ENVIRONMENTAL IMPACT AS SESSMENT (EIA)

CONSTRUCTION OF NEW SYED PHARMA LOCATED AT 8-KM MURIDKE SHEIKHUPURA ROAD, DISTRICT SHEIKHUPURA

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Prepared by **Sustainable Environmental Solutions (SES)**

House # 476, F2 block, Johar Town, Lahore,

Ph.office# 0301-4211409

E-mail: sustenvsol@gmail.com

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List of Acronym

HVAC	Heating ventilation and Air conditioning
HEPA	High efficiency particulate arrestance
RO	Reverse Osmosis
PEPA	Punjab Environment Protection Act
EA	Environmental Assessment
EIA	Environment Impact Assessment
IEE	Initial Environmental Examination
EMP	Environmental Management Plan
ESMP	Environmental and Social Management Plan
IFC	International Finance Corporation
PEQS	Provincial Environmental Quality Standards
PC	public consultation
PEPA	Punjab Environmental Protection Agency
PEPAct	Pakistan Environment Protection Act 1997 (as regulated and amended 2012)
EPA	Environment Protection Agency
NOC	No Objection Certificate
NPO	No Project Option
DOE	District Officer Environment
SES	Sustainable Environmental Solutions
TSS	Total Suspended Solid
TDS	Total Dissolved Solids
EPD	Environment Protection Department

Cfs	Cubic Feet per Second
LPCD	Liter per capita per day
dB	Desi Bell
HSE	Health Safety and Environment

Executive Summary

1. BACKGROUND

At the time of independence, Pakistan had virtually no pharmaceutical industry in place with traders mostly engaged in importing medicines from various countries. The total healthcare spending in Pakistan (Government and Private) amounted to PRs. 185 bn (US$ bn3.2), a mere 4% of GNP. The healthcare sector is not well developed and almost 90% of healthcare expenditure is out of-pocket expense, meaning old and sick have to pay from their pockets for health care.

The demand for Pharmaceuticals is fueled by a high population growth rate (2.00% in 2025), rising life expectancy (62.6yrs) and consequent rise in older age group. At the same time, Pakistan has >50% of its population that lies below the age of 19 years. Infant mortality is high, at 74.4 per 1000 live births, as is maternal mortality. These factors along with increasing urbanization, increasing number of doctors and private investment in new hospitals and clinics will keep Pakistan a growing market for Pharmaceutical products.

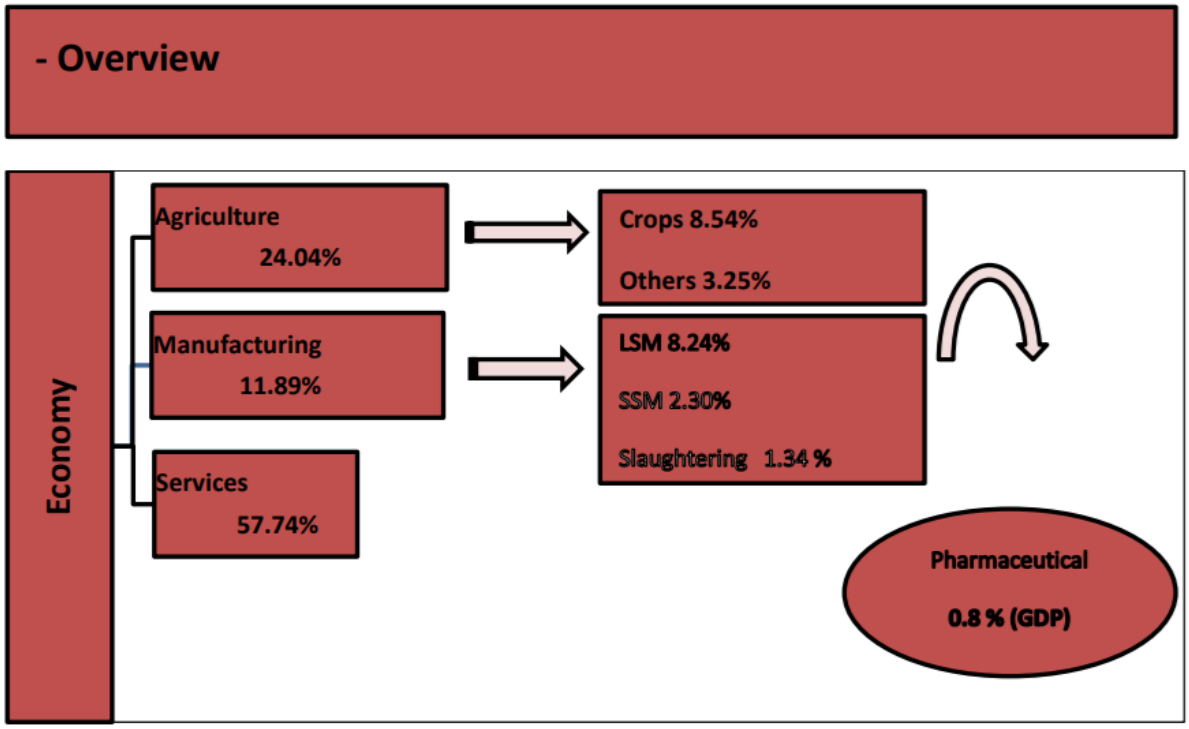
Pakistan's pharma sector in 2025 shows strong growth, nearing $2 billion in market size, driven by price deregulation and a surge in exports (34% growth in FY25) into global generics markets, though facing challenges with high import dependency (90% for raw materials) and ensuring affordability through volume growth beyond price hikes, with focus on API production and regulatory reforms for sustainable expansion.

The global pharmaceutical industry has experienced significant growth during the past two decades, with revenues totaling around 1.6 trillion U.S. dollars in 2023. With growth like that, the industry's size is now comparable to the gross domestic products (GDPs) of countries like Spain, Mexico, or Australia.

We can see the pharmaceutical has 15.70 % growth rate as well as share in GDP is 0.8 percent. As Large Scale manufacturing has great contribution as well as linkage with others sectors. It has 8.24% in FY 24.

The production of Pharmaceutical grew sharply by 15.7 % in FY24against the sustained decline of 28.8 % in the previous year. Productions of syrups and tablets contributing around 84 % of pharmaceutical production remain the principal product lines contributing almost entirely to the growth. A number of factors supported production of pharma during

FY24. This includes increase availability of raw materials, deregulation of drugs, prices by DRAP in between rising cost of raw materials and export increased



Source: Economic Survey of Pakistan & SBP Annual Report 2023-24

There are about 400 licensed Pharmaceutical companies, including 30 foreign companies those together accounts for 80% of the country's pharmaceutical consumption. Foreign multinationals(MNCs) had a market share of 38% in 2004, however they are gradually losing market share to local companies which offer cheaper variants (branded generic drugs) priced usually at 20-25% lower than the MNC drugs. The per capita consumption of Pharmaceuticals in Pakistan is currently is less than USD 10 on a yearly basis as the modern medical and Pharmaceutical care is available mostly in large cities and a vast majority of rural population consumes the Homeopathic, Ayurvedic, or other forms of local and traditional (Unani) remedies. As more of the rural population shifts towards the cities they will be exposed to availability of modern medical care including the Pharmaceuticals.

Large scale manufacturing LSM) is essential part of any economy, in Pakistan for economic growth has linkage with other sectors too. The pharmaceutical sector is classified industrial activities segment of economy. The LSM growth rate 15.70 % growth rate whereas contribution in GDP is 0.8.

As most of the industries in Pakistan are ruled by private sector, the pharmaceutical industry also depends on many factors. These factors may be political, social or economic level. Pharmaceutical industry is also one of them. This industry faces many challenges and competitions. Among 750 registered pharmaceuticals units in Pakistan, 400 produced active finished drugs which also include those 24 units run by multi-national companies. In Pakistan, multi-national (MNC) and national units are working with a ratio of 2:3. GSK, a multi-national with 11.60% while among national Getz has a market share of 3.75%. Above figure depicts top 10 companies in Pakistan.

Keeping in view the demand of pharmaceutical products in Pakistan, project proponent of M/S New Sayyed Pharma has been planned to install a small scale pharmaceutical unit located at 8 km Muridka- Sheikhupura Road, Tehsil Muridke district Sheikhupura.

2. OBJECTIVES OF THE PROJECT:

The main objective of this project is to establish a pharmaceutical unit which formulate the syrups for human and veterinary uses. To contribute to the production of pharmaceutical production in Pakistan and make the country self-sufficient in medicines and drugs.

The purpose of the this EIA study is to identify the possible beneficial and adverse environmental impacts of the project as presently envisaged and propose the applicable mitigation measures to be implemented during construction and operational stages of the project to minimize the negative impacts to fulfil the legal requirement of the project under section 12 PEPA, 2012.

To fulfil the social and legal binding upon New Sayyed Pharma for compliance of Provincial Environmental Quality Standards (PEQS) for industrial waste, industrial emissions, ambient air, motor vehicles and noise in letter and spirit.

Section 12 of Punjab Environment Protection Act of 1997 Amended 2012 binds the developer (proponent) to submit an EIA report to a Provincial EPAs and get approval for construction and operation phase of the project in a manner prescribed in IEE/EIA Regulations 2022.To fulfil the legal obligations the project has been analyzed for possible positive and negative, social and environmental impacts and their abatement, for

submission to Punjab-EPA, Lahore for issuance of Environmental approval under above said regulation.

3. BRIEF DESCRIPTION:

The proposed project is a small-scale pharmaceutical manufacturing unit which is going to be established at 8 km Muridke- Sheikhupura Road, Tehsil Muridke and District Sheikhupura. The proposed site for the NSP Pharma had been already under the possession of the owner. The proposed Pharma will have following manufacturing process unit.

1. Oral Liquid syrup manufacturing section for veterinary

2. Oral liquid

Design parameters:

Sr. No	Particular	Description
1	Project site location	08 km Muridka- SKP Road, Tehsil Muridka, District Sheikhupura.
2	Project Proponent	**New Sayyed Pharma**
8	Road Accessibility:	Muridka – Sheikhupura road
9	Nearest Town:	Muridka
10	Land available:	4 kanal- 11 marla
11	Building lay out	Double storey concrete structure approved by TMA
12	1. Water Requirement for project process. 2. Water requirement for utility purpose	15000 litre or 1.50 m3/day
13	Pharmaceutical products	1. Oral liquid syrup 2. Anti-inflammatory , tonic, cough , body and brain tonic, joshanda, phakee, tablet herbal,
14	Raw material	Active Pharmaceutical Ingredients (API)

		3. Oral liquid syrup, 1. IVY leaf extract, 2. Thymol(fennel), extract, 3. Ephedra vulgaris extract, 4. Iron Bisglycinate extract, 5. Vitamin C, D3, E, B1, B2. B6, B12, 6. Capsule (food supplement) 1. Coral calcium 2. Vitamin C, D3, E, B1, B2. B6, B12 3. Iron Bisglycinate extract 4. ORS Sachets 1. Vitamin C, calcium powder, dextrose AH, Citric acid AH, 2. Orange flavor, sweetener (polysucralose) 1. Tablets (Anti-inflammatory, Analgesic and multi vitamins) 1. Ascin, 2. Iron Bisglycinate extract, Vitamin C, D3, E, B1, B2. B6, B12, 3. Oral calcium
15	Capacity	Oral liquid syrup =10000 liter per day
16	Air quality Control	HVAC system along with air purification system consisting of aluminum filter, bag filter and HEPA filter
17	Man power requirement: 1. Construction phase 2. Operation phase	10-15 workers 3, 5 workers
18	Completion time	Approximate 4-5 month
19	Project Cost	200 million PKR

The proposed pharmaceutical unit will have production capacity of 10000 litre syrup bottles oral liquid syrup, 300-400 packets of sachets, tablets (Anti-allergic and multi vitamins). Water requirement for this proposed project is small. The water will be used

for production of syrup and washing purpose. About 15000 litre water will be required in syrup manufacturing process. Small quantity of waste water will be generated from washing process activities. About 10-15 man power will be required during construction phase and for operation phase 35 person will be required for operation of this proposed pharmaceutical unit. The proposed project will have modern air cleaning system (Heating Ventilation and Air Conditioning system) and for control of dust and vapours during operation phase. Further before emitting air into environment, it will be passed through two stage aluminum filter and HEPA filter with collection efficiency of 99.9% for fine dust and vapours removal.

4. SITE DESCRIPTION:

The proposed project is a small scale Pharmaceutical unit. It is located on main road of Sheikhupra road Muridke, Chak no 47 UCC. Site is industrial land use surrounded by the green agriculture farms. The proposed project consists of 4 kanal and 11 marla of land. The proposed site for the NSP Pharma had been already under possession of the owner.

The topography of the area is quite typical of the Punjab plains. The soil mainly consists of silt, clay and fine sands. Groundwater table in the area exists at 5-8 m depth below the existing ground level and has almost sweet taste. The site is presently open and have no trees or vegetation.

5. Environmental Assessment Team:

Sustainable Environmental Solutions prepared this EIA. A team of experts comprising of experienced Environmental scientists, engineers and Ecologist paid visits to the project site .Discussions were held on project components and detail design parameters. Meetings were also held with Project owner of NSP Pharma for obtaining the basic information about site and aims and objectives of project. He provided the baseline data and necessary technical, administrative, and environmental information of the project. The following team of Consultants remained engaged for preparation of the Initial Environmental and social Examination Report:

1. Mr. Muhammad Farooq Alam, Senior Environmentalist and team leader (SES)
2. Mr Zahid Ali, GM

3. Mr. Usman ul Haq, Senior Environmentalist (SES)

4. Saghir Ahmed, Pak Green Environment laboratory,

5. Mr. Shafqat Saeed Farooqi, Environmental officer (SES)

6. PROJECT BASELINE CONDITIONS:

As the area around the project is agriculture and industrial in nature with some cluster of houses settlements. The houses are mud and cement plastered. Village UCC is the closest population which is about 0.6 Km from site. 70 % population of these villages depends upon agriculture while 30 percent depend upon the labour, service and business related to the surrounding industry and commercial centers. Farmers and labor are the significant community in the project area. Economy of the area is intermediate. The proposed site is adjacent on main road and was formerly being used for tent manufacturing which has been defunct. Presently there are other industries on this road which include rice processing, engineering and small manufacturing. The nearest town is Muridke which is 8 Km away. This town is center of industrial and business activity in the area.

The Ambient air monitoring at site shows the clear ambient air quality as there is no point source of pollution. only the traffic on the Muridke road is source of air pollution near this site. The data of Meteorology Department, Government of Pakistan was also consulted for meteorological parameters.

The proposed project will cause positive socio-economic impacts in area by:

Creating new direct and indirect job opportunities, although on small scale. Increasing the value of the land of the area. Change in attitude and outlook of the people in nearby villages. The following stake holders were identified from the following groups.

Local people, Proponents, Government, Agencies, NGO, Influential people, Technical persons and Poor People.

Total 25 people from different stake holders were interviewed which had unanimous opinion about the usefulness of the project.

Consent of people on project implementation:

In favor of the project	22	100%
Conditional favor of the project	0	0%
Against the project	0	0%

7. Waste water and disposal option:

During manufacturing process of pharmaceutical product 15000 liter quantity of water will be required for syrup production. The water quality will be improved through using of reverse osmosis (RO) technique. The RO reject water will be clean water will be recycled in the factory. The water will be pumped out from the subsoil stratum using motor pump. Only small quantity of waste water may generate during badge washing process which will not have **significant** impact.it will be disposed of in Chhoti Deg Nulla passing by the proposed project.

The waste water generated from the utilities like toilets offices and kitchen for 35 persons is estimated to be 1.517 m3/day or 0.00062 cusec (using yardstick of 85 % of 51 LPCD. This waste water will be treated in three stage septic tank. The treated waste water will be disposed of in Chhoti drain passing by the project.

8. Solid waste disposal:

Solid waste from construction activities consists of inert material and scrap. Recyclable and reusable material will be separated and other material will be disposed of. During operation of pharmaceutical unit small amount of solid waste will be generated. Expired pharmaceutical products will be stored in separate room and sold out to EPA approved incineration facility. Reuse and recyclable material will be collected separately. Solid waste from offices and kitchens will be disposed of at designated place by TMA.

9. Environmental Impact on Air quality and Noise:

Dust may generate due to movement of vehicles for transportation of construction material. Water sprinkling will be done to avoid dust problem. Construction material will be covered and building area will be isolated through green sheet to contain the dust dispersing in the area. During operation phase no air quality will be disturbed due to the

nature of the project. Heating Ventilation and Air Conditioning system and two stage aluminum filter and HEPA filter will be installed to clean the indoor air quality of manufacturing unit. The noise level during operation phase will be within the PEQS standards. Overall air quality and noise impact will be insignificant during operation phase.

CHAPTER-1
INTRODUCTION

1.1 BACKGROUND

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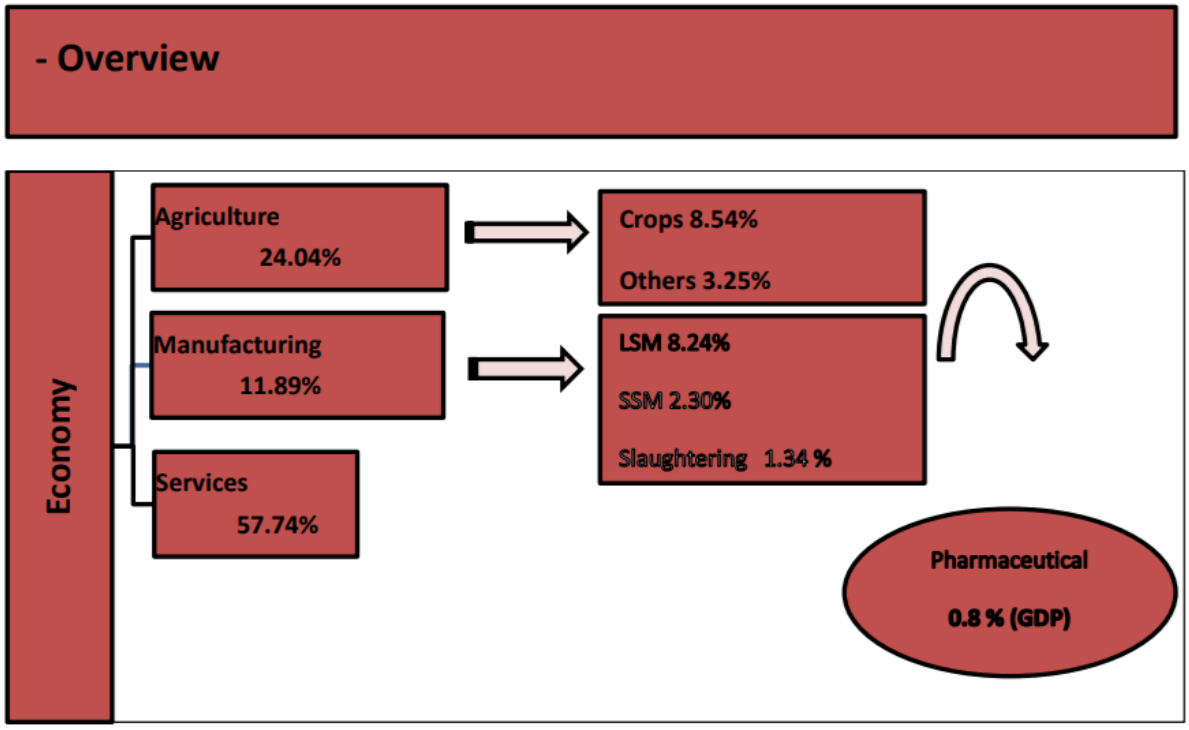

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Section 12 of Punjab Environment Protection Act of 1997 Amended 2012 binds the developer (proponent) to submit an EIA report to a Provincial EPAs and get approval for construction and operation phase of the project in a manner prescribed in IEE/EIA Regulations 2022.To fulfil the legal obligations the project has been analyzed for possible positive and negative, social and environmental impacts and their abatement, for submission to Punjab-EPA, Lahore for issuance of Environmental approval under above said regulation.

1.3 PROJECT PROPONENT

The project proponent is M/S **New Sayyed Pharma (NSP)** for establishing pharmaceutical unit. The contact address of NSP in this case is as follows:

The contact persons will be:

Mr. Zahid Ali

General Manager,

M/S New Sayyed Pharma,

Office Address: Chak NO 27 UCC, 08 Km Main Muridka- Sheikhupura road, Tehsil Muridka district Sheikhupura.

Phone: 03138750433

1.4 Scoping session

The Punjab Regulations IEE/EIA 2022**,** Policy and Procedure for filing, review and approval of environmental assessments and guidelines for public consultation were key documents which served basis for scoping of the EIA. The concerned departments were visited and had discussions to chalk out the scope of the report.

District Officer Environment, Sheikhupura is the key stake holder who has to make site inspection report which covers the scope of report and details of the site and its suitability. His office was visited who opined pharmaceutical manufacturing unit comes

in schedule II of IEE/ EIA Regulations. He also opined that water should also be treated before disposal.

After detailed discussion with stake holders it was decided that format of the IEE given in the "Policy and Procedure for filing, Review and Approval of Environmental Assessments" is the final and report will be prepared on its format mentioned in section 2.3 of above-mentioned document.

1.5 Environmental Assessment Team

Sustainable Environmental Solutions prepared this EIA. A team of experts comprising of experienced Environmental scientists, engineers and Ecologist paid visits to the project site. Discussions were held on project components and detail design parameters. Meetings were also held with Project owner of NSP Pharma for obtaining the basic information about site and aims and objectives of project. He provided the baseline data and necessary technical, administrative, and environmental information of the project. The following team of Consultants remained engaged for preparation of the Initial Environmental and social Examination Report:

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1.6 NATURE, SIZE AND LOCATION OF THE PROJECT

1.6.1 Location

The proposed project is a pharmaceutical manufacturing unit named as **M/S New Syed Pharma (NSP)** situated in Chak No. 27 UCC at main road 08 Km Muridke Sheikhupura road. The proposed site for the proposed project had been already owned by project proponent. The document of land is attached at **Annexure-I.** The proposed site plan map of the site is given below and also attached at **Annexure-II** along with layout map.

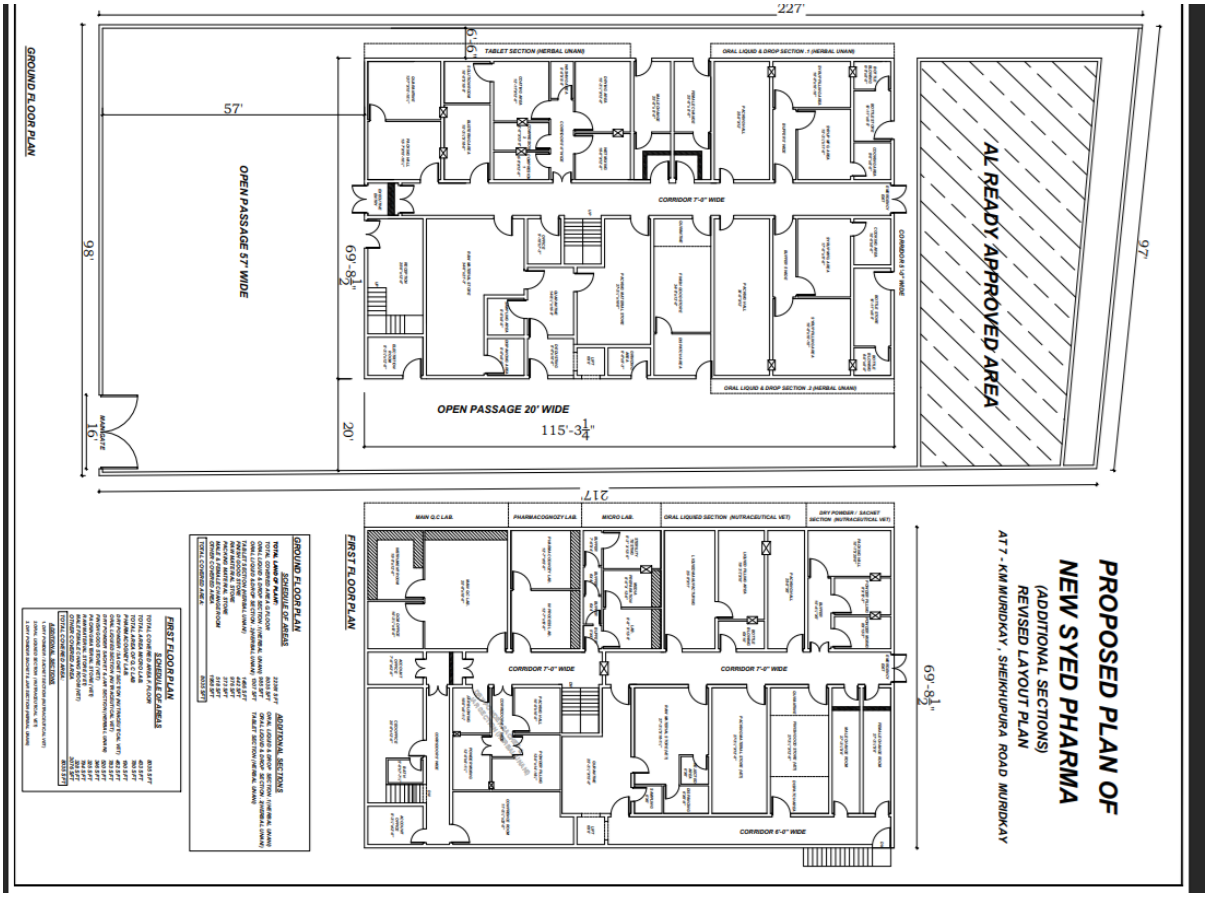

Figure 1.1: Site plan map of proposed pharmaceutical project site

Design of the Pharmaceutical unit

1.6.2 Nature and Size

A. Design:

BRIEF DESCRIPTION:

The proposed project is a small-scale pharmaceutical manufacturing unit which is going to be established at 8 km Muridke- Sheikhupura Road, Tehsil Muridke and District Sheikhupura. The proposed site for the NSP Pharma had been already under the possession of the owner. The proposed Pharma will have following manufacturing process unit.

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13	Pharmaceutical products	10. Oral liquid syrup 11. Anti-inflammatory , tonic, cough , body and brain tonic, joshanda, phakee, tablet herbal,
14	Raw material	Active Pharmaceutical Ingredients (API) 12. Oral liquid syrup, 13. IVY leaf extract, 14. Thymol(fennel), extract, 15. Ephedra vulgaris extract, 16. Iron Bisglycinate extract, 17. Vitamin C, D3, E, B1, B2. B6, B12, 18. Capsule (food supplement) 19. Coral calcium 20. Vitamin C, D3, E, B1, B2. B6, B12 21. Iron Bisglycinate extract 22. ORS Sachets 23. Vitamin C, calcium powder, dextrose AH, Citric acid AH, 24. Orange flavor, sweetener (polysucralose)

		25. Tablets (Anti-inflammatory, Analgesic and multi vitamins) 1. Ascin, 2. Iron Bisglycinate extract, Vitamin C, D3, E, B1, B2. B6, B12, 3. Oral calcium
15	Capacity	Oral liquid syrup =10000 liter per day
16	Air quality Control	HVAC system along with air purification system consisting of aluminum filter, bag filter and HEPA filter
17	Man power requirement: 26. Construction phase 27. Operation phase	10-15 workers 3, 5 workers
18	Completion time	Approximate 4-5 month
19	Project Cost	200 million PKR

The proposed pharmaceutical unit will have production capacity of 10000 litre syrup bottles oral liquid syrup, 300-400 packets of sachets, tablets (Anti-allergic and tonics). Water requirement for this proposed project is small. The water will be used for production of syrup and washing purpose. About 15000 litre water will be required in syrup manufacturing process. Small quantity of waste water will be generated from washing process activities. About 10-15 man power will be required during construction phase and for operation phase 35 person will be required for operation of this proposed pharmaceutical unit. The proposed project will have modern air cleaning system (Heating Ventilation and Air Conditioning system) and for control of dust and vapors during operation phase. Further before emitting air into environment, it will be passed through two stage aluminum filter and HEPA filter with collection efficiency of 99.9% for fine dust and vapours removal. The layout of proposed project is as given below:

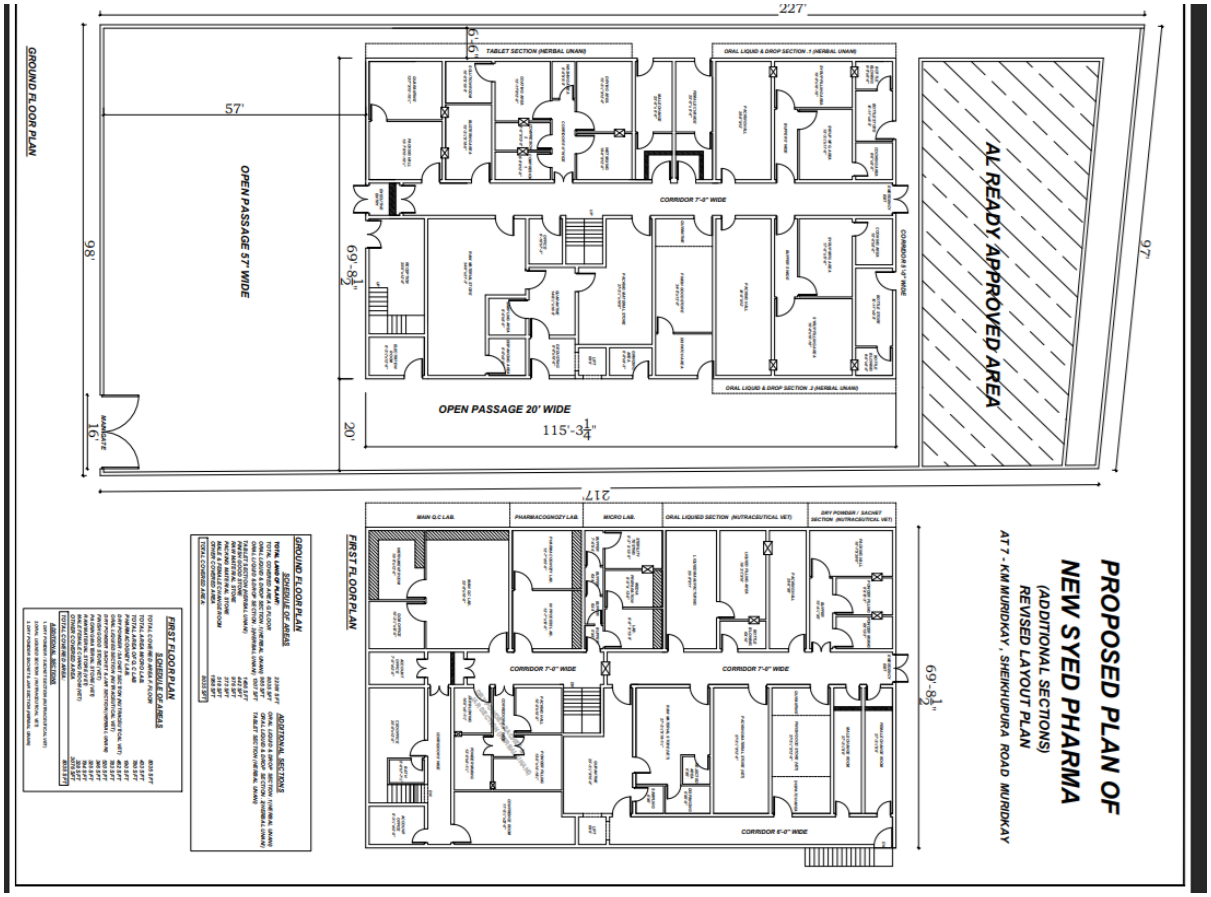


Fig 1.2: Layout map of proposed project

1.7 CAPITAL COST ESTIMATES

The capital cost is 200 million PKR which include civil cost, mechanical, electrical and other expenses.

1.8 STUDY AREA

For an environmental assessment Study, a clear delineation of the Study Area is important within which the impacts must be considered. In the light of this, impacts on the existing environment have been considered in a geographical area (Study Area) of the proposed Project. The boundary of Study Area for the proposed pharmaceutical unit was limited due to its low adverse impact on surrounding environment of the area. As the area is mixture of commercial, industrial and agriculture in use.

1. Service industry in the north

2. Chak No 27 UCC about 2 km

3. Choti Deg Drain about 100 m towards south.

4. Police Post 100 m towards south

5. Main Muridke- Sheikhupura road

The regular settlement is in form of Chak no 27, Dera amb wala, khanna lubana village, joyanwala, chak 28 dara Kamboh, Dhup Sarhi, which are in the radius of 1 Km from the project site. 70 percent population of these villages depends upon agriculture while 30 percent depend upon the labour, service and business related to the surrounding industry and commercial centers. Farmers are the significant community in the project area. Muridke is the prominent commercial and industrial ub which plays an important role in the economy of the area.

The Ambient air monitoring at site shows the clear ambient air quality. The data of Meteorology Department, Government of Pakistan was also consulted for meteorological parameters. Based on above parameters, and keeping in view the size of the project and its limited implications on the surrounding area.

1.9 STRUCTURE OF THE REPORT

The EIA report is structured in the light of guidelines for Review and filling of IEE and EIA regulations. It includes non-technical or executive summary and followed by eight (8) chapters with Chapter-1 provides introduction of the proposed project, Chapter 2 provides the country's environmental policy, legal and administrative framework applicable to the proposed project together with the guidelines, Chapter 3 describes in detail the existing environmental baseline conditions of the Study Area considering the physical, ecological and social domains of environment Chapter 4 presents the description of the project including components ,design parameters, detail of infrastructure facilities etc. Chapter 5 exhibits the Public consultation and social survey Chapter 6 exhibits the impacts assessment at construction and operational stages of the proposed project along with their mitigation measures, Chapter 7 depicts Environmental Management and Monitoring Plan (EMMP) along with proposed institutional framework required for effective implementation and monitoring and

Chapter 8 gives the conclusions and recommendations about the viability of the project.

CHAPTER - 2
ENVIRONMENTAL LEGISLATIVE REQUIREMENTS AND FRAMEWORK

2.1 GENERAL

This Chapter deals with the relevant policy, legal and administrative frameworks instituted by the Government of Pakistan and Punjab for the protection of environment. All the relevant provisions of these policy and legal frameworks have been duly considered in this EIA study. In addition to this, the roles and responsibilities of the Proponent and other key players such as EPA Punjab have also been discussed in this section. The legal set of documents which will applicable to this project is also discussed in this chapter.

2.1.1 POLICY FRAMEWORK

The Ministry of Environment was responsible authority for policy making on environmental protection in Pakistan. With the 18th amendment all the powers of environmental legislation have been entrusted to provincial government. Presently EPD Punjab is the legislator as well as regulatory department in the present scenario. The rules laws and emulations draft are whetted by law department, provincial Environment Protection Council and are finally are approved by provincial assembly. The set of rules and regulations applicable to the project by implemented EPD are discussed in this chapter.

1. **National Environment Policy, 2005**

The National Environmental Policy (2005) provides an overarching framework for addressing the environmental issues (particularly pollution of fresh water bodies and coastal waters, air pollution, lack of proper waste management, deforestation, loss of biodiversity, desertification etc.) confronting Pakistan. It recognizes the goals and objectives of the Pakistan National Conservation Strategy (PNCS), 1992, National Environmental Action Plans, and other existing environment related national policies,

Strategies, and action plans. It also provides broad guidelines to the federal government, provincial governments, federally administered territories and local governments to address their environmental concerns and to ensure effective management of their environmental resources.

2.2 LEGAL FRAMEWORK

The Government of Pakistan (GOP) has promulgate laws/acts, regulations and standards for the protection, conservation, rehabilitation and improvement of the environment. In addition to this, they have also developed environmental assessment procedures governing development projects. Following are the glimpse of these laws and procedures relevant to the proposed Project.

1. Pakistan Environmental Protection Act 1997

The Act was enacted on December 06, 1997 by repealing the Pakistan Environmental Protection Ordinance 1983. It provides the framework for implementation of the PNCS, 1992 establishment of provincial sustainable development funds, protection and conservation of species, conservation of renewable resources, and establishment of Environmental Tribunals, appointment of Environmental Magistrates, Initial Environmental Examination (IEE), and Environmental Impact Assessment (EIA).

Section 11 binds the proponents to emit the effluents and emissions within the prescribed limits as notified in PEQS. Section 12 of the Act stresses the need to carry out EIA/IEE study prior to construction or operation of a project. A committee under the chairman ship of Director General EPA reviews the report and gives its decision for approval or otherwise of any project. Environmental approval is issued for construction phase. After completion of the project construction approval for operational phase is also required to be obtained.

2. The Punjab Environmental Protection Act 1997 Amended 2012

After implementation of the 18th amendment government of Punjab, EPD adopted the federal act as such which is now called The Punjab Environment Protection Act, 1997

amended in 2012. All the rules and regulation made here under have been adopted by EPD.

3. Pakistan Environmental Protection Agency (Review of IEE/EIA) Regulations, 2000

These regulations provide criteria for projects requiring IEE and EIA. The projects have been divided into two schedules according to the scoping of project. The construction of pharmaceutical unit lie in schedule one which require IEE to be submitted for environmental approval before provincial or federal Environment protection agency. They also briefly describe the procedure for preparation and review of environmental reports in the department. (**Annex- III IEE Regulation 2000**)

Pak-EPA published a set of guidelines for conducting IEE/EIA and environmental management of different types of projects. The EIA/IEE process followed in Pakistan is provided in figure 2.1

Figure 2.1 IEE/EIA Process in Pakistan

4. Punjab Municipal Solid Waste Management Guidelines, 2007

Punjab Municipal Solid Waste Management Guidelines, 2007 provide the general guidance to the provincial Government departments, local governments, private operators and other agencies that initiate to operate any solid waste management activity in urban areas.

The present set of guidelines is aimed to cover only the municipal solid wastes. Therefore, hazardous wastes do not come under the preview of these guidelines. Various components of solid waste management such as waste generation and collection, waste transfer, recovery of useful components, waste incineration, composting, bio-gas generation and land filling are covered in these guidelines giving a technical guidance to do these operations with minimal impacts to the environment. For the disposal of waste by land filling, it provides the general, design and operational guidelines. Apart from that, these guidelines also explain the pollution control system for the landfill site with design details. As far as environmental monitoring is concerned, these guidelines also prescribed the National Environmental Quality standards for Municipal and liquid Industrial effluent and ground Water Quality Monitoring Standards.

5. Pakistan Environmental Assessment Procedures, 1997

Pakistan Environmental Assessment Procedures (1997) is, in fact, a package, which contains the following, sets of information relevant to the proposed Project:

a) Policy and Procedures for Filing, Review and Approval of Environmental Assessment Reports

It describes environmental policy and administrative procedures to be followed for filing of environmental examination/assessment reports by the proponents and their review and approval by the concerned environmental protection agencies.

b) Guidelines for the Preparation and Review of Environmental Reports

These guidelines are developed to facilitate both the proponents and decision makers to prepare reports (inclusive of all the information contained therein) and carry out their review so as to take informed decisions.

c) Other Relevant Laws

i) CDGL Solid Waste Management Bye - Laws, 2005

All powers were delegated under section 192 of the fifth schedule of Punjab Local Government Ordinance, 2001, to ZilaNazim on behalf of Zila Council to make and promulgate Solid Waste Management Bye-Laws, 2005. These laws explain the powers of City District Government Lahore, for the collection, transfer and disposal of solid waste from the public areas. These laws also define the penalties for violations concerning the solid waste pollution. According to the Bye -Laws, the City District Government concern may appoint adequate staff and adopt other measures for carrying out the effective implementation of these by laws. DOE Environment playing dual role. He exercises the powers of 1997 through DG EPA and PLGO through DCO.

iii) Canal and Drainage Act, 1873

This Act entails provisions for the prevention of pollution of natural or man-made water bodies

The Provincial Government may, by notification in the official gazette, prohibit the discharge of any effluent, including any solid or liquid matter or combination of them from industrial, municipal or any other source, into any river, canal and drainage work including any natural drainage channel.

In case of contravention of sub-section (1), the Divisional Canal Officer, after such enquiry including taking of sample, may impose such special drainage charges as may be prescribed and shall take other necessary steps to prevent such contravention and consequential cost so incurred shall also be recoverable from the person found responsible for such contravention.

After the publication of notification under sub-section (1), any person, organization or entity, interested in discharging such effluent into any river or drainage work, including

any natural drainage channel, shall apply to the Divisional Canal Officer or any other person authorized by the Provincial Government in this behalf, for grant of permission for the discharge of such effluent.

The applicant shall obtain a certificate of no adverse impact of such discharge on environment from the authority designated in this behalf under any law for the time being in force relating to environment.

iv) Labor Laws

Construction and operational activities during the course of construction could affect the occupational health of the workers. Quantitative national standards for occupational health are yet to be developed in Pakistan and employers are required to abide by the labor laws in respect of their own employees and also ensure that contractors to follow the relevant labor laws and rules relating to safety of workers. The proponents will ensure that the labor force engaged is not exposed to any danger by monitoring the contractors' work frequently. Labor Department Government of Punjab is the relevant department who cares for the implementation of labour laws.

v) Pakistan Penal Code, 1860

The Pakistan Penal Code 1860 deals with offences where public or private property or human lives are affected due to the intentional or accidental misconduct of an individual or body of people. In the context of the environment, the Penal Code empowers the local authorities to control noise, noxious emissions and disposal of effluents. The NEQS enforced by the EPA supersede the application of this legislation on industries and municipalities. The Penal Code, however, can provide a basis for the client to coordinate its activities with the local authorities to ensure that its construction activities do not become a cause of public nuisance or inconvenience.

vi) Factories Act, 1934

The clauses relevant to the proposed project are those that concern the health, safety and welfare of workers, disposal of solid waste and effluent and damage to public and private property. The Act also provides regulations for handling and disposing of toxic

and hazardous materials. Given that the construction activity is classified as 'industry, these regulations will be applicable to the project contractors. In addition to this, the following will also be consulted:

Employees' Cost of Living Relief and Allowances - Workers' Children (Education Law) Companies Profit (Workers' Participation) Law, Law of Essential Services, Industrial Relations Law, Workers' Welfare Law, Employees' Old Age Benefit Law , The Shop Act, The Law of Social Security, The Law of Payment of Wages and Minimum Wages, The Law of Industrial and Commercial Establishments

vii) Punjab Wildlife (protection, preservation, conservation and management Act 1974

This Act provides the protection, preservation, conservation and management of wildlife in the Province of the Punjab.

1. Wildlife Sanctuary

The wildlife sanctuary shall be set aside as undisturbed breeding ground for the protection of wildlife and access thereto for public shall, except in accordance with the rules, be prohibited and no exploitation of forest therein shall be allowed except for reducing fire hazards, epidemic or insect attacks or other natural calamities.

No person shall–

(i) Enter or reside,
(ii) Cultivate any land,
(iii) Damage or destroy any vegetation,
(IV) Hunt, kill or capture any wild animal or fire any gun or other firearm within one mile of the boundaries,
(v) Introduce any exotic species of animal or plant,
(vi) Introduce any domestic animal or allow it to stray,
(vii) Cause any fire, or
(viii) Pollute water in wild life sanctuary

2. Game Reserve

No hunting and shooting of a wild animal shall be allowed in the game reserve, except under a special permit, which may specify the maximum number of game animal that may be killed or captured, the area and duration for which such permit shall be valid.

The number of occasions on which hunting and shooting may be allowed shall not exceed two in a year.

3. National park

A national park shall be accessible to public for recreation, education and research subject to such restrictions as Government may impose.

Provision for access roads to and construction of rest houses, hostels and other buildings in the national park along with amenities for public may be so made and the forest therein shall be so managed and forest produce so obtained as not to impair the object of the establishment of the national park.

The following acts shall be prohibited in a national park

(i) Hunting, shooting, trapping, killing or capturing of any wild animal in a national park or within one-and-a-half-mile radius of its boundary;

(ii) Firing any firearm or doing any other act which may disturb any animal or bird or doing any act which interferes with the breeding places;

(iii) felling, tapping, burning or in any way damaging or destroying, taking, collecting or removing any plant or tree therefrom;

(iv) Clearing or breaking up any land for cultivation, mining or for any other purpose

(v) Polluting water flowing in and through the national park.

2.3 PUBLIC PARTICIPATION & CONSULTATION

Public consultation and participation are mandatory for IEE/EIA procedure. Sectoral guide lines issued by Pakistan environmental agency are required to be consultant during the process of public consultation. EIA/IEE regulations 2000 also give guide

Line for public participation of schedule II projects. An advertisement is published in to leading newspaper for comments of the public on proposed project. Duration of thirty days is fixed for public comments. Finally, a public hearing is conducted on any public place where each stakeholder is heard by the representative of Director General of EPA Punjab. Proper remedial measure/action is taken by EIA section on the reservation of stakeholders.

2.4 PUNJAB ENVIRONMENTAL QUALITY STANDARDS (PEQS)

2.4.1 Punjab Environmental quality standards for Ambient Air

EPA Punjab published environment quality standards for ambient air in the Punjab gazette notification no. SO(G)/EPD/7-26 -2013, dated 15-8-2016 for compliance of ambient air quality. Compliance of is the requirement of approval of IEE/EIA. Ministry of Environment notified these standards in 1993. EPA Punjab revised previous environment quality standards and established a set of municipal and liquid industrial effluent standards (Amended 2016). They furnish information on the permissible limits for discharges of municipal and industrial effluent parameters and industrial gaseous emissions in order to control environmental pollution. A copy of these standards is attached as (**Annexure-I (PEQS) All).**

Table- 2.1 Punjab Environmental Quality Standards for Municipal and Liquid Industrial Effluents (mg/l, Unless Otherwise Defined)

Sr. No.	Parameters	Into Inland Waters	Into Sewage Treatment[5]
1	Temperature or Temperature Increase	≤3°C	≤ 3°C
2	pH value (H^+).	6-9	6-9
3	Biochemical Oxygen Demand $(BOD)_5$ at 20°C[1]	80	250
4	Chemical Oxygen Demand (COD)[1]..	150	400
5	Total Suspended Solids (TSS)	200	400
6	Total Dissolved Solids(TDS)	3500	3500
7	Oil and Grease	10	10
8	Phenolic compounds(as phenol)	0.1	0.3
9	Chloride (as Cl^-)	1000	1000
10	Fluoride (as F^-)	10	10
11	Cyanide (as CN^-) total...	1.0	1.0
12	An-ionic detergents (as MBAS)[2]	20	20
13	Sulphate (SO_4^{2-})	600	1000
14	Ammonia (NH_3)	40	40
15	Pesticides	0.15	0.15
16	Cadmium[4]	0.1	0.1
17	Chromium (trivalent and hexavalent [4]...	1.0	1.0

Sr. No.	Parameters	Into Inland Waters	Into Sewage Treatment[5]
18	Cooper [4].....	1.0	1.0
19	Lead [4].....	0.5	0.5
20	Mercury [4].....	0.01	0.01
21	Selenium [4]	0.5	0.5
22	Nickel [4]....	1.0	1.0
23	Silver [4]	1.0	1.0
24	Total toxic metals....	2.0	2.0
25	Zinc....	5.0	5.0
26	Arsenic [4].....	1.0	1.0
27	Barium [4].....	1.5	1.5
28	Iron....	8.0	8.0
29	Manganese.....	1.5	1.5
30	Boron [4].....	6.0	6.0
31	Chlorine....	1.0	1.0

2.4.2 DRINKING WATER QUALITY STANDARDS

In pursuance of the statutory requirement of the Punjab Environment Protection Act amended 2012) the Punjab Environmental Protection Agency has notified drinking water quality standards 2016 notified in the Punjab Gazette. WHO drinking water quality guidelines have been used for bench marking purpose in the drinking water quality standards that are notified and given in **Table 2.2.**

Table- 2.2 Punjab Environmental Quality Standards Drinking Water

Sr. No.	Parameters	Standard values (mg/l)	WHO (mg/l)
1	Aluminum (Al)	≤ 0.2	0.2
2	Ammonium (NH3)	-	1.5
3	Antimony (Sb)	≤ 0.005	0.02
4	Arsenic (As)	≤ 0.05	0.01
5	Barium (Ba)	0.7	0.7
6	Boron (B)	0.3	0.3
7	Cadmium (Cd)	0.01	0.003
8	Chloride (Cl)	< 250	250
9	Chromium (Cr)	≤ 0.05	0.05
10	Copper (Cu)	2	2
11	Cyanide (CN)	≤ 0.05	0.07
12	Fluoride (F)	≤ 1.5	1.5
13	Iron (Fe)	-	0.3
14	Lead (Pb)	≤ 0.05	0.01
15	Manganese (Mn)	≤ 0.5	0.5
16	Mercury (Hg)	≤ 0.001	0.001
17	Molybdenum (Mo)	-	0.07
18	Nickel (Ni)	≤ 0.02	0.02

Sr. No.	Parameters	Standard values (mg/l)	WHO (mg/l)
19	Nitrate (NO_3)	≤ 50	50
20	Nitrite (NO_2)	≤ 3 (P)	3
21	Selenium (Se)	0.01(P)	0.01
22	Residual Chlorine	0.2-0.5 at consumer end 0.5-1.5 at source	-
23	Zinc (Zn)	5.0	3.0
24	Color	≤ 15 TCU	≤ 15 TCU
25	Taste	Non-Objectionable/ Acceptable	Non-Objectionable/ Acceptable
26	Odor	Non Objectionable/ Acceptable	Non Objectionable/ Acceptable
27	Turbidity	< 5 NTU	< 5 NTU
28	Total hardness	< 500 mg/l	-
29	TDS	< 1000	<1000
30	pH	6.5-8.5	6.5-8.5
31	Alpha emitters bq/l or pci	0.1	0.1
32	Beta Emitters	1	1

2.5 OCCUPATIONAL HEALTH

Construction and operational activities could affect the occupational health of the workers. Quantitative national standards with respect to the above aspect are yet to be developed in Pakistan. However, guidance in qualitative terms can be obtained from the Pakistan Factories Rules, 1962 (based on the Factories Act, 1934) and the Labor Laws (Amended) Ordinance, 1972.

2.6 TOXIC AND HAZARDOUS WASTE

Section 14 of the PEPA Act, 1997 amended (2012) prohibits the handling trade collection and storage of hazardous substances. Hazardous substances rules have been formulated in this regard but they are still on the status of draft and available on the website of EPD and Pak EPA. Protection of the environment with regards to toxic and hazardous waste is also covered by the Pakistan Penal Code (PPC), 1860. Environment Protection Department (EPD), Punjab, is mandated to monitor the transportation of hazardous materials within the provincial limits.

2.7 PRESERVATION OF CULTURAL HERITAGE

The Antiquities Act, 1975, administered by the Provincial Government, is aimed at safeguarding the preservation of cultural heritage, destruction, damage or defacement of antiquities is an offence under the Act. No archaeological site lies in project area.

2.8 ADMINISTRATIVE FRAMEWORK

2.8.1 M/S New sayyed Pharma

The implementing agency of the proposed project is New sayyed Pharma who will execute the proposed Project at 8 km Muridka- Sheikhupura road, district SKP. The management of NSP Pharma will ensure that all the proposed measures are effectively implemented at the design, construction and operational stages up to satisfaction of the act, rules and regulations.

2.8.2 Environmental Protection Agency, Punjab

Pakistan Environmental Protection Council is the apex inter-ministerial and multi-stakeholders decision-making body, which is headed by Prime Minister. While Pakistan Environmental Protection Agency is meant for the enforcement of environmental laws in Pakistan, they have delegated powers to provincial environmental protection agencies for review, approval and monitoring of environmental examination/ assessment projects. After 18th Amendment EPD has all powers to enforcement of PEPA 1997 amended 2012. As regards the proposed Project, EPA Punjab will be responsible for reviewing the report, issuing No Objection Certificate (NOC) and overall/broad based monitoring of the proposed Project activities.

Hazardous Substances Rules, 2003

These guidelines are developed to cope with the storage and disposal of hazardous substances. The proponent shall ensure to carry out EIA and list all the substances defined by the rules in the proper place. The basic instruction should be mentioned on the substances. The relevant portion of these guidelines will be followed.

Hospital Waste Management Rule, 2014

According to this rule all hospitals, clinics, laboratories, dispensaries, pharmacies, nursing homes, blood banks, autopsy centers, mortuaries, medical research institutes, and veterinary institutions are to strictly follow hospital waste management rules of 2014 for the environmentally-safe disposal of infectious and hazardous waste. Pakistan Environmental Protection Act, 1997 and Hospital Waste Management Rules, 2014, strictly prohibit unsafe disposal of all types of hospital/hazardous waste including hospital waste. Every hospital public or private shall responsible for the proper management of the waste generated by it till its final disposal in accordance with provision of this act and rule. Waste management plan shall be prepared by waste management officer for the approval by the hospital waste management team and shall be based on internationally recognized environmental standards for safe collection, transportation, storage and its final disposal. Radioactive shall be stored separately clearly marking with radioactive sign on bags. The landfill shall be located at site with minimal risk of pollution of ground water and rivers. Every hospital shall follow reuse, recycle waste to avoid its maximum waste generation with provision of this act and rules.

2.9 Punjab Environmental Quality Standards for Treatment of Liquid and disposal of Bio medical waste 2016.

EPA Punjab established a set of guidelines for treatment of liquid and disposal of bio medical waste notified in the Punjab Gazette. The following notification number. SO(G) /EPD/7-26 /2013, dated 15-08-2016 regarding the Punjab environmental Quality standards for treatment of liquid and disposal of bio medical waste by incineration, autoclaving, Microwaving and deep burial.

1. Air pollution control devices shall be installed or retrofitted with the incinerator to achieve the given standards.
2. Chlorinated plastics shall not be incinerated and the waste incinerated shall also not be chemically treated with any chlorinated disinfectant.
3. Only low Sulphur fuel such as light diesel oil, CNG or LPG shall be used as a fuel in the incinerator.
4. Combustion gas analyzers shall be used to measure CO2, CO and O2

5. A pit or trench shall be dug about 2 meter deep. It shall be half filled with waste and then covered with lime within 50 cm of lime before filling the rest of the pit wit soil.

2.10 Punjab Environmental quality standards (Motor Vehicles exhaust and noise) 2016

According to this rule a person shall not operate a motor vehicle from which air pollutants or noise are being emitted in an amount, concentration or level which is in excess of the Environmental quality standards or where applicable the standards established under clause (g) of subsection (1) of section 6 of the Act.

The authorized officer shall verify the compliance of the directions. The authorized officer may impound, with the help of local Police, the motor vehicle which is being operated in contravention of these rules after the days mentioned on the direction slip or even after the imposition of administrative penalty.

2.11 ENVIRONMENTAL GUIDELINES

Three sets of guidelines, the Pak-EPA's Environmental Guidelines, the World Bank Environmental Guidelines, and ADB Environmental Guidelines are reviewed here.

2.11.1 Environmental Protection Agency's Environmental Guidelines

The Federal EPA has prepared a set of guidelines for conducting environmental assessments. The guidelines derive from much of the existing work done by international donor agencies and NGOs. The package of regulations, of which the guidelines form a part, includes the PEPA 1997 amended 2012 and the PEQS. The guidelines themselves are listed below.

1. Guidelines for the Preparation and Review of Environmental Reports,
2. Guidelines for Public Consultation,
3. Guidelines for Sensitive and Critical Areas,
4. Sectoral Guidelines

It is stated in the Pakistan Environmental Protection Agency Review of IEE and EIA Regulations, 2000 that the EIA or IEE must be prepared to the extent practicable, in accordance with the Pakistan Environmental Protection Agency Environmental Guidelines.

World Bank Environmental Guidelines

1 The principal World Bank publications that contain environmental guidelines are listed below.
2 Pollution Prevention and Abatement Handbook 1998: Towards Cleaner Production, (WB/UNIDO/UNEP, 1999)
3 Environmental Assessment Sourcebook, Volume I: Policies, Procedures, and Cross-Sectoral Issues, (WB, 1991-a).

2.11.2 ADB Guidelines

The principle ADB guidelines relevant for this project are the Environmental Assessment Guidelines (ADB, 2003). The guidelines have two parts, the first providing an overview of the environmental assessment requirements and procedures, and the second, the technical guidelines. In addition, the guidelines include Rapid Environmental Assessment checklists for different sectors, and contents and formats for ElAs as well as lEEs.

Asian Development Bank also notified in 2006 performance and evaluation guidelines for public sector operations including hospitals which give a broad line guidance for a successful implementation a project like hospital.

CHAPTER-3
DESCRIPTION OF THE ENVIRONMENT

3.1 INTRODUCTION

This chapter describes the baseline conditions, which cover the existing physical, ecological, and socio-economic environment of the Study Area. Information on these aspects has been derived from the desk study of available data, field visits to the project area as well as information obtained through visits to the Government departments and other agencies namely Irrigation Department, Meteorological Department, EPD, Forest offices and prevailing environmental laws and environmental quality standards etc.

3.2 DESK STUDIES

Proposed project design data was collected from NSP Pharma. This data included the available documents, drawings, reports, etc. related to the proposed pharmaceutical unit. The experts conducted a detailed desk study of the above available data before the field visit. Salient features of the Project were thoroughly reviewed to assess the environmental implications. Performa for social and economic baseline condition was designed for field survey.

The documents which were consulted and departments visited are Irrigation Department, Archaeology department, Meteorological Department, EPD, and other related officials and literature on internet.

3.3 SITE VISITS

A team of experts of “Sustainable Environmental Solutions visited the proposed site of Pharmaceutical manufacturing unit and had discussion on the structure and process design flow of the project and options for disposal of the waste water.

The proposed project area is situated at 8 km main Muridke- Sheikhupura road and surrounded by industries and agriculture land use. Environmental data on physical, ecological and socioeconomic aspects were collected for carrying out environmental assessment. Secondary data were also collected from various sources mainly reports and literature. An introductory leaflet was prepared about the features of the proposed

project among the people of the area. After some days, social survey of the project area was carried out through a questionnaire under which people living around the proposed plant area were interviewed to have their views about the project installation and the perceived impacts on the natural environment around the proposed project. This included information on socioeconomic conditions, project information and its possible impacts. Photographs of the various environmental aspects both inside and outside the proposed project area were also taken and are given as Photo logs.

3.4 PHYSICAL ENVIRONMENT

3.4.1 Topography

The proposed project site comprises of 4 kanal and 11 Marla of land which is situated in Chak NO 27 UCC at main road 08 Km Muridke Sheikhupura road. The topography of the proposed Project Site is relatively flat as the area is located in plain terrain of Punjab. The existing site is surrounded by cultivated land and industries. Average elevation of the site is 205-216 m Above Mean Sea Level (AMSL).

P.P 3.1: Topography of the proposed site

3.4.2 Soils

The soil of the district Sheikhupura is of alluvial character of very recent origin formed by rivers and their changing courses and sand can be found a few feet below the surface. The course of the river Ravi within Sheikhupura area is winding and often subject to frequent alternations. In the rainy season, the currents are very strong. The geotechnical presence of the three distinct lithological units is revealed in this area. First one is Lean Clay (CL) present in a firm to stiff state up to a depth of 3.0 to 4.0 m below NSL. Second is Silty fine Sand (SM) and poorly graded Sand with Silt (SP-SM) present in medium dense to very dense state following the top layer and extending up to maximum investigation depth of 30 m. Third layer is Lean Clay/Sandy Lean Clay (CL) of thickness ranging from 1.0 to 9.0 m is present at depths ranges from 14.0 to 23.0 m. The groundwater table was observed at a depth 22 ft from existing ground level.

3.4.3 Seismology

Seismically, SKP lies in minor damage zone; distant earthquake can cause damage to structure with fundamental periods greater than 1.0 second, which corresponds to intensity V and VI of the M.M. scale. Earthquakes are generated due to tectonic processes in the upper part of the earth called lithosphere, which is divided into several rigid parts called “Plates”. Due to the movement of these plates, stress build up takes place and results in the deformation of the crustal mass in the form of folding and faulting. The energy produced due to movement along the faults is depicted in the form of earthquakes. The Project site is located north of the collision zone between the Indian and Eurasian plates. This contact represented by the Himalayas has always been generating moderate to large earthquakes including Kashmir (2005), Kangra(1905),Nepal-Behar (1934) and Assam (1897 and 1950) that caused huge damage to life and property. Any major to large earthquake along Himalayan frontal faults can cause appreciable ground motion at site.

The Punjab Plain, in which the Project is located, also shows low to moderate level of seismicity which is associated with the faulting in the Basement rocks covered by the alluvial deposits. A minor to moderate earthquake originated from the Basement rocks in Punjab Plain could also produce appreciable ground shaking due to thick alluvial

deposits. The project site lies in Zone 2A where ground acceleration of g/15 to g/20 is expected.

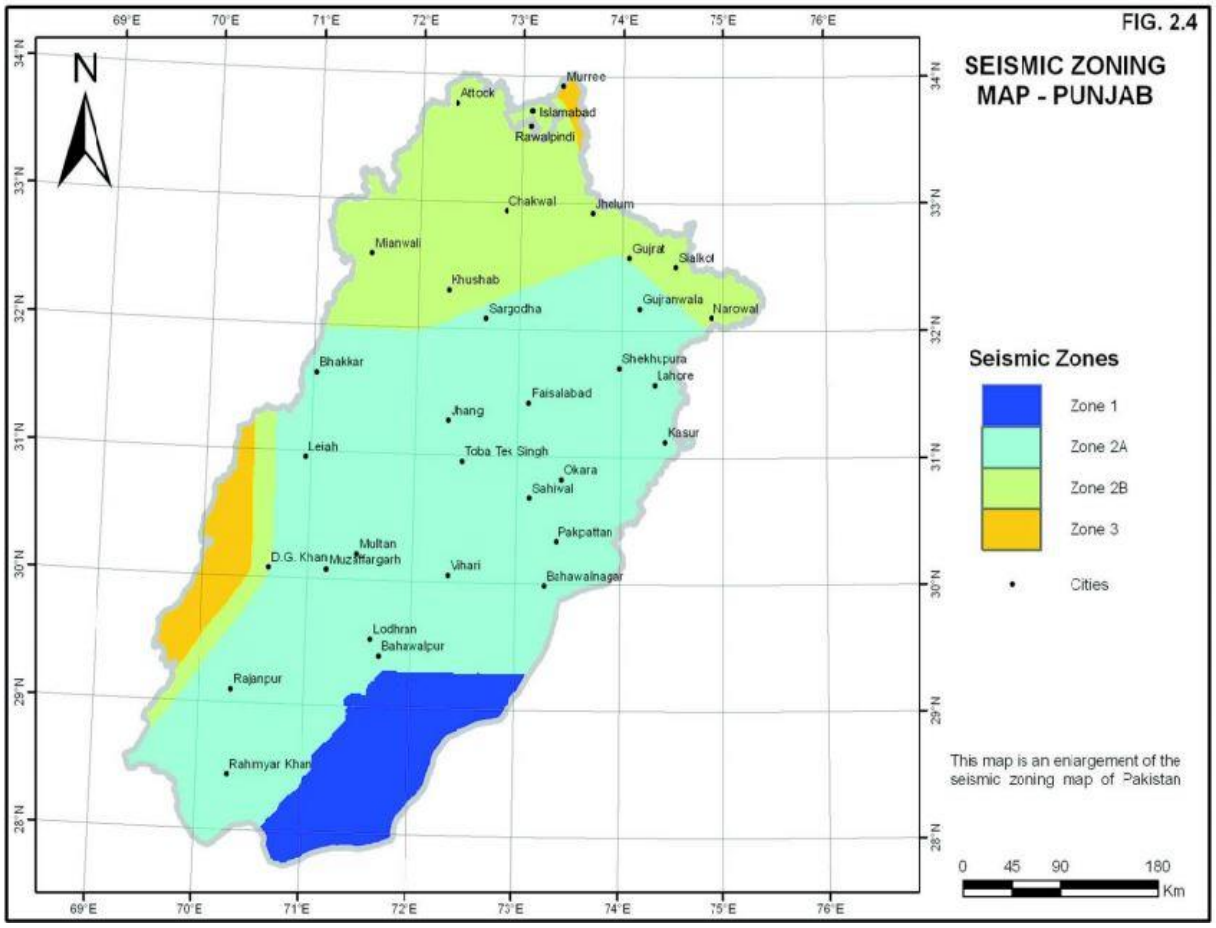


Exhibit 3.1: revised seismic Zones of Pakistan

According to Seismic Zoning Map of Pakistan included in the Pakistan Building Code Seismic Provisions (2007), Tehsil Raiwind falls in Zone 2A, therefore project structures should be designed in accordance with the requirement of seismic designing Zone 2A after giving due consideration to the foundation material about 0.08 to 0.15g.

3.4.4 Traffic

The project site is located on main Muridke Sheikhupura road which is busy area with respect to traffic. The area is rural cum industrial in nature. About 150 vehicles per hour passes from access road which includes trolley tractor, car, motorcycle, Rickshaw and Mazda, bus, trucks, vans and rickshaws.

P.P 3.2: view of access road, Muridka- SKP road

3.4.5 Meteorology and Climatology

The project area lies in the plain lands of central Punjab. Summers are quite hot with moderate humidity, whilst winters are of extreme cold. Mean winter temperature (December/January) ranges between 12.8°C and 14.2°C. Mean summer temperature remains around 31.2 to 38°C with frequent spells crossing 40°C. The mean of the maximum temperature ranges between 36-40°C and mean of the minimum ranges from 15 to 20°C. Spring and autumn seasons are the most pleasant parts of the year and full of colorful activities. The season is divided into a dry period called "rabi" extending from October to March and a wet one called "kharif' with substantial precipitation (approx. 50% of annual total) occurring in July and August. Long-term climate trend data was obtained from the MET office, located at the Jail road, in Lahore. The meteorological and climatic features of the project site are shown in **Table 3.1**

Lahore has a hot humid climate with rainy, long and extremely hot summers, dry and cold winters, a monsoon and dust storms. The weather of Lahore is extreme during the months of May, June and July, when the temperatures soar to 35–40 °C. From

late June till August, the monsoon seasons starts, with heavy rainfall throughout the province. The highest average temperature recorded in summer is recorded in June that is 36 °C while the lowest was recorded in September that is 31°C. Recorded-breaking highest temperature of 45°C was recorded on 27 May 2010.The lowest temperature recorded in Lahore is 5.9 °C (42.6 °F) recorded in month of January. The heaviest rainfall for Lahore also occurred in summer on 8 August 2010 when 163 millimeters (6.45 inches) of rain was recorded in 24 hour while the wettest month of summer is July as the highest average monthly rainfall is 202 (7.957 inches) millimeters.

Table-3.1 Meteorological and Climatic features of the project site

Climatic features of the project area	
Classification of climate	Tropical (hot / humid)
Predominant wind direction	Northeast / South
Wind intensity	Weak to moderate
Average annual precipitation	> 628.2 mm
Rainy season	July to August
Dry season	October to June
Average annual temperature	19.8-30.8°C
Average summer temperature	31-40 °C
Average winter temperature	5.9-6.8 °C

The Project Area has extreme climate: it has hot summer and cold winters. The summer starts from April and lasts till September. May, June, and July are the hottest months. The mean maximum and minimum temperature ranges from 40.4 °C and 27.3 °C respectively for these months. The winter seasons last from November to March. December, January and February are the coldest months. The mean maximum and mean minimum temperature ranges from 21.1°C to 4.2 °C in January. Few days earlier, temperature went down to 3 °C, ever minimum recorded in the history. Temperatures in the Project Area vary from 5 °C to 40 °C. The Project Area receives rains in all the seasons but monsoon rain is pronounced and constitutes a definite rainy season between the month of July and September. The average rainfall is about

628.2 millimeters per year. **Table-3.2** summarizes month-wise temperature, precipitation, and relative humidity. Based on climatic elements, five seasons are recognized in the Project Area:

Month	Mean Temperature		Precipitation (mm)
	Maximum	Minimum	
January	19.8	5.9	23
February	22	8.9	28.6
March	27.1	14	41.2
April	33.9	19.6	19.7
May	38.6	23.7	22.4
June	40.4	27.4	36.3
July	36.1	26.9	202.4
August	35	26.4	163.9
September	35	24.4	61.1
October	32.9	18.3	12.4
November	27.4	11.6	4.2
December	21.6	6.8	13.9
Annual	**30.8**	**17.8**	**628.2**

Table 3.2:
Average Monthly Temperature and Precipitation
Source: Meteorology Department Lahore

3.4.5.1 Pre-monsoon Season

Pre-monsoon refers to the period from April to June prior to the setting of the monsoon. This is the hottest and the driest season, with persistent dry and hot winds. Day time temperature rises to 40. °C or even higher. The flows in the river begin to rise simultaneously due to melting of snow in the high mountains. The water table falls to the maximum depth.

3.4.5.2 Monsoon Season

The climate of the district is subject to extreme variations. From the middle of December to the middle of March, the air is very damp, cold and light to moderate rain falls at intervals. The winter rain is followed by a spell of pleasant weather. In April, the temperature rises fast and the two successive months are very hot. Towards the end of June, Monsoon appears.

Monsoon is the main rainy period, which starts at the beginning of July, reaches its climax in August and gradually, subsides in September. High intensity Rainfall causes soil erosion which is a function of erosivity and erodibility. The cool monsoon winds followed by heavy showers lower the temperature to great extent. The part of rain percolates into the soil and is conserved in the subsoil and part ads to the groundwater. It is one of the major source of ground water recharge. The conserved moisture in the soils is generally sufficient to rejuvenate the vegetation. All plants grow rapidly and mature towards the end of the season. With the start of monsoon season, the rivers flow at their peak level. The groundwater level is improved toward the end of the season in September and October.

3.4.5.3 Post-monsoon Season

Post monsoon season refers to autumn (October-November). The temperature starts falling but the extreme aridity prevents plants to flower early and set seed toward mid-seasons. Groundwater level rises as a result of infiltration from rainfall.

3.4.5.4 Winter Season

Winter refers to the period from December to January. Western Disturbance influence the winter season. The average lowest January temperature in the season of winter is 5.9 °C (42.6°F). While the average highest temperature in winter was recorded in the month of December which is of 21.6 °C (70.9 °F). Heavy rains occur in winter which decreases the temperature further. Hailstorms also occur due to Western Disturbance. The highest monthly rainfall in winter occurs in February that is 28.6 millimeters. The plants become dormant and most of them dry out. Most of the trees shed their leaves and few remain green or partly green. Sometimes this season becomes severe due to

cold Siberian winds. Groundwater level declines in this season due to low flows in the rivers and no or little rains which usually fall in light showers causing little soil erosion.

3.4.5.5 Spring Season

Spring refers to the period from February to April, when temperatures become pleasant. The highest average temperature of 33.9 °C (93 °F) in spring season was recorded in April while the lowest is recorded in March that is 14 °C (57.2 °F). Rains are rare in the spring season. The highest average monthly rainfall was recorded in the month of March that is 41.2. Some light showers of rain may also fall without generating run off. The vegetation sprouts again because of conserved moisture from winter and spring rains, if any. The water table starts falling.

3.4.5.6 Rainfall

Towards end of June monsoon condition appears and during the following 2 and half months spell of season alternates with intervals of sultry weather. The winter rain falls during January, February and March ranging from 23 to 41.2 millimeters. Month wise mean precipitation recorded is given in **Table- 3.2**

3.4.6 Noise and Air Analysis

The air quality of the project area is influenced by the industrial activity in the area and and Line source of main Muridka- SKP road where hundreds of motor vehicles pass daily. Yet the air quality of the area is well within the PEQS limits. Noise from vehicles and other powered mechanical equipment is intermittent. There are no significant disturbances to the quiet rural setting. However, the construction from the proposed project will use mechanical equipment.

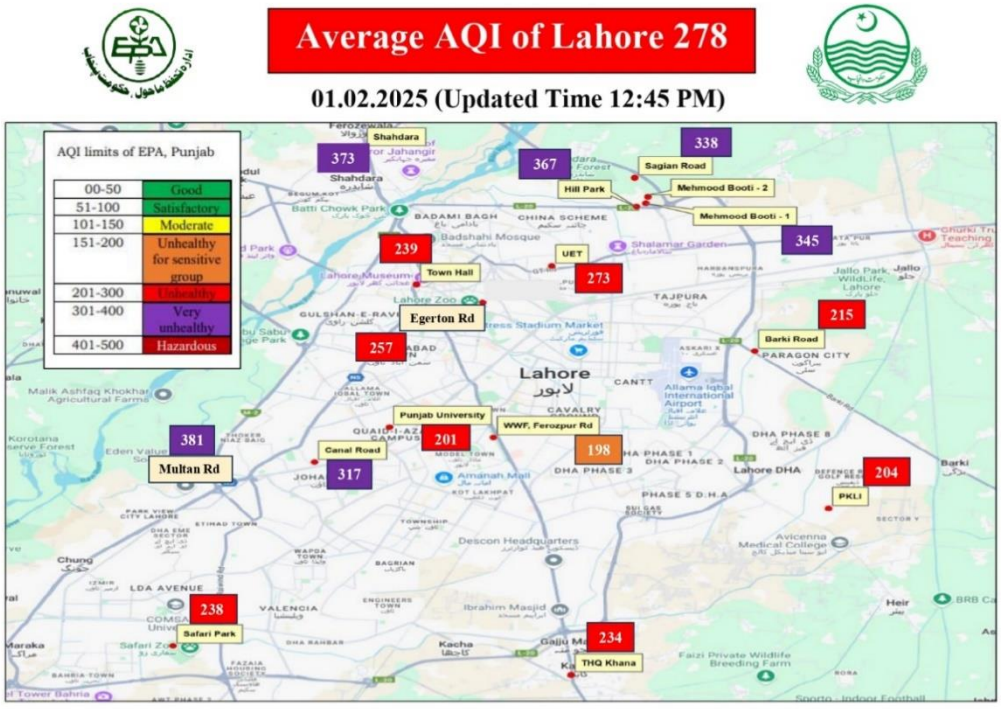
Pak Green Environmental Lab team has carried out noise level measurements at various locations within the premises. They analyzed Log equivalent values at site which were much below the PEQS limit prescribed by the EPA. Typical values were: average 63.6 dB A; high 67.0 dB A; and low 59.5 dB A. The noise level monitoring results are attached at **Annex-II.**

3.4.6.1 Air analysis

The air quality at project site is good in spite of some small sources of air pollution in the area. The conventional parameters of air quality indicators were measured

and found well within Punjab Environmental Quality standards for ambient air. This is due to hot and semiarid climatic conditions of the area which make the atmosphere highly favorable for dispersion of air pollutants emitted from main highway and other sources in the area.

There is traffic on this segment of highway having negligible impact on the air quality of the site due to dispersion effect. The nearest air quality monitoring station is near Nawaz Sharif Hospital, GT Road, Shahdara. Its air quality Index was recorded on Ist February, 2025 is 373 which is very unhealthy. The air quality Index of 15 sites across Lahore as recorded by EP & CCD monitoring stations is given below:



Note: Parameter used to Calculate AQI = ***Particulate Matter (PM2.5)***-PEQs value of PM2.5= **35 µg/m³**
All hourly values of AQI in Lahore are monitored by EPA Punjab- Air Quality Monitoring Stations

3.5 Biological Environment

3.5.1 Flora

In Sheikhupura the flora is similar to rest of the irrigated tracts at central Punjab. In general, the vegetation found in this part of the arid region is sparse. Only plants with xerophytes adaptations such as deep roots, rod like thick or fleshy stems, leaves either absent or reduced are able to survive in this extremely dry

climate. Distinctly scattered trees of stunted growth are found along the depressions technically known as desert scrub.



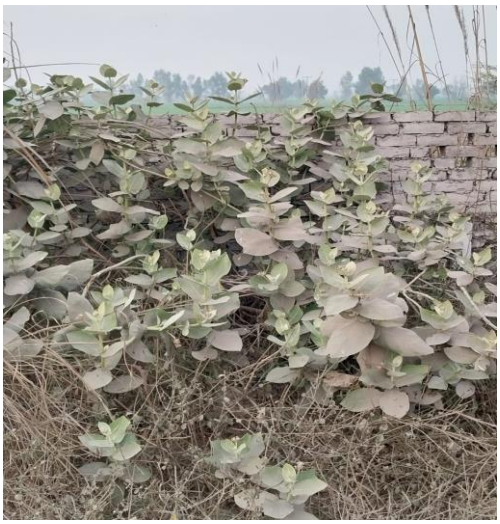



Table No 4.5: Vegetation of the project area

Sr. No.	Botanical Name	English Name	Local Name
1.	*Acacia nilotica*	Gum acacia	Baber
2.	*Albiaaiz procera*	Indian walnut	Achosirhan
3.	*Azadirachta indica*	Ash-leaved bead tree	Nim
4.	*Cassia fistula*	Pudding pipe tree	Amaltas
5.	*Conocarpus lancefoleus*	Ethiopian teak	Kono
6.	*Dalbergia sisso*	Shisham	Talee
7.	*Eucalyptus camaldulensis*	Red-gum	Sufada
8.	*Ficus bengalensis*	Ficus	Bur
9.	*Pithecellobium dulce*	Jangle pithecolobium	Jungle Jalebee
10.	*Salmalia malabarica*	Silk cotton tree	Simal
11.	*Sesbania aegyptica*	Egyptian sesbania	Manjathri
12.	*Terminalia arjuna*	Terminalia	Aarjan
13.	*Thespesia populnea*	Tulip tree	Pyrus peepal

Source: Punjab Forest Department (2010)

3.5.2 Fauna

The unblemished geographical feature of vast arid land; provides an ideal

opportunity for variety of wildlife. Other animals found are pig, wolf, jackal, fox, squirrel, rats.

3.5.2.1 Important Fauna at Study Area

The area is very important of resident and migratory bird species. More than 100 species of have been recorded from the area. Table.4.6. lists the important birds of the study area:

Table No. 4.6: Important Birds of study area

Sr. No.	English Name	Scientific Name	Local Name
1.	Great Bustard	*Ardeotis nigricps*	Barri Tiloor, Hukria
2.	Houbara/Macqueen's Bustard	*Chlamydotis Macqueeni*	Tiloor, Houbaia
3.	Common/ Blue Peafowl	*Paro cristatus*	Neela More, Mor
4.	Black Francolin/ Partridge	*Francolinus*	Kala Titer, Karo Titar
5.	Grey Francolin/ Partridge	*Francolinus Pondicerianus*	Bhura Titer, Achho Tittar
6.	Yellow Legged Green Pigeon	*Treron phocnicoptera*	Harrial Kabutar
7.	Red Turtle Dove	*Streptopclia Tranquebarica*	Surkh Fakhta
8.	Dalmatian Pelican	*Pelecanus crispus*	Hawasal, pain Pakhhi
9.	Lesser Flamingo	*Phoenicopterus minor*	Lum Dheeng/Laakho Jani
10	Oriental Darter/Anhinga/Snake bird	*Anhinga melanogaster*	Jall Kawwa
1.1	White Stork	*Ciconia*	Safaid Laqlaq/Achhhi Toor
12.	Greater Painted Snipe	*Rostratula Benghalensis*	Rangeen Isnif
13.	Sociable Lapwing	*Vanellus gregarious*	Tattihri, Sehkari teeto
14.	Pheasant tailed Jacana	*Hydrophasianus*	Peehoo, Peehoorri

Source: Punjab Wildlife Department (2010).

Fig No 4.7: Important Birds in this area

3.5.3 Agricultural Habitats

Most parts of the study area are under very intensive irrigated cultivation. In addition, livestock rearing is also practiced extensively, and milk animals are common. The use of the chemical fertilizers and pesticides is very common. Several species of wildlife have adapted to the changed habitat. These include: Jackal; Jungle Cat, Bengal Fox, Small Indian Mongoose, Shrew, Rodent pests including Porcupine, Fruit Bats and Wild Boar. The avifauna which survived the modified habitat include Doves, Black Partridge, Cuckoos, Koel, Woodpeckers, Parakeets, Bulbuls, Babblers, Black Drongo, Bee-eaters, Finches and House Sparrow. The reptilian species of this modified habitat include Krait, Cobra, Saw-scaled Viper, Rat Snake and Monitor Lizard. In these modified habitats, the winter bird species from Himalayas have reduced due to the extensive use of pesticides in these areas, since these species feed on the insects. These birds play an important role in controlling insects particularly in the forests. Almost all of the project interventions will be undertaken in this habitat type. (Agriculture Department Government of Punjab (2011) (Environmental and

Social Assessment Report of Punjab Irrigated-Agriculture Productivity Improvement Project.)

During both the seasons i.e. kharif and winter variety of crops are grown in the study area. The crops grown are wheat, cotton, maize, rice, sugarcane, sorghum, sunflower, rapeseed, ground nut, guwar, variety of vegetables and other food, fodder, oilseed, and other crops.

Among fruit crops the pre-dominant species are mango, variety of citrus and several other fruits.

3.5.4 Forests and Vegetation

The forest resources of the study area included riverine bela forests, irrigated plantations, linear plantations and range lands. The Riverine forests are located along the rivers within the embankments and are managed by the Punjab Forest Department. Irrigated plantations are located within the irrigated zone and get water from irrigation network. Linear plantations are the trees planted along the irrigation network, roads, railway strips and rangelands are located in the rain-fed areas of the study area. On farmlands lot of trees of different varieties were found grown in the study area. Mango and Citrus gardens on the farmlands were very common in almost all tehsils of Kasur district but except in the pockets where the quality of lands was either waterlogged or soils were saline.

Major trees grown in all types of forest resources are Shisham, Eucalyptus, Simal, Babul and other species.

The types of forests are as under:

- Tropical Thorn Forests Indus Floodplains
- Tropical Thorn Forests (Sandy)
- Irrigated Forest Plantations on farmlands and Tropical Thorn Forests
- Rivers, Wetlands, and Waterlogged Areas throughout the study area
- Farmlands/Agricultural Areas Throughout the study area
- Smart Forest and Guzara forest are about 20 Km from the site.

Sheikhupura District in Pakistan features significant forest areas, notably the pioneering **Rakh Jhok Forest**, Punjab's first "Smart Forest," located near the Ravi River and planned for massive afforestation. Key forest and green spaces also include

the historic **Hiran Minar** complex, serving as a recreational spot with eco-tourism initiatives, and various nurseries and linear plantations along highways and canals managed by different departments like forest and wild life.

The **Shahdara Reserve Forest** is a significant forest area located near the border of the Lahore and Sheikhupura districts in Pakistan. While it is often associated with Lahore (its address is in Lahore, and it falls under the Lahore Forest Division), its proximity means it is a major forest for the Sheikhupura region.

3.5.5 Livestock

After agriculture the second important source of economy is the livestock. Almost all households are involved in livestock rearing on their agriculture farms and in houses. The main species of livestock are Buffalo, Cow, Bullock, Goat, Sheep, Camel, donkey and other animals. Poultry farming is another source of earning of the people of the study area. People use this resource for variety of uses such as milk, meat, hides, cultivation, draught, and several other uses.

Fig No 4.9: Livestock in this area

3.5.6 Wildlife

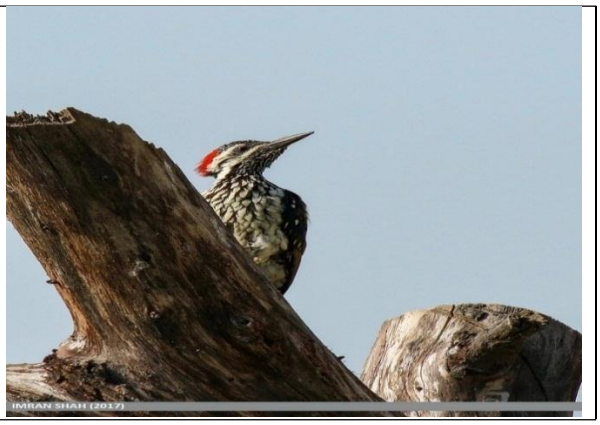
The existing natural habitat of the province is largely modified habitat owing to human interventions. Construction of an extensive irrigation network during early 20th century paved the way for transformation of the tropical thorn forest into agricultural lands. This has led to changed landscape and loss of wildlife. Nine habitat types have been identified in the province, of which, deserts, sub-tropical deciduous and wetlands are of concern with regard to threat to wildlife. The major habitats along with their geographical areas have been discussed in this report.

The areas located in the Sheikhupura districts are semi -arid areas. Agricultural and irrigated is the main habitat type in the area which is an important hotspot where the natural, bio- physical and social environment and natural resources

are different from the irrigated areas of the package area and rest of the irrigated areas. The wild life has been restricted in fields like sugarcane and riverine banks of river and canals. Some of the wild life jackal, fox, carpenpine, hedgehog, snakes, lizards, mangoos, squirrel.

3.5.7 Environmental/Biological Hotspots

The environmental hotspots in the study area are essentially the wildlife protected sites, flora, fauna vegetation, rangelands and others. They are considered as biodiversity hotspots due to the availability of diverse habitats and relatively low anthropological disturbance.



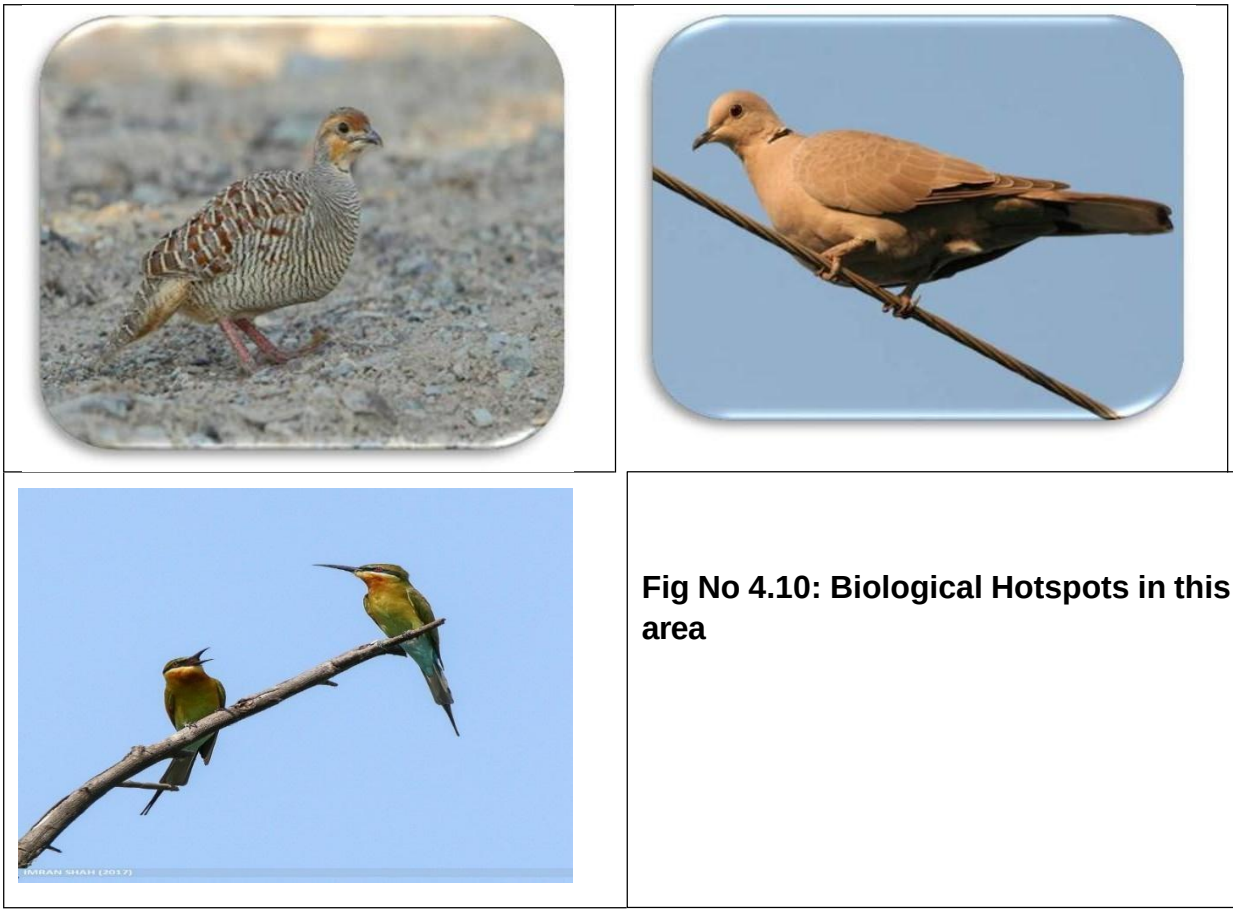


Fig No 4.10: Biological Hotspots in this area

3.5.8 Mammals in Study Area

A variety of mammals are found in the study area that include Hog deer, Chinkara, Desert Cat, Fishing Cat, Caracal, Smooth coated Ottor, Wild boar, Desert hare, Foxes, Jackal and Feral wild ass. **Table-4.7** lists the important mammals in Sindh and the study area:

Table 4.7: List of Mammals in Study Area

Sr. No.	English Name	Scientific Name	Local Name
1.	Ibex / Persian Wild Goat	*Capra aegagrus Blythi*	Sarah, Pahari Bakra
2.	Afghan Urial / Asian Wild Sheep	*Ovis vignei blanfordi*	Gad, Pahari Dumba
3.	Indian Desert Gazelle / Chinkara	*Gazella bennettii*	Chinkara, Hiran
4.	Black Buck / Indian Savana Antilope	*Antilope cerricapra*	Kala Hiran

6.	Blue Bull / Nilgai	*Boselaplus Tragocamelus*	Neel Gai, Rojh
7.	Indian Wild Ass / Gorkhar / Onagar	*Equus hemionus*	Khur Jungli Gadha, GorkharKhuchhar
8.	Striped Hyaena		Hyaena
9.	Indian Desert Wolf	*Cains lupus pallipus*	Bherria, Bagharr
10.	Indian Desert Fox	*Vulpes vulpes Pusillus*	Lomrri, Lomarr
11.	Caracal / Red Lynx	*Felis caracal*	Siah Gosh, Harola
12.	Jungle Cat / Swamp Cat	*Felis chaus*	Jungli Billi
14.	Small Indian Civet	*Viverricula indica*	Mushk Billi, Rasse
15.	Honey Badger / Ratel	*Mellivora capensis*	Bijju, Gor Pat
16.	Scaly Anteater / Pangolin	*Manis crassicandata*	Chiunti Khor, Chhalerano
18.	Smooth Coated Otter	*Lutrogale Perspicillata*	Udh Bilao, Luddharr
19.	Flying Fox / Fulvous Fruit Bat	*Rousettus leschenaultia*	Urra Lomrri, Meva Khore Chimgadar
21.	Mouse-like Hamster	*Calomyscus hotsoni Hamster*	Chooha

Source: Punjab Wildlife Department, 2010

Buffalo, goat, sheep, camel, donkey, bull, horse, hen, peacock, deer, dog and cat are the common animals reared as domestic and livestock animals which are source of income for the people of the area.

Table 4.8: Important Reptiles and Amphibians of Punjab

Sr. No.	English Name	Scientific Name	Local Name
1.	Indian Ocean Green Turtle	*Chelonia mydas*	Samundri Subz Katchhwa
2.	Pacific Olive Ridley Turtle	*Lepidochelys olivacea*	Sumundri Zaituni Katchhwa
3.	Spotted Pond Turtle	*Geoclemys hamiltoni*	Talabi Katchhwa
4.	Indian saw back River Turtle	*Kachuga tecta*	Daryai Katchhwa
5.	Starred Tortoise	*Geochelone elegans*	Sitara Katchhwa

6.	Marsh/Snub-Nosed Crocodile	*Crocodylus palustris*	Magar Much, Mugger, Wagu
7.	Yellow/Striped Monitor – Lizard	*Varanus flavescens*	Goh, Dhari Dar Goh
8.	Fat-Tailed/Leopard Gecko	*Eubleparis macularius*	Hann Khann, Cheetah Chhupkali
9.	Banded Dwarf Gecko	*Tropiocolotes helenac*	Dhari Dar Chhoti Chhupkali
10.	Sindh Broad Tailed	*Gecko teratolepis Fasciata*	Sindh Moti Dum Chhupkali
11.	Orange Tailed Sand Skink	*Eumeces schncideri*	Narangi Dum Regmahi, Makh Chatti
12.	Indian Sand Swimmer	*Ophiomorus Tridactgylus*	Regmahi, Makh Chatti
13.	Indian Spiny Tailed Lizard	*Uromastix hardwicki*	Sandha, Sandho
14.	Indian Chameleon	*Chamaeleo zeylanicus*	Rung Badal Girgit
15.	Indian Rock Python	*Molurus*	Azdaha, Arrarh Blah
16.	Russelle Sand Boa	*Eryx conicus*	Russelle Ki Do Muhi
17.	Oxus/Black Cobra	*Naja oxiana*	Kala Naag, Cobra
18.	Indian Common Krait	*Bungarus caeruleus*	Sang Choor, Peeun Blah
19.	Russelle's Viper	*Vipera russelii*	Ghorriala, Dumbhar Blah
20.	Red Spotted Diadem Snake	*Sphalcrosoplis Arenarius*	Shahi Naag, Korarr
21.	Pakistan Ribbon/Sand Snake	*Psammophis leithi*	Regis Amp, Shehgi
22.	Glossy Bellied Racer	*Coluber Ventromaculatus*	Paharri Samp, Par Blah
23.	Common Rat Snake/Dhaman	*Ptyas mucosus*	Dhamman, Kua Mar
24.	Sindh River Snake	*Enhydris pakistanicus*	Daryai Samp
25.	Beaked Sea Snake	*Enhydrina schistosus*	Chonch Dar Samundari Samp

26.	Annulated Sea Snake	*Hydrophis cyanocinctus*	Dhari Dar, Samundari Samp
27.	Slender Blind Snake	*Typhlops porrects*	Andha Samp, Sampolia
28.	Tiger Bull Frog	*Rana tigerina*	Maindak Dedhar
29.	Indus Toad	*Bafo andersori*	Khushki Ka Maindak

3.6 Socio-Economic Environment of Study Area

3.6.1 Population and Demographic Features of Study Areas:

Demographic Features of study areas as per the demographic indicators of the Tehsils are presented below. As of the 2023 census, Sheikhupura district has 593,260 households and a population of 4,049,418. The district has a sex ratio of 105.58 males to 100 females and a literacy rate of 68.88%: 72.09% for males and 65.46% for females. 1,087,191 (26.85% of the surveyed population) are under 10 years of age. 1,550,793 (38.30%) live in urban areas.

3.6.2 Poverty

Due to small land holdings and self-cultivation is majority of areas of the project, the people are well to do due to earnings from agriculture. The quality of most lands is good where variety of agriculture in the form of crops and orchards are practiced. There are small to medium industries in the project area and also there are sugar mills and other industries providing sources of earnings. The farmers also grow variety of fruit trees on their lands. Farmers are also very hard working in every aspect of earnings. All these factors described above are indicators of rate of poverty. It was revealed during the stakeholder consultations and discussions with the communities that people living below the poverty line range between 20-30%. This is a better indicator compared to some parts of Punjab and the most parts of the country. *(Estimates given by stakeholders during consultations).*

3.6.3 Infrastructure and social services

The study areas are well connected through road, rail and other infrastructure. There are motorways, highways, provincial and district roads, village roads and farm to market roads. The consultants did not observe any difficulty with respect to road infrastructure, their quality and connectivity. Like-wise when asked direct

questions about also did not express any difficulty in infrastructure and social services. This was also felt by the EIA team also. When asked direct questions about also infrastructure and social services the villagers did not express any difficulty in infrastructure and social services.

3.6.4 Education

Education is an important aspect of social service. During travelling and communicating with the communities during stakeholder consultations, visiting the private and government educational institutions (primary and secondary schools) and observing while passing it was seen that the level, quality of education and cleanliness was above average than other parts of the country.

When asking direct questions about education the stakeholders were satisfied with education system and opportunities for educational institutions and overall quality of education in the study area.

	
Government associate college, high school Foundation school in project area.	

3.6.5 Health

There are adequate health facilities in the study area right from tehsils headquarters to villages. The communities did not have any complain on this social aspect. This was also observed during the community consultations.

3.6.6 Livelihood sources

Agriculture and livestock are the dominant sources of livelihood for the people. People also have many opportunities of earnings from labor work in industries other works, shop keeping, road and building construction etc. etc. The people also did not have any complain on the un-employment aspect in government and private agencies. Majority of land holdings are small to medium resulting in self-sufficiency in earning their livelihood. Some big landlords located in the study area were having large landholdings.

3.7 Quality of life values

Quality of life values of the areas are good enough. The area is basically agriculture in nature which is changing rapidly into industrial one which is providing more job opportunities for the locals to improve their life style. Good educational institutes and adequate health facilities are available in the area. General Trunk (GT) Road passing by the area which helps people connecting with Lahore, Islamabad and Karachi and to transport their goods to the market to earn handsome money. Industrial hub in Muridke also helps to boost the economy of the people. It is the world's best rice growing area.

The quality-of-life value of the project area will be improved by implementation of the project through following ways:

By providing job opportunities at local level which will enable the people to invest on education and health. The enhancement in income will make people able to use their income to use to improve their quality of life.

3.8 Cultural Heritage in Study Area

This chapter of report provides the baseline of important archeological and heritage sites. A large number of sites exist in the province having archeological, historical, cultural, and religious significance, and the ones that have been officially notified and protected under the Antiquity Act, 1975. The data/information has been collected from primary and secondary data sources and surveys in the study area conducted prior to preparation of this report.

Sheikhupura has a rich cultural heritage that includes forts, tombs, and other historic sites.

Sheikhupura Fort: Built in 1607 during the reign of Emperor Jahangir, this fort was altered during the Sikh era. The fort was later given to Maharani Datar Kaur, the wife of Maharaja Ranjit Singh, who lived there until her death.

- Mughal emperor Jahangir's fort: Located in the Centre of the town, this fort was completed in 1619.

Tombs

	
Tomb waris shah	Hiran minar

- Hiran Minar Tomb: A popular attraction in Sheikhupura, the Hiran Minar is a massive tower that overlooks the countryside.

Other historic sites

- Sangla hill: An important town in the Sheikhupura District, Sangla hill is said to be the site where the founder of Sikhism, Gurunanak, preached and helped the needy.
- Jamia Masjid Muhajarin: A popular attraction in Sheikhupura.
- Ali Masjid: A popular attraction in Sheikhupura.

Sensitive Habitat

No sensitive habitat has been seen or reported by any authority in or around the proposed site.

3.9 WATER RESOURCES

3.9.1 Rivers

The project area located near river Ravi. It is located 20 Km away from the river flows in the west of Lahore, which act as the major recharge source of the subsoil water. Ground water is used as source of water for domestic and agriculture purpose. Therefore, there is no usage of river water in this project.

3.9.2 Canals

The important canal is UCC canal which transfers water from river Chenab to river Ravi. The project area is irrigated through this canal distribution system. No water will be drawn from canal for proposed project.

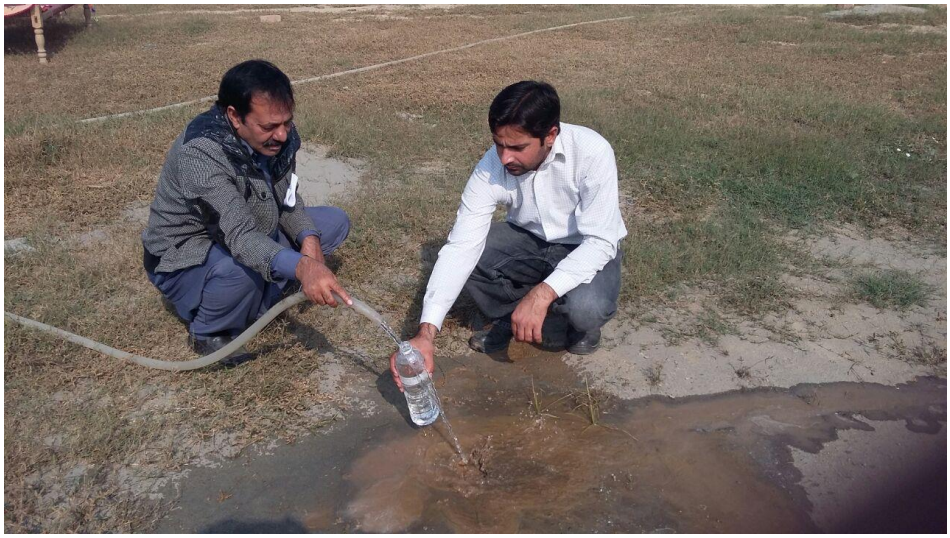
PP 3.8: View of UCC canal

3.9.3 Drains

Choti drain passes from this site. It comes from India and collects waste water of all urban centers and industries of Tehsil Kamoki and Muridka. It passes by the project site.

3.9.4 Groundwater

The water requirement during operation phase of the project will be minimum. Water will be used for syrup manufacturing and washing purpose. Which will be drawn from sub soil. The project area is underlain by unconsolidated alluvial deposits laid by river Ravi. Fine to medium sands from aquifer material and fine sediments (clay, silt) occur as discontinuous layers/lenses. The aquifer is fairly thick and may be considered continuous on regional basis. Groundwater table generally occurs at the site from 10-20meter below the existing surface. Keeping in view the general hydro-geological set up of the regional aquifer



PP 3.9: Sampling of existing underground water in the area.

The quality of ground water is good and is being used in the irrigation. Pakistan Council of Research on Water Resources (PCRWR) ministry of Science, Islamabad conducted survey of the drinking water in district Lahore. The report shows 260 water samples from 20% villages of all the union councils were collected and analyzed. The analytical data demonstrated that 34% water samples were contaminated with Total Coliforms, 5% with Nitrate (NO3), 7% with Arsenic and 37% samples had high level of TDS when compared with PSQCA water quality standards. Overall analytical results picture showed that 69% water samples were found unsafe and only 31% samples were evaluated as safe for drinking purpose in rural areas of district Lahore.

There is one motor pump operating in the proposed site at the depth of 170 feet. Sample of the bore hole was collected and got analyzed from environment certified lab Pak Green Lab. The analysis showed that the water is of good quality. The chemical analysis of the groundwater is given in **Table 3.5 and attached at Annex- VI.**

Table 3.5 Analysis of Groundwater Samples

Sr. No	Parameter	Value
1	Colour	Colorless
2	Taste	Normal
3	pH	8.00
4	Chloride	235 mg/l

Sr. No	Parameter	Value
5	Total Dissolved Solids (TDS)	921mg/l
6	Total Hardness	70 mg/l
7.	Arsenic	BDL
8	Nitrate	1.846
9	Fluoride	1.5
10	Residual chlorine	0.04
11	Sodium	505
12	Potassium	9.84

3.10 Noise Levels

The major source of noise at the project Site is the vehicular traffic on the highway leading Sheikhupura from Muridke. The log equivalent of noise in the center of site was measured 54.8 dB (A). The noise at access road was measured 60.4 dB (A). When any motor vehicle presses horn the noise level goes up to 65 dB(A) which is not routine at this sight. Results of noise level monitoring data at the project site are presented in (**Annex- VII).**

3.11 Air Quality

The project area is agricultural and industrial in nature with thinly centered population in shape of villages. Air quality contaminating stationary source were observed near the site i.e. Kansai paints, Abdullah flour mill and Sunder Industrial state. There are three Pharmaceutical units, which are present 1 km away from site and have no impact on the site. The motor vehicles which pass from here are cars, motorcycle, truck, tractor, Qinchi, and loader vans. The quality monitored at site shows the levels of SO2, NO2 and CO within ambient air quality standards. No significant impact of line source has been measured and site comes under the category of clean as prescribed criteria in NEQS of SRO 2000. Table-3.8 describes the average ambient air quality in the project area. The results of environmental laboratory at attached at **Annex- VIII Air quality parameters.**

Table-3.6 Air quality Monitoring Data at Project Site

	CO (mg/m^3)	NO_2 ($\mu g/m^3$)	SO_2 ($\mu g/m^3$)	NO (ppb)	PM_{10} ($\mu g/m^3$)	PM2.5 (ug/m3)
	1.9	31.85	31.85	12.14	167.5	64.2
NEQS for Ambient air	5	80	120	40	150	35

1. **For daily average**

P.P 3.11: Ambient Air monitoring at site

CHAPTER- 4
PROJECT DESCRIPTION

4.1 Introduction:

The demand for Pharmaceuticals is fueled by a high population growth rate (2.00%), rising life expectancy and consequent rise in older age group. At the same time, Pakistan has >50% of its population that lies below the age of 19 years. Infant mortality is high, at 74.4 per 1000 live births, as is maternal mortality. These factors along with increasing urbanization, increasing number of doctors and private investment in new hospitals and clinics will keep Pakistan a growing market for Pharmaceutical products. The average growth rate of this market has been an impressive 13% over the last 3 years. Therefore, M/S New Syed Pharma has also planned to establish pharmaceutical manufacturing unit in Chak No. 27 UCC at main road 08 Km Muridke Sheikhupura road. it will minimize the burden of pharmaceutical products import in the country while saving. It is a healthcare project.

4.2 Components of proposed project:

1. Oral Liquid Syrup for cough
2. Syrups Tonics, vitamins, anti inflamatery
3. Herbal joshanda
4. Phhakki

Design Parameters:

Sr. No	Particular	Description
1	Project site location	08 km Muridka- SKP Road, Tehsil Muridka, District Sheikhupura.
2	Project Proponent	**New Syed Pharma**
8	Road Accessibility:	Muridka – Sheikhupura road
9	Nearest Town:	Muridka
10	Land available:	4 kanal- 11 marla

11	Building lay out	Double storey concrete structure approved by TMA
12	5. Water Requirement for project process. 6. Water requirement for utility purpose	15000 litre or 1.50 m3/day
13	Pharmaceutical products	7. Oral liquid syrup 8. Anti-inflammatory , tonic, cough , body and brain tonic, joshanda, phakee, tablet herbal,
14	Raw material	Active Pharmaceutical Ingredients (API) 9. Oral liquid syrup, 10. IVY leaf extract, 11. Thymol(fennel),extract, 12. Ephedra vulgaris extract, 13. Iron Bisglycinate extract, 14. Vitamin C, D3, E, B1, B2. B6, B12, 15. Capsule (food supplement) 16. Coral calcium 17. Vitamin C, D3, E, B1, B2. B6, B12 18. Iron Bisglycinate extract 19. Orange flavor, sweetener (poly sucralose) 20. Tablets (Anti-inflammatory ,Analgesic and multi vitamins)
15	Capacity	Oral liquid syrup =10000 liter per day
16	Air quality Control	HVAC system along with air purification system consisting of aluminum filter, bag filter and HEPA filter
17	Man power requirement: 21. Construction phase 22. Operation phase	10-15 workers 10 workers
18	Completion time	Approximate 3-5 month
19	Project Cost	200 million PKR

The proposed pharmaceutical unit will have production capacity of 10000 litre syrup bottles oral liquid syrup, 300-400 packets of sachets, tablets (Anti-allergic and tonics). Water requirement for this proposed project is small. The water will be used for production of syrup and washing purpose. About 15000 litre water will be required in syrup manufacturing process. Small quantity of waste water will be generated from washing process activities. About 10-15 man power will be required during construction phase and for operation phase 10 person will be required for operation of this proposed pharmaceutical unit. The proposed project will have modern air cleaning system (Heating Ventilation and Air Conditioning system) and for control of dust and vapors during operation phase. Further before emitting air into environment, it will be passed through two stage aluminum filter and HEPA filter with collection efficiency of 99.9% for fine dust and vapours removal. The layout of proposed project is attached at **Annexure-.**

4.2.1 Oral Liquid Syrup:

Oral liquid are homogeneous liquid preparations usually contain a solution an emulsion or a suspension of one or more active ingredients in a suitable liquid base. They may also contain suitable sweeting agents, flavouring agents and anti-microbial substances for preservation. During manufacturing, packing storage and distribution process of oral liquid microbial quality will be maintained and microbial count will be within acceptance criteria. There are different types of oral liquid.

1. Syrup
2. Oral suspension
3. Oral solution
4. Oral drop
5. Oral Emulsion
6. Mixture
7. Linctus **(** citric acid monohydrate)

The manufacturing process flow diagram is given below.

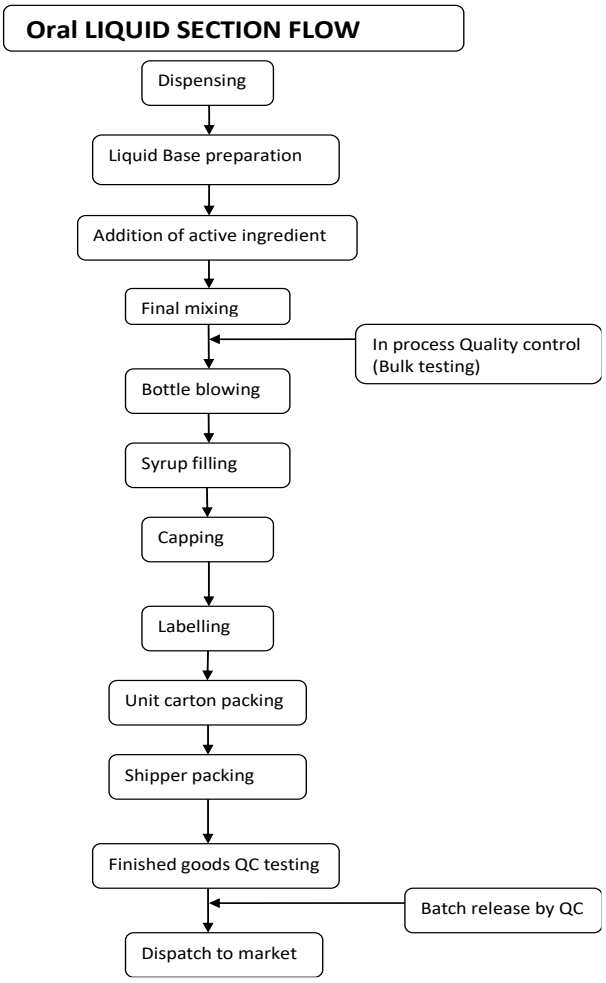


Fig 4.1: process flow chart of oral liquid syrup

4.2.2 Tablet, and Sachet:

The production capacity of tablets, Capsule and sachet of proposed pharmaceutical unit will be 1000 packets daily. Tablet manufacturing consist of following process:

1. Mixing
2. Grinding
3. Compression
4. Coating
5. Blistering
6. Packing

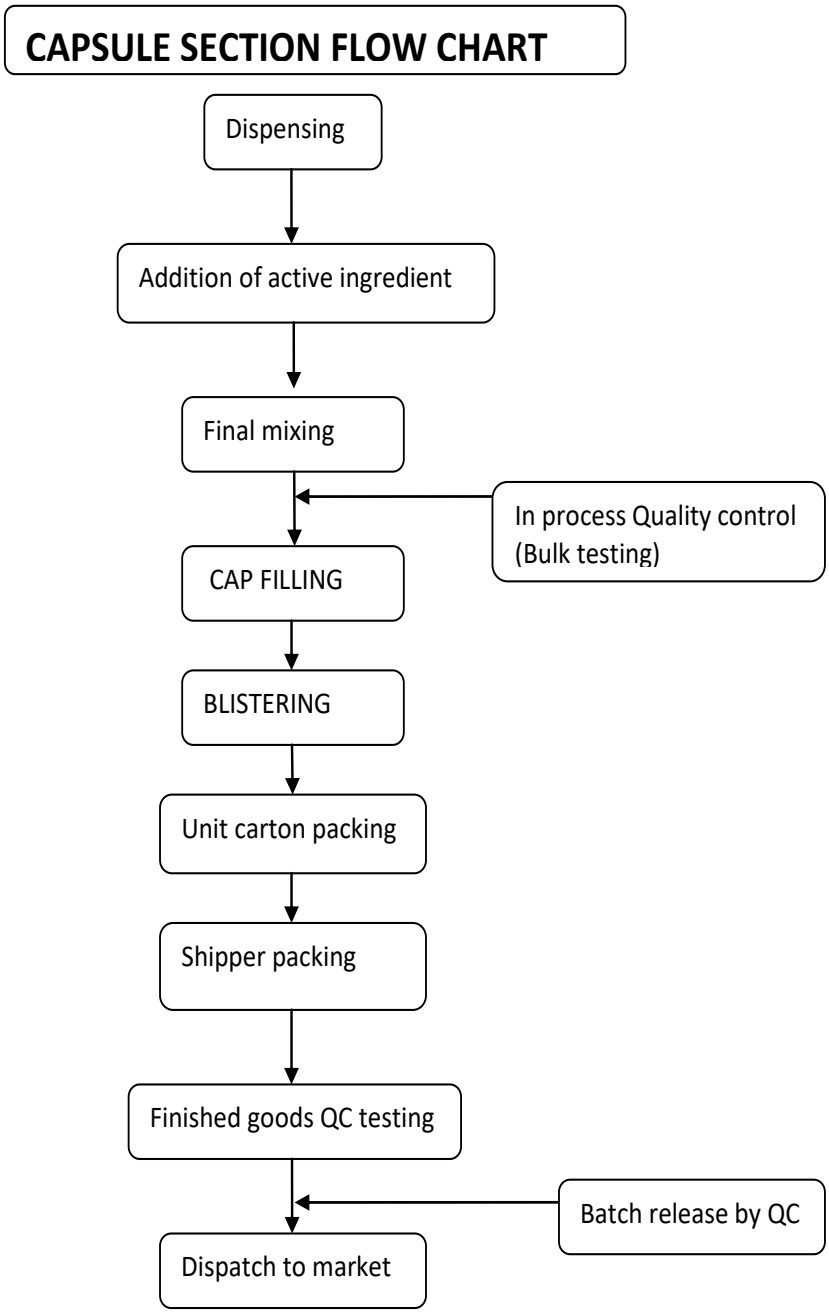


Fig 4.2: capsule process flow chart diagram

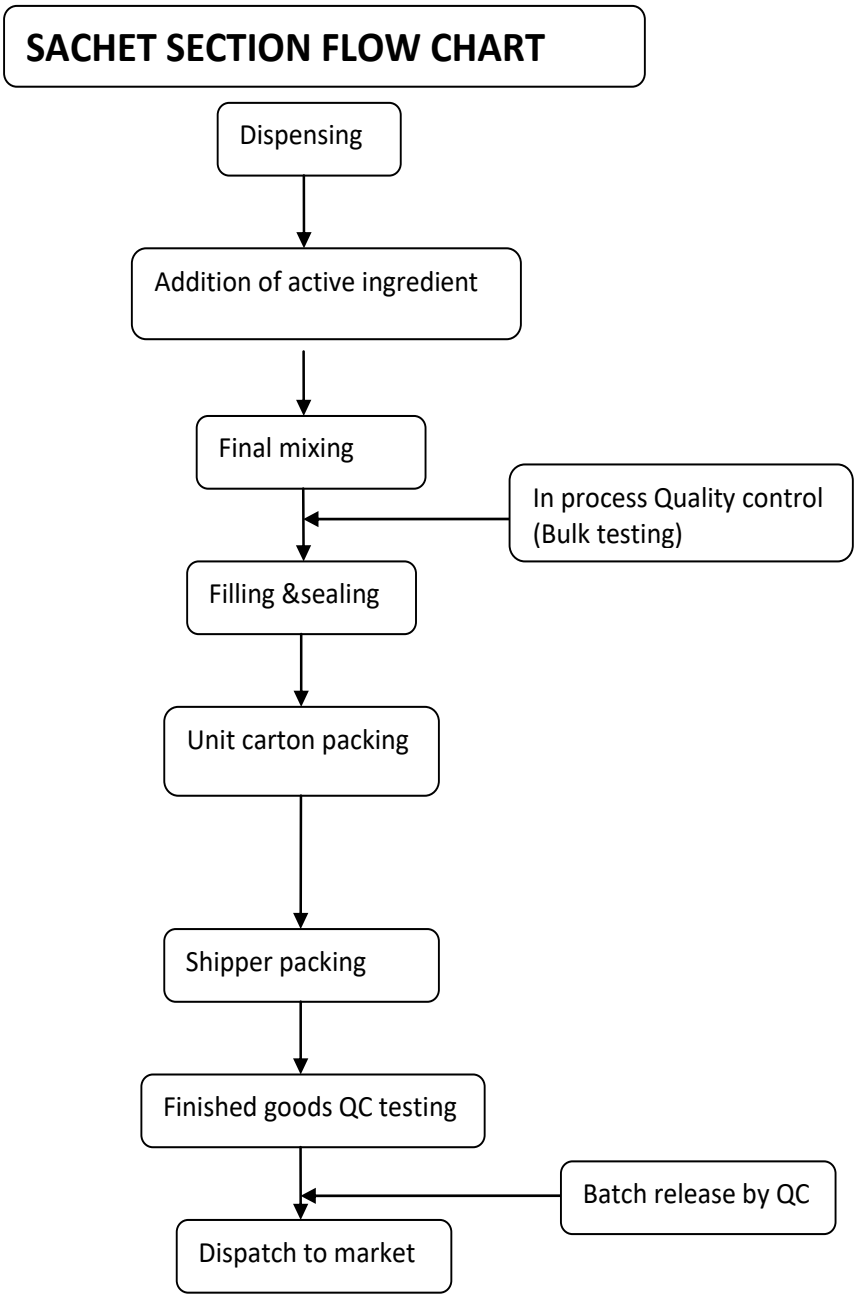


Fig 4.3: Sachet process flow diagram

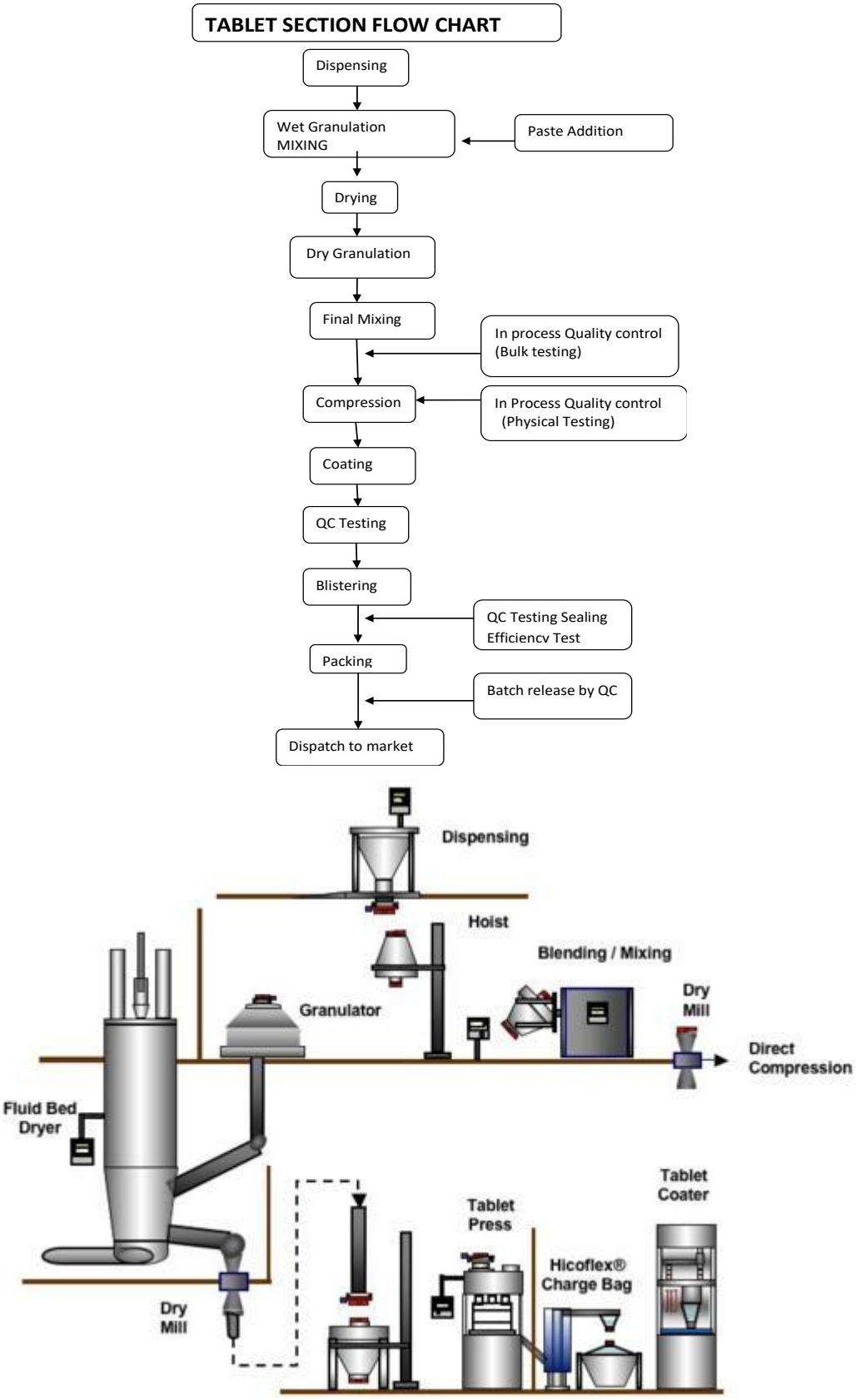
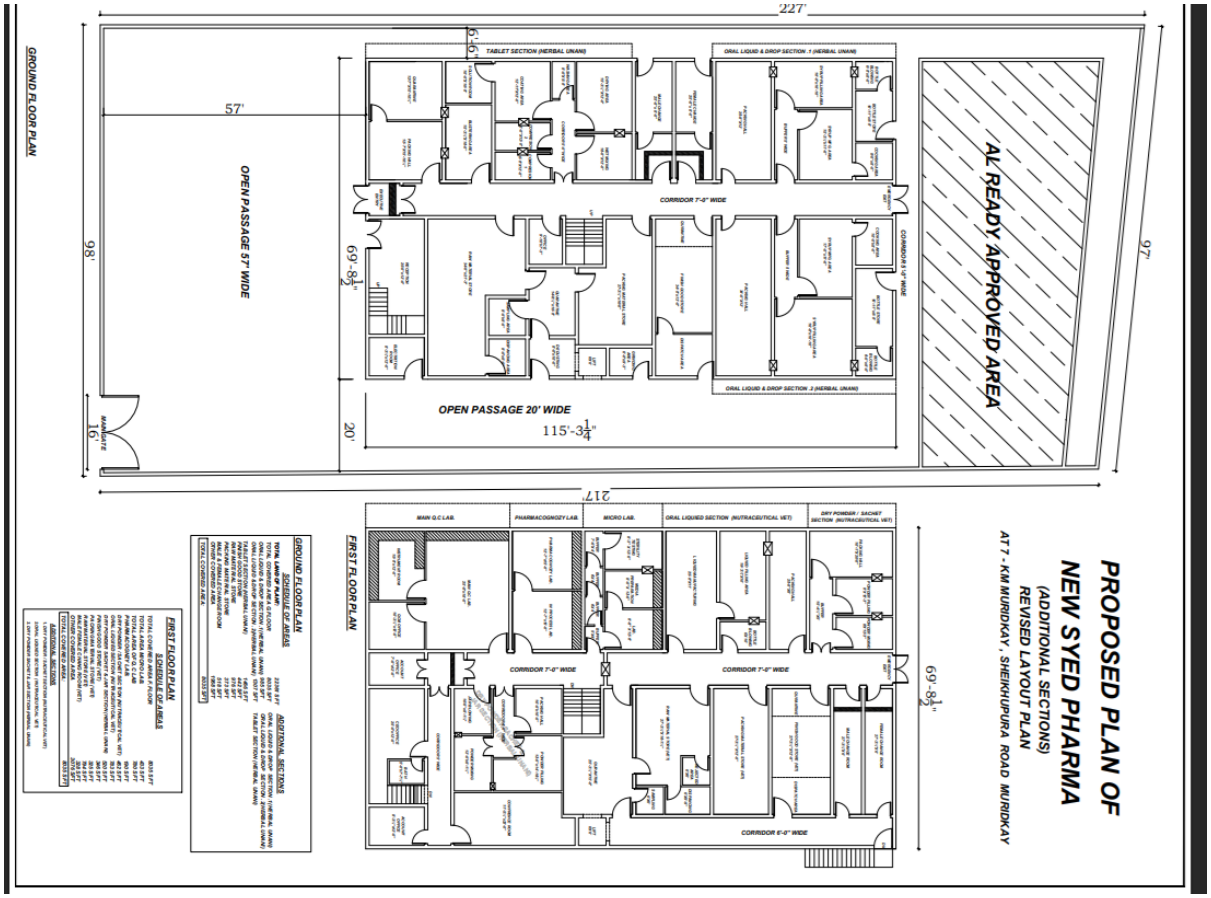


Fig 4.5: tablet manufacturing process chart

4.3 Site and Project layout:

The proposed project site is located at an altitude of about 203-210 meters above mean sea level. **Annexure presents** various location map of the project.

Detailed layout map and site plan map of the project is presented in **Annexure - V.**



P.P 4.1: layout and site plan of proposed site

The proposed project site is located at 8 km Muridke- Sheikhupura road on main road chak No. 27 UCC. The land of proposed project has already been procured. Presently, the proposed site is bounded by wall and open area.

4.4 Working Conditions

The following are the working conditions at proposed site of the Pharmaceutical unit.

1. Altitude above mean sea level = 210 m

2. Minimum (mean)ambient air temperature in January= 5.9ºC

3. Maximum ambient air temperature during May = 38.6 0C

4. Earthquake design ground acceleration (g) = 0.15 ,

5. Seismic zone= 2A

6. Air quality clean

(Source: Pakistan met Department and Building Code of Pakistan, Seismic Provision 2007.)

4.5 CIVIL WORKS

The civil works include the construction of the following major components;

1. All foundations
2. Building of NSP /Offices/ Admin buildings) /Works shop (Electrical/storage area)
3. Water drainage system

4.6 Alternative site/No project option:

No Alternative site has been considered due to insignificant environmental impacts.

The proposed site fulfills the site selection criteria of Drug Regulatory of Pakistan, Ministry of health.

4.7 Solid waste disposal:

During operation of pharmaceutical unit small amount of solid waste will be generated. Expired pharmaceutical products will be stored in separate room and sold out to EPA approved incineration facility. Reuse and recyclable material will be collected separately. Solid waste from offices and kitchens will be disposed of at designated place by TMA.

4.8 Water and Waste water:

Only small amount of water required for liquid syrup manufacturing and washing process. About 1500the litre water will be required which will be drawn from subsoil. Reverse osmosis will be used to reduce the TDS of the water. The reject water will be clean water will be used in situation purpose. This waste water will be treated through adoption of an integrated approach combining physicochemical and biological methods. The specific process design will depend heavily on the variable composition and organic load of the wastewater.

Treatment Stages

The treatment train will include the following steps:

1. **Preliminary/Primary Treatment:** This initial stage removes large solids, grit, and floating matter to protect downstream equipment.
    - **Screening:** Removal of coarse and fine suspended materials.
    - **Sedimentation & Skimming:** Gravity-based settling of heavy solids and removal of floating oil, fat, and grease.
    - **Neutralization:** Adjustment of the wastewater pH (which is often highly acidic in herbal pharma waste) to a neutral range suitable for subsequent biological treatment.
2. **Physicochemical Treatment (Pre-treatment/Polishing):** This step uses chemical agents to break down complex organic matter and improve the water's biodegradability.
    - **Coagulation & Flocculation:** Addition of coagulants (e.g., alum, lime, ferric chloride) and polyelectrolytes to aggregate fine suspended solids and colloidal particles into larger flocs that can be easily settled or filtered.
    - **Adsorption:** Using materials like activated carbon to adsorb dissolved organic contaminants and residual APIs that are resistant to other treatments.

Only small quantity of treated waste water may generate during washing process which will not have **significant** impact. it will be disposed of chhoti Deg drain.

The waste water generated from the utilities like toilets, offices and kitchen for 10 persons is estimated to be 510 lire /day (using yardstick of 85 % of 51 LPCD. This waste water will be treated in septic tank which will bring the effluent within PEQS. After that it will be disposed of in Chhoti Deg nullah passing by the project site.

4.9 Treatment system for Indoor Air quality:

The manufacturing process environment is critical for product quality in pharmaceutical units. It depends on following factors.

1. Light

2. Temperature

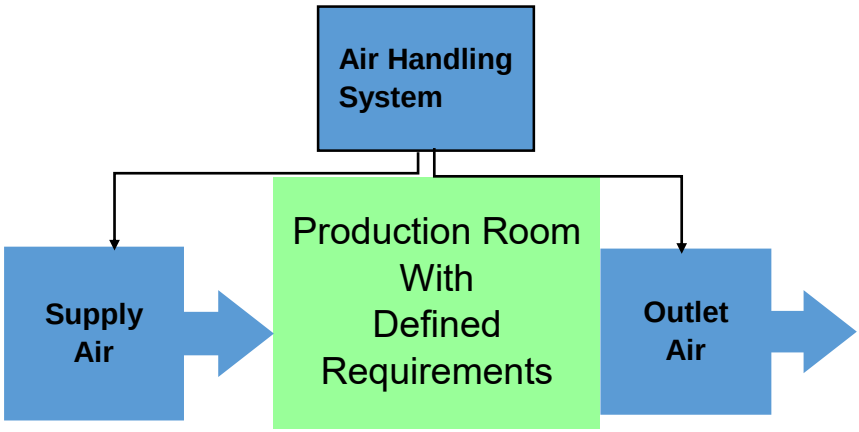
3. Humidity

4. Air movement

5. Microbial contamination

6. Particulate contamination

7. Uncontrolled environment can lead to product degradation

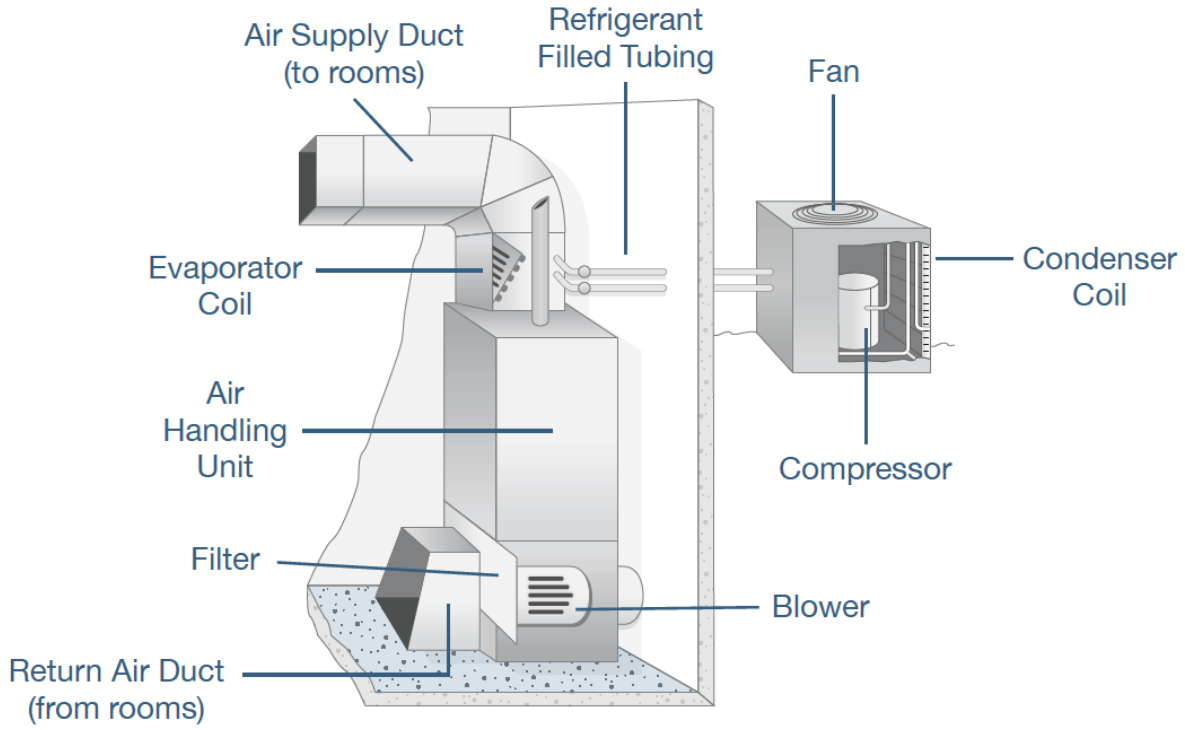


4.9.1 Heating Ventilation and Air Conditioning system (HVAC)

This system is used to provide heating and cooling services to buildings.

HVAC is an important part of residential structures such as single family homes, apartment buildings, hotels and senior living facilities, medium to large industrial and office buildings such as skyscrapers and hospitals, on board vessels, and in marine environments, where safe and healthy building conditions are regulated with respect to temperature and humidity, using fresh air from outdoors. Ventilation is the process of exchanging or replacing air in any space to provide high indoor air quality which involves temperature control, oxygen replenishment, and removal of moisture, odors, smoke, heat, dust, airborne bacteria, carbon dioxide, and other gases. Ventilation removes unpleasant smells and excessive moisture, introduces outside air, keeps interior building air circulating, and prevents stagnation of the interior air.

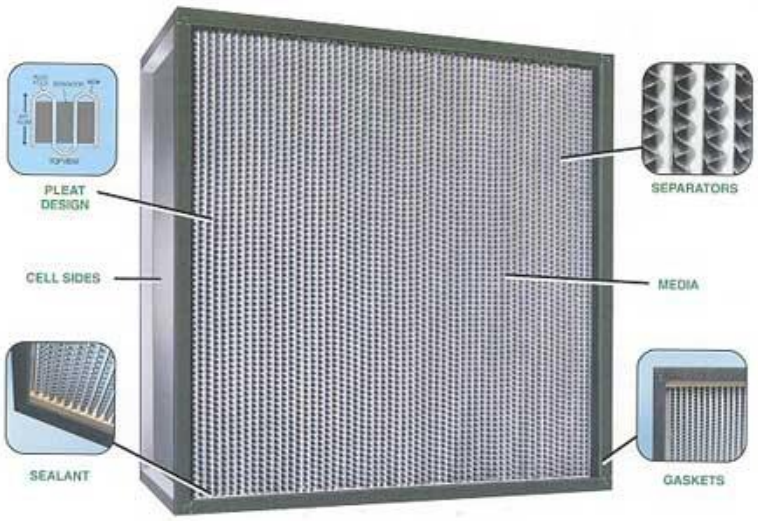
The proposed pharmaceutical unit will have HVAC system in Production area.it will maintain the temperature and air quality of process area during winter and summer season.



P.P 4.2: View of HVAC system diagram

4.9.2 HEPA Filter:

High-efficiency particulate arresting or high-efficiency particulate air, is a type of air filtration system. It can remove vide range of airborne contaminants, including fine dust, smoke and vapours. Aluminium filter along with HEPA filter will be installed before air duct with removal efficiency 99.99%.it will capture fine dust, air born contaminants and vapours.



P.P 4.3: View of HEPA Filter

CHAPTER 5
PUBLIC CONSULTATION AND INFORMATION DISCLOSURE

5.1 SOCIO-ECONOMIC SURVEY OF THE PROJECT AREA

Consultation with the stakeholders is a tool for managing two-way communication between the project sponsors and the public. Its goal is to improve decision - making and build understanding by actively involving individuals, groups and organizations which have a stake in the project. This involvement increase project's long term viability and enhances its benefits to locally affected people and other stakeholders. The public consultation was conducted for this project keeping in view the above theme.

5.1.1 Methodology

5.1.1.1 Identification of stakeholders

Stake holders in this project were identified keeping in view the **Guidelines for Public consultation published by Pakistan EPA, 1997**. The stake holders were identified from the following groups.

1. Local people
2. Affected Communities
3. Proponents
4. Management of Zodiac Pharma
5. Government Agencies
6. NGO
7. Influential people
8. Technical persons
9. Poor People

5.1.1.2 Techniques for Public Consultation

The following principals were kept to select the techniques or public consultation

1. Provision of material / information in easy language
2. Providing sufficient time to understand
3. Providing discussion to understand the information in a friendly way
4. Portraying the actual issues relating to the project
5. Discussion at the place which has easily access to the people
6. Selection the time when maximum people are available
7. Selection of influential people of project area
8. Including of poor people
9. Selection of people who give true presentation of community make up
10. Including technical people who has clear knowledge of on the issues relating to Pharma industry.
11. School teachers of the area were included in public consultations
12. Concerned government departments were selected who had liaison with the execution of the project and environmental approval.

5.1.2 Dissemination of information

The EIA team reviewed the available information, held meetings with the proponent and designer and prepared a leaflet in Urdu containing all the necessary information about the proposed New Syed Pharma relating to the public interest. The pamphlet was distributed to the public in informal meetings group discussion and corner

meetings at Public and work places of Muridka road chak no 27 UCC The original social survey Performa are being attached at **Annex- X**

	
PP 5.1: Recording the views of the people of area.	PP 5.2: interaction with people of the area

5.1.3 Public Meetings and Group discussions

The surrounding area is agricultural and rural in nature therefore we decided to hold physical contact instead of using print or electronic media. The group discussion is the way of opinion making used in the Punjab since hundreds of years. It is reliable and unbiased way to get opinion of the people. The seminar or public gathering was avoided as the poor people cannot attend and unable to express his views without duress or influence of chaudry or wadera of the area or village.

5.1.4 Convenient Time and Place

The people in villages do not move away from village except in case of urgency. We went to them on their residences or work places. In this way no time and money of the people was spent and we got indiscriminate access to the concerned people. In this way the people who do not have money to travel to go to government departments got access to information and had opportunity to express his opinion in a liberal way.

5.1.5 Non Government Organization

The following NGO are reported to be working in the area namely Mera Muridka, Support with Honour Foundation (SWHP). These were contacted but nobody could be available for interview.

5.2 Limitations of the Public Consultation

We tried our best to include all segments of life in to account according to education and professions as per local distribution of the social formation. But we could not include the enough women in public consultation process due to closeness of the society for women exposure to alien people and social taboo.

5.2.1 Questionnaire

After review of the available information a questionnaire was developed containing all necessary information and question covering positive and negative aspects of the Zodiac Pharma. The questionnaire comprised of two parts. First part has brief description of the project and part II was divided in the following parts:

1. Socioeconomic background
2. Positive impact of the NSP Pharma
3. Acceptance level of the Project.

5.3 Public Consultation

The following stake holders were identified and meetings were held with them to inform them about the project design and know their response.

1. Management of proposed project.
2. Nobles of the area.
3. Teachers of the schools
4. Shopkeepers at main road
5. Shopkeepers of Muridke

6. Farmers
7. Laborers
8. Residents of the area

The socio-economic information was gathered through different techniques and methodologies and is derived from primary and secondary sources. Primary data were collected through following data collection tools: (i) Village profiles; (ii) Socio economic survey; Village profiles were carried out for all villages/settlements falling in Project Area. An introductory leaflet about basic information of the project was prepared in Urdu and distributed among the people at public places. This helped the people to understand about the project pros and cons. Leaflet is attached. After one week the area was revisited by the team of experts and again asked the opinion of the people about the project in the form of well-designed social survey questionnaire. Public consultations were also conducted in the area.

5.4 Issues Discussed

Following issues were discussed during the stakeholder consultation:

1. Personal information
2. Education status
3. Income level
4. Residence information
5. Information about project
6. Possible impacts on natural vegetation, land and properties;
7. Beneficial factors and involvement
8. Opportunities for the local people.
9. Adverse effects of the project
10. Acceptance of the project by the people of the area

11. Scope of the environmental assessment report

Different segments of the society were included to reflect the true and unbiased opinion. From numberdar to labour all segments of the project area were interviewed. The offices at district level were approached to have their verdict on the project. The people who were interviewed through a questionnaire which showed the following results:

Socio Economic Survey

1. Gender:

Male	29
Female	0

2. Occupation:

Farmer	09	31 %
Factory worker	05	20%
Shopkeeper	02	0.06%
Government service	01	0.03 %
Students	04	14%
Artisan /technicians	03	10 %
Imam masjid/ khateeb	01	0.03%
environmentalists	02	0.06%

List of individuals consulted

Sr. No	Name	Designation	Address	Contact
1	Irshad Ali	Farmer	Chak-27, Dera Ambwala, Tehsil Muridke, District Sheikhupura	0302-7114987
2	Qaiser Mehmood	Farmer	Chak-27, Dera Ambwala, Tehsil Muridke, District Sheikhupura	0305-6857252
3	Muhammad Toseef	Principal of School	Chak-27, Dera Ambwala, Tehsil Muridke, District Sheikhupura	0304-8140688

4	Azam Ali	Factory worker	Chak-27, Dera Ambwala, Tehsil Muridke, District Sheikhupura	0324-5896081
5	Ghulam Mujtaba	Imam Mosque	Chak-27, Dera Ambwala, Tehsil Muridke, District Sheikhupura	0300-9851364
6	Maqsood Hussain	Farmer	Chak-27, Dera Ambwala, Tehsil Muridke, District Sheikhupura	0304-4106095
7	Shahid Mehmood	Milkman	Chak-27, Tehsil Muridke, District Sheikhupura	0303-4243575
8	Muhammad Zaman Bhatti	Owner of Shoes factory	Chak-27, Tehsil Muridke, District Sheikhupura	0321-6454412
9	Muhammad Awais	Factory worker	Chak-27, Tehsil Muridke, District Sheikhupura	0302-4239223
10	Muhammad Razaq	Carpenter	Chak-27, Tehsil Muridke, District Sheikhupura	0304-4768914
11	Amir Farooq	Factory Worker	Chak-27, Tehsil Muridke, District Sheikhupura	0321-5486194
12	Muhammad Akram	Farmer	Chak-27, Tehsil Muridke, District Sheikhupura	03046083459
13	Muham mad Muslim	Factory Worker	Chak-27, Tehsil Muridke, District Sheikhupura	0321-8470210
14	Fafaqat Ai	Farmer	Chak-27, Tehsil Muridke, District Sheikhupura	0305-4001306
15	Hadayat Ali	Barber	Chak-27, Tehsil Muridke, District Sheikhupura	-
16	Saqlain Ali	Kharkhana worker	Chak-27, Tehsil Muridke, District Sheikhupura	0307-9403394
17	Muhammad Rafiq	Farmer	Dera Dhupsarhi,, Khanna Lubana Village, Tehsil Murike	0309-9413441
18	Sardar Ali	Farmer	Dera Dhupsarhi,, Khanna Lubana Village, Tehsil Murike	0305-1350539
19	Waqas Ali	Farmer	Dera Dhupsarhi,, Khanna Lubana Village, Tehsil Murike	0304-4697036
20	Muhammad Imran	Electrician	Dera Dhupsarhi,, Khanna Lubana Village, Tehsil Murike	0300-4138140
21	Muhammad Sharif	Farmer	Dera Dhupsarhi,, Khanna Lubana Village, Tehsil Murike	0302-2913912

22	Muhammad Abdullah Hassan	Student	Chak-28, Dera Kombo, Tehsil Muridke, District Sheikhupura	0305-6084776
23	Ghulam Farid	Student	Chak-28, Dera Kombo, Tehsil Muridke, District Sheikhupura	0306-9356326
24	Azeem Hassan	Student	Joyan wala village, Muridke-Sheikhupura Road, Sheikhupura	0318-7981519
25	Muhammad Hamza	Student	Ghausia Colony, Muridke, District Sheikhupura	0334-3023067
26	Muhammad Amin	Sweet shop	Madina Sweet, Khanna Lubana , Tehsil Muridke, District Sheikhupura	0306-6612966

Consultation with Proponent

Name	Designation	Address
Zahid Ali	General Manager	New Syed Pharma, 8-Km Muridke Sheikhupura road, District Sheikhupura

Environmental Experts

Name	Designation	Address	Contact
Iftikhar Ahmad	Environmental Consultant Pak Green Environmental Lab	Gulberg, Lahore	0303-4442334
Fahim Nasim	Consultant	Gulshal Ravi, Lahore	0333-6878606

3. Employment chances Direct and indirect:

Yes	29	100%
No	0	0%

4. Consent on project implementation:

Yes	29	100%
Conditional (yes)	0	0%
No	0	0%

5.5 Apprehensions of the people of the area

1. Low employment offer to local people during operation phase

2. Social work in the area

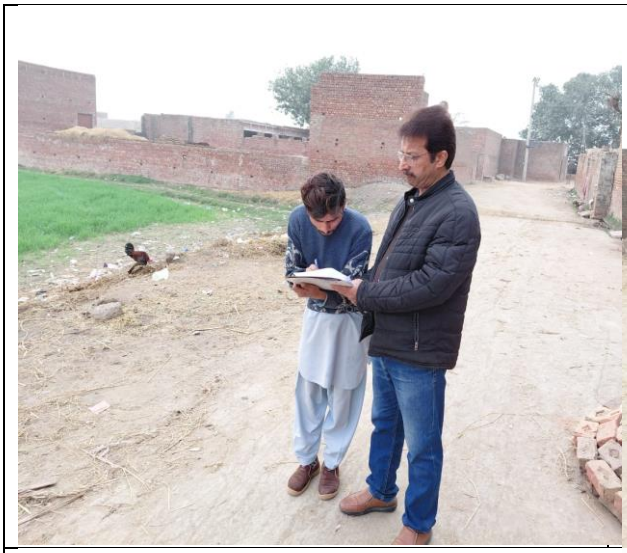
3. Health dispensary

5.6 Mitigation of the Peoples Apprehensions

1. No resettlement is involved
2. Waste water will be treated before disposal
3. Big opportunities for the local people during construction phase and small scale chances of job during operational phase.
4. It will create employment opportunities.
5. Project management will give priority to local people for employment
6. Social welfare work through community uplift

Photo Plates 5.4: Public consultation about establishment of NSP Pharma at proposed project area.

Images of Public consultation in the Project area



CHAPTER 6
SOCIAL AND ENVIRONMENTAL IMPACTS

6.1 Introduction:

The proposed project is small scale pharmaceutical manufacturing unit. The proposed project may have short term impact on the environment during construction & operation phases. During the construction phase, the impacts may be regarded as temporary or short term. During the operation phase no adverse impact will be seen. The project has overall positive impacts by providing a competitive, cost-effective pharmaceutical product which will reduce the import of pharmaceutical products in the country.

This EIA report identifies the impacts likely to arise as a result of construction and operational activities and assesses the likely magnitude of the impact in order to provide some indication as to which impacts are likely to be most significant. A full determination of the significance of the identified impacts, based on an assessment of the magnitude in relation to the sensitivity of the receiving environment has been formed part of the EIA.

During the construction phase, the following activities may have impacts on environment:

1. Minor excavation and levelling
2. Hauling of earth materials and wastes Cutting and drilling
3. Erection of concrete structure
4. Road construction
5. Painting and finishing
6. Landscaping and afforestation

6.2 Possible Environmental Impacts during Construction phase:

6.2.1 Impact on Air Quality:

During construction phase, no such heavy machinery will be used. Dust will generate due to the movement of vehicles for transportation of construction material and site clearance. The primary concern during construction phase are emissions of dust and

particulate matter that arise from the movement and storage of materials and other construction activities. Civil work will not have significant impact on air quality. There will be minimum impact on the existing air quality. Water sprinkling will be done to control emission of dust.

6.2.2 Impact on Noise Level:

Sources of noise pollution during construction phase is from vehicular movement and some civil work. No heavy machinery will involve which may arise existing noise level. There will be no significant impact on noise level.

6.2.3 Impact on Water resource:

During construction phase of the project small quantity of will be required for different civil work activities. To fulfil the water requirement, subsoil water will be used for construction activities and utility purpose. No significant impact on water level.

6.2.4 Impact on Existing Traffic system:

The proposed project will involve minimal and temporary increase in traffic on access road for the transportation of construction material. The size of road and the traffic density is large hence no significant impact will be seen due to a couple of vehicles addition due to this industry.

6.2.5 Impact on soil quality:

Land disturbance from the proposed construction activities will be confined to the immediate work area. Overall the impact of this on the site environment will be temporary or short term. Vegetation cover will be provided in and around proposed pharmaceutical unit after completion of construction of project.

6.2.6 Impact on Ecology:

The proposed project area was already industrial land use and bounded by wall. There is no rare or sensitive flora and fauna species present in site area and hence no impact will be seen. The nature and size of the project do not have possible adverse impacts on the ecology. No mitigation measures will be required.

6.2.7 Impact due to Solid waste generation:

Different type of solid waste will generate from construction activities. Recyclable or reusable material will be separated and other inert type material will be disposed off at designated place by TMA.

6.3 Environmental Impacts during Operation phase:

6.3.1 Air Quality impact:

During operation of a pharmaceutical unit, dust particles and vapours may be emitted from the following processes/activities:

1. Mixing
2. Dryer
3. Reactor
4. Distillation unit
5. Filtration
6. Extraction
7. Centrifugation
8. Packing

Dryers are one of the largest sources vapours emissions in bulk manufacturing. In addition to the loss of solvent during drying, manual loading and unloading of dryers can release solvent vapours into ambient air, especially when tray dryers are used. Vapours are also generated from reaction and separation steps via reactor vents and manways. These compounds may pose a serious danger to workers through inhalation. The impact can be serious to human health and environment e.g. where emissions contain harmful compounds like dioxins.

1. Mitigation measures:

Personal protective equipment will be given to the workers during operation phase. Heating Ventilation and Air Conditioning (HVAC) system will be installed in order to keep the clean environment of manufacturing process of Pharmaceutical unit. Two stage filter one is Aluminium filter and other is HEPA filter will be installed after HVAC system. It will remove airborne particles fine dust and vapours with removal efficiency 99.99%..This system will emit clean air into the environment.

6.3.2 Waste water and its Disposal:

During syrup and tablet manufacturing process small quantity of water will be required. Total 1500 litre per day water will be required that will be drawn from existing motor pump. The RO reject water of about 500 liter per day will be produced which will be reused in sanitary requirement. Only small quantity of waste water may generate

during washing process which will be treated in formal treatment plant and disposed of in Chhoti Deg which carries waste water of the area. Hence no adverse significant impact is foreseen.

The waste water generated from the utilities like toilets offices and kitchen for 15 persons is estimated to be 765 L/day (using yardstick of 85 % of 51 LPCD. This waste water will be treated in septic tank. The treated waste water will be disposed of in Chhoti Deg passing by the factory.

6.3.3. Solid Waste Disposal:

During operation of pharmaceutical unit small amount of solid waste will be generated. Expired pharmaceutical products will be stored in separate room and sold out to EPA approved incineration facility. Reuse and recyclable material will be collected separately. Solid waste from offices and kitchens will be disposed off at designated place by TMA.

6.3.4 Fire Protection and Other Hazards

An efficient Fire protection system will be provided for controls and measures or mitigation of accidents and associated risks by setting objectives and following applicable and other requirements. All possible places of fire will be provided with fire extinguishers and fire water hydrants. Fire alarm will be fixed in the factory. Adequate firefighting arrangements will be made to cope the risk of any fire at the Pharmaceutical unit.

6.3.5. Occupational Health and Safety of workers:

Personal Protective Equipment (PPEs) will be given to the workers. First aid facility will be provided in case of any injury due to exposure of chemicals. Training of workers on health, safety and environment will be conducted to avoid safety issues.

6.3.6: Social and Economic Impact:

Social and economic impacts during operation phase, which may create longer term benefits, such as the creation of job and business opportunities at small scale, which have positive effects on the economic welfare of the local population.

CHAPTER 7
ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN AND MONITORING

7.1 GENERAL

This section provides brief description of environmental issues, mitigation measures to contain eliminate and/or reduce environmental and social impacts to an acceptable level, institutional arrangement for the implementation of the mitigation measures and also carrying out environmental monitoring for air quality, water quality, and noise pollution related parameters.

This ESMP is a delivery mechanism for environmental and social mitigation measures made in the Assessment Report. The purpose of the EMP is to ensure that these recommendations are translated into practical management actions which can be adequately resourced and integrated into the Project phases. The ESMP is, therefore, an environmental management tool used to ensure that undue or reasonably avoidable adverse impacts of construction, operation and decommissioning are prevented and that the positive benefits of the Projects are enhanced (Lochner, 2005).

The Environmental and Social Management Plan (ESMP) is developed to eliminate and / or mitigate the impacts envisaged at the design, construction and the operational stages and provide specific guidelines for long-term monitoring by identifying the roles and responsibilities of the Proponent, Design Consultant, and Contractor(s).

The reason for making ESMP is to eliminate and mitigate the potential impacts at the design, construction and operational stage of the project. It provides the specific guidelines for long term monitoring by identifying the role and responsibilities of the proponent, design consultant and contractors.

The social and Environmental Management Plan includes:

1. Construction Management Plan;
2. Traffic Control Management Plan;
3. Waste Management Plan;
4. Employment and Workforce Policy;
5. Local Employment Strategy;
6. Occupational Health and Safety Policy;

7. Emergency Response Plan.
8. Environmental management plan

This proposed project has no adverse environmental impact.

7.2 OBJECTIVES OF THE ENVIRONMENTAL MANAGEMENT PLAN

The Environmental Management Plan (EMP) will help the management to address the future likely negative impacts of the proposed Project, enhance the Project's overall benefits and introduce standards of good environmental practice. The primary objectives of the EMP are to:

1. Define the responsibilities of the Project Proponent and other key players during the design, construction and the operational phases;
2. Facilitate the implementation of the mitigation measures by providing technical details of each project impact, and proposing an implementation schedule of the proposed mitigation measures;
3. Develop a monitoring mechanism and identify monitoring parameters to ensure that all the proposed mitigation measures are completely and effectively implemented;
4. Identify training requirements at various levels and provide a plan for the implementation of training sessions;
5. Identify the resources required to implement the EMP and outline corresponding financing arrangements;
6. Providing a cost estimate for all the proposed EMP actions.

7.3 KEY ENVIRONMENTAL ISSUES

Following are the key issues, which are envisaged for the proposed Project at the design, construction and operational stages;

1. Traffic management during transport of material during construction.
2. Implementation of mitigation measures at Construction activities
3. Bringing down the pH, and TDS within the PEQS from sanitary waste water effluents
4. Control of dust in manufacturing area using HVAC system.
5. Maintenance of Noise levels within PEQS;
6. Health and safety of workers; and

7. Interaction with the people of the area for feedback on social and environmental control measures.

7.4 SPECIFIC IMPLEMENTATION RESPONSIBILITIES

This section describes the responsibilities of different functionaries during the design, construction and operational phases of the proposed project.

7.4.1 Stakeholders Role and Responsibilities in EMP

a) Contractor(s)
b) Chief Executive officer of Zodiac Pharma
    1. Administration of Zodiac Pharma
    2. Head of quality control officer
    3. Area sale manger
c) Social welfare officer / Public Relation officer

7.5 ENVIRONMENTAL MONITORING AND IMPROVEMENT SYSTEM

7.5.1 Design Phase/ Pre-Construction Phase

Proponent of the proposed project NSP Pharma is responsible for ensuring that the proposed Project design and specifications adequately meet the Provincial environmental standards given in PEQS SRO 2016 and ensure the implementation of proposed steps reflected in the EMP. The responsibilities of owner, admin officers and staff would be as follows:

To ensure that technology and design of the Pharmaceutical unit is environment friendly which bring down all the parameters of gases, water and noise within the PEQS.

1. To get IEE approved from EPD Punjab;
2. Setting up systems for environmental management; and
3. Incorporating environmental mitigation and socio-economic measures in the design / tender document.

7.5.2 Construction Phase

The proponent and Contractor(s) will be responsible for compliance of environmental mitigation measures for the proposed Project, while project coordinator and Administration will arrange monitoring the compliance.

The proponent will incorporate all environmental requirements and plans contained in this EIA in tender document.

During construction phase, the Contractor(s) employed after following prescribed procedure and fulfilling all the required codal and procedural formalities, Chief Executive of NSP Pharma will be responsible for the implementation of the proposed mitigation plan in letter and spirit. The Contractor(s) will be bound to follow the provisions of the contract documents especially about environmental protection and apply good construction techniques and methodology without damaging the environment. Obligations of the contractor, to safeguard, mitigate adverse impacts and rehabilitate the environment should be addressed through environmental provisions in the contract document and through adequate implementation at site. Project administration will also be responsible for conducting frequent meeting with the surrounding people to clear the misconception about the project regarding any adverse impact on the environment.

1. Operational Phase

Long Term environmental monitoring (till the project life) would be conducted at completed site at post closure stage to ensure that there is no release of contaminants from the site that may impact the health of the surrounding environment and violation of PEQS.

1. Deployment of trained and dedicated staff to monitor the quality of the effluent and emissions and its periodic reporting on monthly basis regarding compliance of PEQS to EPA, Punjab.
2. Proper maintenance of the pollution control equipment and its function.
3. Similarly, Occupational Health and Safety measures will be implemented and monitored to check the effects of Pharmaceutical operation on the O&M staff. Good maintenance of the project.
4. Assure the adequate funds allocation for the implementation of EMP.

Table 7.1:

Environmental Management Plan (EMP) of NSP Pharma

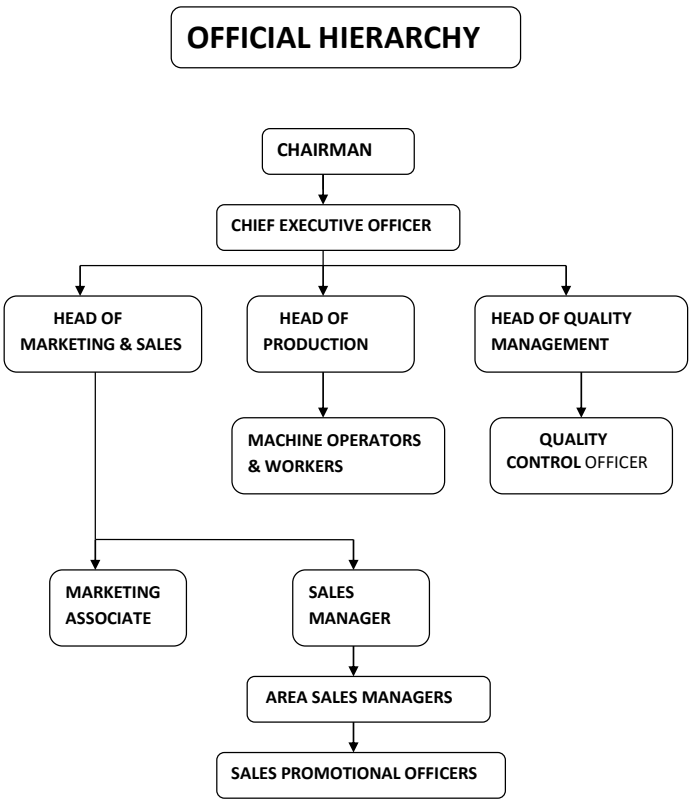
Sr. No.	Adverse effect	Action proposed	Responsibility
1.Planning stage			
1	Land acquisition and Resettlement plan	1. Not required as the land is already possession of the project proponent.	-
2	Livelihood loss	2. Not required	-
1.	**Construction Phase**		
3	Air pollution	2. Vehicles delivering loose and fine materials like sand and aggregates shall be covered. 3. Water shall be sprayed on earthworks periodically	Chief Executive
4	Water pollution	4. Toilets will be provided for construction workers and waste water generated from toilets will be treated in septic tank. 5. Water drainage system will be provided	Management of proposed project
5	Noise pollution	6. No significant impact of noise during construction.	
6	Worker's health and safety	1. Providing adequate warning signs. 2. Providing workers with skull guard or hard hat	Contractor and HSE in charge officer.

		3.	Contractor shall instruct his workers in health and safety matters, and require the workers to use the provided safety equipment.	
		4.	Establish all relevant safety measures as required by law and good engineering practices.	
5.	**Operation Phase**			
7	Air Pollution	1.	Smooth operation of HVAC and HEPA filter system	Quality Control officer
8	Water pollution	2.	Municipal waste water will be treated in septic tank to compliance the effluent quality standards prescribed in PEQS	EHS officer
9	Noise pollution	3.	No significant impact of noise pollution during operation of pharmaceutical unit	
10	Health ,Safety and Environment	4.	During manufacturing process safety of workers shall be ensured.	Head of production and quality control officer
		5.	For indoor Air quality HVAC and HEPA filter will be used.	
		6.	Personal Protective Equipment will be used	
11	Environment policy	Development of environment policy		Quality control officer.
12	Social compliance	Interaction between the management and people of the area		Manager admin and administrative officer
14	Record keeping	Record of monitoring reports		Quality control officer
15	Emergency plan	Working and maintenance of all		Quality control officer

		health and safety equipment, firefighting equipment and extinguishers	
16	Compensation in case of causalities	In case of any injury to worker, compensation / insurance may be paid	Chairman and Chief Executive
17	Training of staff on health and safety	Regular training on health and safety is required	Head of production area and quality control officer
18	Budget for EMP	To ensure the provision of budget for environmental management	Chairman and Owners of the proposed project.

2. Institutional Arrangements:

The proposed Zodiac Pharma will have following staff management for operation phase.



CHAPTER -8

CONCLUSION AND RECOMMENDATION

The nature of the pharmaceutical unit is known to have minimal adverse impact on the surrounding environment. There will be some temporary or short term impact will be observed during construction phase that will mitigated through proper environmental management system.

The local's expectation on the Project is in line with the Project's commitment on environmental and social responsibility. On the basis of the findings of the EIA, it is concluded that the project will not pose any adverse impact on the local population and the environment. Therefore, it is recommended for environmental approval.

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9. IEE/EIA Review regulations 2000.