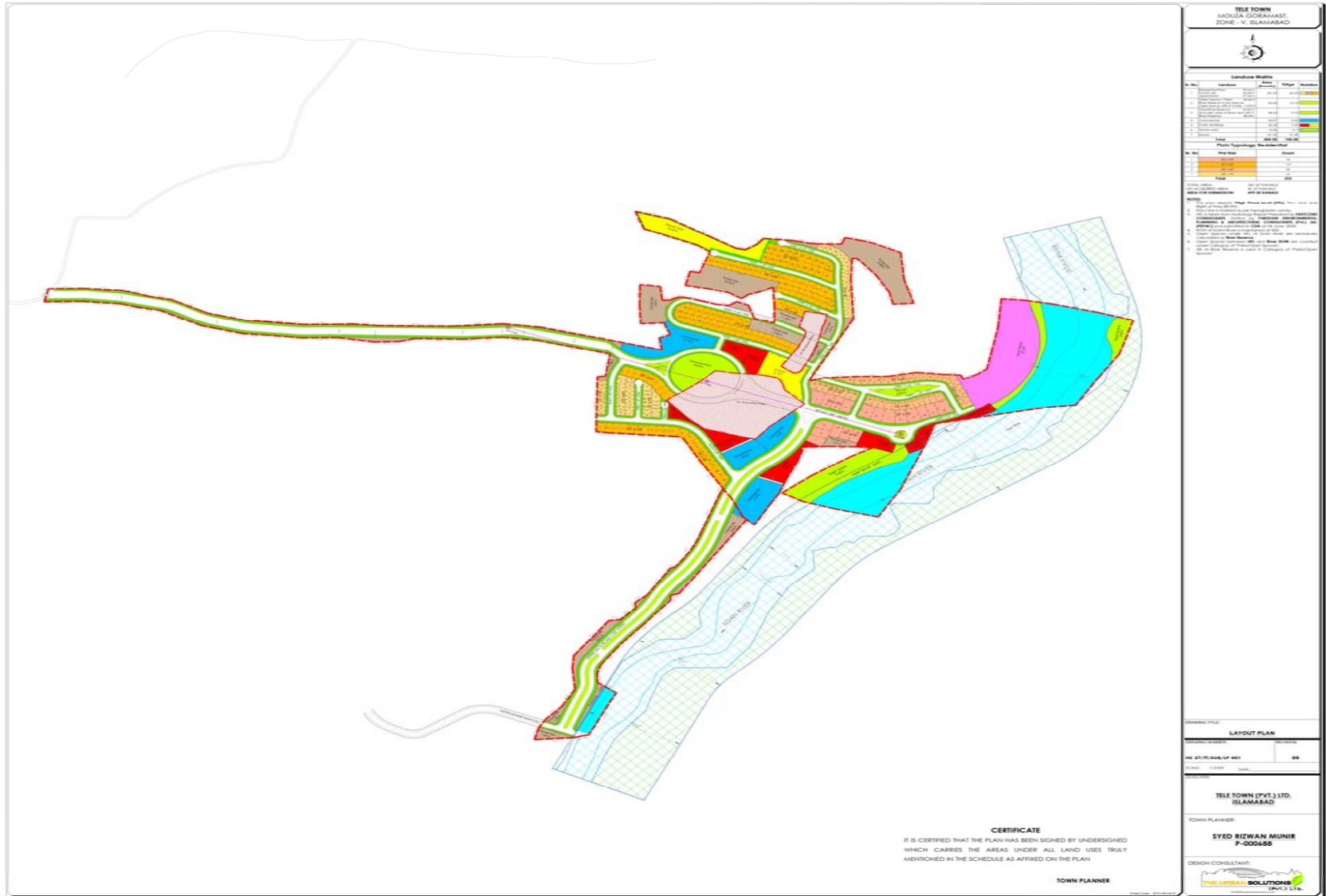
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11. ANNEXURES

**ANNEXURE A
LAYOUT PLAN**



ANNEXURE-B
NATIONAL ENVIRONMENTAL QUALITY STANDARDS

REGISTERED No. M - 302
L.-7646

The Gazette of Pakistan



EXTRAORDINARY
PUBLISHED BY AUTHORITY

ISLAMABAD, FRIDAY, NOVEMBER 26, 2010

PART II

Statutory Notifications (S. R. O.)

GOVERNMENT OF PAKISTAN

MINISTRY OF ENVIRONMENT

NOTIFICATIONS

Islamabad, the 18th October, 2010

S. R. O. 1062(I)/2010.—In exercise of the powers conferred under clause (c) of sub-section (I) of section 6 of the Pakistan Environmental Protection Act, 1997 (XXXIV of 1997), the Pakistan Environmental Protection Agency, with the prior approval of the Pakistan Environmental Protection Council, is pleased to establish the following National Environmental Quality Standards for Ambient Air.

National Environmental Quality Standards for Ambient Air

Pollutants	Time-weighted average	Concentration in Ambient Air		Method of measurement
		Effective from 1st July, 2010	Effective from 1st January 2013	
Sulphur Dioxide (SO ₂)	Annual Average* 24 hours**	80 µg/m ³ 120 µg/m ³	80 µg/m ³ 120 µg/m ³	-Ultraviolet Fluorescence method
Oxides of Nitrogen as (NO)	Annual Average* 24 hours**	40 µg/m ³ 40 µg/m ³	40 µg/m ³ 40 µg/m ³	- Gas Phase Chemiluminescence

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Pollutants	Time-weighted average	Concentration in Ambient Air		Method of measurement
		Effective from 1st July, 2010	Effective from 1st January 2013	
Oxides of Nitrogen as (NO _x)	Annual Average*	40 µg/m ³	40 µg/m ³	- Gas Phase Chemiluminescence
	24 hours**	80 µg/m ³	80 µg/m ³	
O ₃	1 hour	180 µg/m ³	130 µg/m ³	-Non dispersive UV absorption method
Suspended Particulate Matter (SPM)	Annual Average*	400 µg/m ³	360 µg/m ³	- High Volume Sampling. (Average flow rate not less than 1.1 m ³ /minute).
Respirable Particulate Matter, PM ₁₀	Annual Average*	200 µg/m ³	120 µg/m ³	-β Ray absorption method
	24 hours**	250 µg/m ³	150 µg/m ³	
Respirable Particulate Matter, PM _{2.5}	Annual Average*	25 µg/m ³	15 µg/m ³	-β Ray absorption method
	24 hours**	40 µg/m ³	35 µg/m ³	
	1 hour	25 µg/m ³	15 µg/m ³	
Lead Pb	Annual Average*	1.5 µg/m ³	1 µg/m ³	- ASS Method after sampling using EPM 2000 or equivalent Filter paper
	24 hours**	2 µg/m ³	1.5 µg/m ³	
Carbon Monoxide (CO)	8 hours**	5 mg/m ³	5 mg/m ³	- Non Dispersive Infra Red (NDIR) method
	1 hour	10 mg/m ³	10 mg/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.

S. R. O. 1063(I)/2010.— In exercise of the powers conferred under clause (c) of sub-section (1) of section 6 of the Pakistan Environmental Protection Act, 1997 (XXXIV of 1997), the Pakistan Environmental Protection Agency, with the prior approval of the Pakistan Environmental Protection Council, is pleased to establish the following National Standards for Drinking Water Quality.

PART II] THE GAZETTE OF PAKISTAN, EXTRA., NOVEMBER 26, 2010 3207

National Standards for Drinking Water Quality

Properties/Parameters	Standard Values For Pakistan	Who Standards	Remarks
Bacterial			
All water intended for drinking (E.Coli or Thermotolerant Coliform bacteria)	Must not be detectable in any 100 ml sample	Must not be detectable in any 100 ml sample	Most Asian countries also follow WHO standards
Treated water entering the distribution system (E.Coli or thermo tolerant coliform add total coliform bacteria)	Must not be detectable in any 100 ml sample	Must not be detectable in any 100 ml sample	Most Asian countries also follow WHO standards
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 present in 95% of the samples taken throughout any 12-month period.	Must not be detectable in any 100 ml sample In case of large supplies, where sufficient samples are examined, must not be present in 95% of the samples taken throughout any 12 month period.	Most Asian countries also follow WHO standards
Physical			
Colour	≤ 15 TCU	≤ 15 TCU	
Taste	Non objectionable/Acceptable	Non objectionable/Acceptable	
Odour	Non objectionable/Acceptable	Non objectionable/Acceptable	
Turbidity	< 5 NTU	< 5 NTU	
Total hardness as CaCO ₃	< 500 mg/l	---	
TDS	< 1000	< 1000	
pH	6.5 - 8.5	6.5 - 8.5	
Chemical			
<i>Essential Inorganic</i>			
Aluminium (Al) mg/l	≤ 0.2	0.2	

3208 THE GAZETTE OF PAKISTAN, EXTRA., NOVEMBER 26, 2010 [PART II]

Properties/Parameters	Standard Values for Pakistan	WHO Standards	Remarks
Antimony (Sb)	≤ 0.005 (P)	0.02	
Arsenic (As)	≤ 0.05 (P)	0.01	Standard for Pakistan similar to most Asian developing countries
Barium (Ba)	0.7	0.7	
Boron (B)	0.3	0.3	
Cadmium (Cd)	0.01	0.003	Standard for Pakistan similar to most Asian developing countries
Chloride (Cl)	< 250	250	
Chromium (Cr)	≤ 0.05	0.05	
Copper (Cu)	2	2	
<i>Toxic Inorganic</i>	<i>mg/Litre</i>	<i>mg/Litre</i>	
Cyanide (CN)	≤ 0.05	0.07	Standard for Pakistan similar to Asian developing countries
Fluoride (F)*	≤ 1.5	1.5	
Lead (Pb)	≤ 0.05	0.01	Standard for Pakistan similar to most Asian developing countries
Manganese (Mn)	≤ 0.5	0.5	
Mercury (Hg)	≤ 0.001	0.001	
Nickel (Ni)	≤ 0.02	0.02	
Nitrate (NO ₃)*	≤ 50	50	
Nitrite (NO ₂)*	≤ 3 (P)	3	
Selenium (Se)	0.01(P)	0.01	
Residual chlorine	0.2-0.5 at consumer end 0.5-1.5 at source	—	
Zinc (Zn)	5.0	3	Standard for Pakistan similar to most Asian developing countries

* indicates priority health related inorganic constituents which need regular monitoring.

PART II] THE GAZETTE OF PAKISTAN, EXTRA., NOVEMBER 26, 2010 3209

Properties/Parameters	Standard Values for Pakistan	Who Standards	Remarks
Organic			
Pesticides mg/L		PSQCA No. 4639-2004, Page No. 4 Table No. 3 Serial No. 20-58 may be consulted.***	Annex II
Phenolic compounds (as Phenols) mg/L		≤ 0.002	
Polynuclear aromatic hydrocarbons (as PAH) g/L		0.01 (By GC/MS method)	
Radioactive			
Alpha Emitters bq/L or pCi	0.1	0.1	
Beta emitters	1	1	

*** PSQCA: Pakistan Standards Quality Control Authority.

Proviso:

The existing drinking water treatment infrastructure is not adequate to comply with WHO guidelines. The Arsenic concentrations in South Punjab and in some parts of Sindh have been found high then Revised WHO guidelines. It will take some time to control arsenic through treatment process. Lead concentration in the proposed standards is higher than WHO Guidelines. As the piping system for supply of drinking water in urban centres are generally old and will take significant resources and time to get them replaced. In the recent past, Lead was completely phased out from petroleum products to cut down Lead entering into environment. These steps will enable to achieve WHO guidelines for Arsenic, Lead, Cadmium and Zinc. However, for bottled water, WHO limits for Arsenic, Lead, Cadmium and Zinc will be applicable and PSQCA Standards for all the remaining parameters.

S. R. O. 1064(I)/2010.—In exercise of the powers conferred under clause (c) of sub-section (1) of section 6 of the Pakistan Environmental Protection Act, 1997 (XXXIV of 1997), the Pakistan Environmental Protection Agency, with the prior approval of the Pakistan Environmental Protection Council, is pleased to establish the following National Environmental Quality Standards for Noise.

3210 THE GAZETTE OF PAKISTAN, EXTRA., NOVEMBER 26, 2010 [PART II]

National Environmental Quality Standards for Noise

S. No.	Category of Area / Zone	Effective from 1st July, 2010		Effective from 1st July, 2012	
		Limit 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 a.m.
 3. Silence zone: Zones which are declared as such by the 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.

[No. F. I(12)/2010-11-General.]

MUHAMMAD KHALIL AWAN,
Section Officer (PEPC).

ANNEXURE C
ENVIRONMENTAL BASELINE REPORTS



ENVIRONMENTAL SERVICES PAKISTAN

CHEMICAL ANALYSIS TEST REPORT (AMBIENT AIR)



Reference Number: **ESPAK/0150I/23/AA/4199/00416** Date: **31/07/2023**
 Name of Industry/Client: **Tele Town (Private) Limited**
 Address: **Ghora Mast, Islamabad**
 Telephone No.: **----**
 Nature of Sample: **Ambient Air** Monitoring Location: **Mid Point of Site, Ghora Mast, Islamabad (GPS: 33.614752°N, 73.291258°E)**
 Date of Sample Collection: **25/07/2023**
 Sample Collected/Sent By: **Shahzaib Ali, Analyst (Field), ESPAK** Grab / Composite: **Continuous- 24 Hours**
 Date of Completion of Analysis: **26/07/2023**

S. No	Parameters	Limit Values (NEQS-24Hours)	Concentration	Method / Equipment Used	Remarks
1	Carbon Monoxide (CO)	5 mg/m ³ (8 Hours)	3.2 mg/m ³	Non Dispersive Infrared Absorption (NDIR)	Within Prescribed Limits
2	Sulfur Dioxide (SO ₂)	120 µg/m ³	13.6 µg/m ³	UV Fluorescence (UVF)	Within Prescribed Limits
3	Ozone (O ₃)	130 µg/m ³ (1 Hour)	21.5 µg/m ³	Non Dispersive UV Absorption	Within Prescribed Limits
4	Oxides of Nitrogen as NO	40 µg/m ³	17.5 µg/m ³	Chemiluminescence Detection	Within Prescribed Limits
5	Oxides of Nitrogen as NO ₂	80 µg/m ³	28.5 µg/m ³	Chemiluminescence Detection	Within Prescribed Limits
6	Particulate Matter PM _{2.5}	35 µg/m ³	32.5 µg/m ³	Particulate Sensor	Within Prescribed Limits
7	Particulate Matter PM ₁₀	150 µg/m ³	145 µg/m ³	Particulate Sensor	Within Prescribed Limits
8	Suspended Particulate Matter (SPM)	500 µg/m ³	473 µg/m ³	Particulate Sensor	Within Prescribed Limits

NEQS: Punjab Environmental Quality Standards for Ambient Air, 2010

• Uncertainty of Measurement (UoM) data will be provided on request, where available. The statement of conformity, if provided in the report, is based on the decision rule of simple acceptance or rejection with equal shared risk due to measurement uncertainty.

Note:

- The report should be reproduced as a whole and not in parts.
- The responsibility of the ethical use of this report lies with the client.
- The values represent sample conditions when monitoring/testing was carried out.
- The report data is not intended to be used legally by the client.

1. Sample Analyzed By: Shahzaib Ali
Analyst (Field)

2. Name of Chief Analyst with Seal: Muhammad Arfan

3. Signature of Incharge of the Environmental Laboratory:

Name: Imran Malik
General Manager
Date: 31/07/2023

----- End of Report -----



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ENVIRONMENTAL SERVICES PAKISTAN

Report Reference	ESPAK/01501/23/AA/4199/00416						
Client Name	Tele Town (Private) Limited						
Address	Ghora Mast, Islamabad						
Monitoring Location	Mid Point of Site						
GPS Co-Ordinates	33.614752°N, 73.291258°E						
Monitoring Date	25-07-2023 to 26-07-2023						
Date - Time	CO	SO ₂	O ₃	NO	NO ₂	PM _{2.5}	PM ₁₀
	mg/m ³	ug/m ³	ug/m ³	ug/m ³	ug/m ³	ug/m ³	ug/m ³
25-07-23 12:50	2.5	15.2	21.5	20.0	32.3	36.0	140.1
25-07-23 13:50	2.6	14.3		20.6	33.2	32.3	138.9
25-07-23 14:50	3.0	15.1		21.1	31.0	37.3	135.7
25-07-23 15:50	3.5	15.9		18.3	31.6	30.2	145.2
25-07-23 16:50	3.9	16.8		18.7	30.6	34.6	143.4
25-07-23 17:50	5.6	17.6		19.1	32.7	35.3	151.3
25-07-23 18:50	2.3	16.3		17.9	25.0	31.2	151.9
25-07-23 19:50	2.3	13.0		18.4	25.4	29.1	142.5
25-07-23 20:50		16.2		17.8	23.2	34.4	150.8
25-07-23 21:50		14.7		16.8	24.2	35.4	137.0
25-07-23 22:50		16.8		18.9	24.1	27.5	131.0
25-07-23 23:50		12.3		18.8	22.4	36.7	141.8
26-07-23 0:50		9.3		15.2	27.0	36.0	139.0
26-07-23 1:50		11.9		15.4	28.4	27.8	139.4
26-07-23 2:50		12.4		13.2	29.7	32.4	175.2
26-07-23 3:50		8.7		13.1	26.9	30.5	165.4
26-07-23 4:50		10.7		18.9	30.2	31.9	166.6
26-07-23 5:50		11.8		15.6	29.5	28.7	140.9
26-07-23 6:50		11.2		18.3	27.8	30.8	153.2
26-07-23 7:50		13.8		15.5	29.3	35.1	130.0
26-07-23 8:50		14.4		17.6	29.2	33.5	142.8
26-07-23 9:50		14.1		18.1	28.1	34.5	140.8
26-07-23 10:50		12.8		15.1	30.6	30.2	140.2
26-07-23 11:50		10.9		17.5	30.8	29.6	141.9
Average	3.2	13.6	21.5	17.5	28.5	32.5	145.2
Maximum	5.6	17.6	21.5	21.1	33.2	37.3	175.2
Minimum	2.3	8.7	21.5	13.1	22.4	27.5	130.0
Monitored By:	Syed Shahzaib Ali						



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ENVIRONMENTAL SERVICES PAKISTAN

PAK EPA & PUNJAB EPD CERTIFIED

NOISE MONITORING REPORT



Reference Number: ESPAK/01501/23/N/4200/00485 Date: 31/07/2023
 Name of Industry/Client: Tele Town (Private) Limited
 Address: Ghora Mast, Islamabad
 Telephone No.: ----
 Nature of Sample: Noise
 Date of Sample Collection: 25/07/2023 Grab / Composite: Continuous - 24 Hours
 Sample Collected/Sent By: Shahzaib Ali, Analyst (Field), ESPAK
 Date of Completion of Analysis: 26/07/2023
 Method/Equipment Used: Sound Level Meter

S. No	Measurement Point	Limit Values (NEQS)	Noise Level in dB(A)	Remarks
1	Mid Point of Site, Ghora Mast, Islamabad (GPS: 33.614752°N, 73.291258°E)- Day Time	65 dB(A)	65 dB(A)	Within Prescribed Limits
2	Mid Point of Site, Ghora Mast, Islamabad (GPS: 33.614752°N, 73.291258°E)- Night Time	55 dB(A)	53 dB(A)	Within Prescribed Limits

NEQS: National Environmental Quality Standards for Noise in Commercial Area, 2010 Day Time Hours (6:00 am to 10:00 pm) Night Time Hours (10:00 pm to 6:00 am)

• Uncertainty of Measurement (UoM) data will be provided on request, where available. The statement of conformity, if provided in the report, is based on the decision rule of simple acceptance or rejection with equal shared risk due to measurement uncertainty.

Note:

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- The responsibility of the ethical use of this report lies with the client.
- The values represent sample conditions when monitoring/testing was carried out.
- The report data is not intended to be used legally by the client.

1. Sample Analyzed By: Shahzaib Ali
Analyst (Field)

2. Name of Chief Analyst with Seal: Muhammad Arfan

3. Signature of Incharge of the Environmental Laboratory:

Name: Imran Malik
General Manager
Date: 31/07/2023

----- End of Report -----



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ENVIRONMENTAL SERVICES PAKISTAN

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CHEMICAL ANALYSIS TEST REPORT (GROUND WATER)

Reference Number: ESPAK/01501/23/GW/4201/01009 Date: 04/08/2023
 Name of Industry / Client: Tele Town (Private) Limited
 Address: Ghora Mast, Islamabad
 Telephone No.: ----
 Nature of Sample: Ground Water at Tele Town
 Date Sample Received: 27/07/2023 Grab / Composite: Grab
 Date of Sample Collection: 25/07/2023
 Sample Collected / Sent By: Shahzaib Ali, Analyst (Field), ESPAK
 Date of Completion of Analysis: 03/08/2023



S. No	Parameters	Limit Values (NSDWQ)	Concentration	Method / Equipment Used	Remarks
1	Total Coliforms	----	ND	SMWW 9221 B	----
2	E. Coli	Must not be detectable in any 100mL Sample	ND	SMWW 9221 F	Within Limits
3	Color	≤15 TCU	ND	SMWW 2120 C	Within Limits
4	Taste	Non Objectionable / Acceptable	Acceptable	Organoleptic	Within Limits
5	Odor	Non Objectionable / Acceptable	Acceptable	Organoleptic	Within Limits
6	Turbidity	<5 NTU	ND	SMWW 2130B	Within Limits
7	Total Hardness as CaCO ₃ *	<500 mg/L	416 mg/L	SMWW 2340C	Within Limits
8	Total Dissolved Solids (TDS)*	<1000 mg/L	645 mg/L	SMWW 2540C	Within Limits
9	pH*	6.5-8.5	7.5	SMWW 4500H*B	Within Limits
10	Nitrate (NO ₃ ⁻)	≤50 mg/L	48 mg/L	SMWW 4500NO ₃ *B	Within Limits
11	Nitrite (NO ₂ ⁻)	≤3 mg/L	ND	SMWW 4500NO ₂ *B	Within Limits
12	Residual Chlorine	0.2-0.5 mg/L	ND	SMWW 4500-Cl B	----
13	Chloride (as Cl ⁻)*	<250 mg/L	39 mg/L	SMWW 4500Cl*B	Within Limits
14	Fluoride (F ⁻)*	≤1.5 mg/L	0.6 mg/L	U.S. EPA 9214	Within Limits
15	Phenolic Compounds (as Phenols)	NGVS	ND	SMWW 5530 C	----
16	Cyanide (CN ⁻)	≤0.05 mg/L	ND	SMWW 4500 CN ⁻ F	Within Limits
17	Cadmium (Cd)	0.01 mg/L	ND	U.S. EPA-200.7	Within Limits
18	Chromium (Cr)	≤0.05 mg/L	ND	U.S. EPA-200.7	Within Limits
19	Copper (Cu)	2.0 mg/L	ND	U.S. EPA-200.7	Within Limits
20	Lead (Pb)	≤0.05 mg/L	ND	U.S. EPA-200.7	Within Limits
21	Mercury (Hg)	≤0.001 mg/L	ND	U.S. EPA-200.7	Within Limits
22	Nickel (Ni)	≤0.02 mg/L	ND	U.S. EPA-200.7	Within Limits
23	Zinc (Zn)	5.0 mg/L	ND	U.S. EPA-200.7	Within Limits

Cepa

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ENVIRONMENTAL SERVICES PAKISTAN

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CHEMICAL ANALYSIS TEST REPORT (GROUND WATER)

Reference Number: ESPAK/01501/23/GW/4201/01009 Date: 04/08/2023
Name of Industry / Client: Tele Town (Private) Limited



S. No	Parameters	Limit Values (NSDWQ)	Concentration	Method / Equipment Used	Remarks
24	Arsenic (As)	≤0.05 mg/L	ND	U.S. EPA-200.7	Within Limits
25	Barium (Ba)	0.7 mg/L	ND	U.S. EPA-200.7	Within Limits
26	Aluminum (Al)	≤0.2 mg/L	ND	U.S. EPA-200.7	Within Limits
27	Manganese (Mn)	≤0.5 mg/L	ND	U.S. EPA-200.7	Within Limits
28	Boron (B)	0.3 mg/L	ND	U.S. EPA-200.7	Within Limits
29	Fecal Coliform Bacteria	Must not be detectable in any 100ml sample	ND	SMWW 9221 F	Within Limits
30	Antimony (Sb)	≤0.005 mg/L	ND	U.S. EPA-200.7	Within Limits
31	Selenium (Se)	0.01 mg/L	ND	U.S. EPA-200.7	Within Limits

NSDWQ: National Standards for Drinking Water Quality, 2010

SMWW: Standard Methods for the Examination of Water and Waste Water 23rd Edition, American Public Health Association, American Water Works Association, Water Environment Federation USA (2017)

USEPA: United States Environmental Protection Agency

NGVS: No Guideline Value Set

ND: Not Detected

- Laboratory tests and measurements were carried out at 25 ± 5 °C and 50 ± 20 % Relative Humidity conditions unless required otherwise.
- Uncertainty of Measurement (UoM) data will be provided on request, where available. The statement of conformity, if provided in the report, is based on the decision rule of simple acceptance or rejection with equal shared risk due to measurement uncertainty.

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- The report data is not intended to be used legally by the client.
- Only parameters marked with asterisk (*) are ISO 17025:2017 accredited.

1. Sample Analyzed By: Waqas Ahmad Abdul Aziz Muhammad Shahid Khizra Bano Ghulam Mustafa
Analyst (ICP-AES) Analyst (Chemical) Analyst (Chemical) Analyst (Microbiology) Analyst (Chemical)

2. Name of Chief Analyst with Seal: Muhammad Arfan *Arfan*

3. Signature of Incharge of the Environmental Laboratory: *Imran Malik*

Name: Imran Malik
General Manager
Date: 04/08/2023

----- End of Report -----



Page 2 of 2

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ANNEXURE D
TOPOGRAPHIC PLAN

