EIA Report

Expansion project of Fauji Fresh n Freeze Ltd.

16-Km, Sahiwal Pakpattan Road, District Pakpatten, Punjab - Pakistan.

Prepared by

Environmental Consultancies & Options (ECO)

The Proponent

FAUJI FRESH N FREEZE LIMITED

Fauji Fresh n Freeze (FFF) is the subsidiary of Fauji Fertilizer Company (FFC). It is pioneers to produce French Fries and IQF Fruits & Vegetables in Pakistan with > 70% market share. Successfully serving its happy customers at national and international levels. It supplies its products to both national and international customers in North America, Europe, Middle East & Russia.

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Gulberg II Lahore, Pakistan

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Factory Site Office
16-KM, Sahiwal – Pakpattan Road, Sahiwal
Punjab, Pakistan

Contact details
Tel #: + 92 42 4227820

The Consultant

ENVIRONMENTAL CONSULTANCIES & OPTIONS

ECO is a professionally run environmental management & engineering firm with strong backup of highly qualified and experienced personnel. The company is specialized in diversified fields and continuously identifies the current and future demands related to environment and engineering. ECO services include: environmental assessments, audits, risk assessments, environmental monitoring, trainings, water, wastewater treatment and alternate energy. ECO is serving market niche with a broad range of high technology products and services to a wide spectrum of industries in Pakistan. ECO is a member of groups of companies. The other members are:

- Global Waste Management (GWM)
- Global ECO Laboratories (GEL) [ISO 9001:2000 Certified: ISO 17025:2005]
- Global Technologies (GT)

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EXECUTIVE

SUMMARY

EXECUTIVE SUMMARY

- **Title and Location**

The proposed project involves an expansion of existing facility within the premises of Fauji Fresh n Freeze Limited located at 16-Km, Sahiwal Pakpattan Road, Pakpattan, Punjab. The proponent hired the Environmental Consultancies & Options (ECO) as consultants to carryout Environmental Impact Assessment (EIA) of the proposed project to get environmental approval from Punjab EPA under section 12 of Punjab Environmental Protection Act (1997), amended 2012. The proposed project falls in Schedule-II (EIA) under the Category B (4).

- **Fauji Fresh n Freeze Limited (FFFL) - The Proponent**

Fresh n Freeze is the No.1 Food processing company of Pakistan with a globally recognized and trusted brand name. It is a wholly owned subsidiary of the Fauji Fertilizer Company Limited (FFC) that was incorporated in 1978 as a joint venture between Fauji Foundation. FFFL is proud to be the first Individual Quick Freezing (IQF) Technology plant in Pakistan to offer a wide variety of frozen produce, all locally sourced and processed from its state-of-the-art plant facility located in Pakpattan. FFFL is the pioneers to produce French Fries and IQF Fruits & Vegetables in Pakistan and successfully serving its happy customers at national and international levels. Its customers include Texas Chicken, Jhonny Rocket,

Hardees, Burger King, Nando's, Howdy, CP Five Star, Metro, Carrefour, Al-Fateh, Green valley, and Chase up.

Factory Address: Fauji Fresh n Freeze limited, 16-Km, Sahiwal Pakpattan Road, District Pakpattan, Punjab. **Telephone:** +92 42 4227820

Contact Person: Mr. Mubashir Rasheed (Project Manager), **Cell:** 0317-3330082

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- **Environmental Consultancies and Options - The Consultant**

The ECO is a professionally run environmental management & engineering firm with strong backup of highly qualified and experienced personnel. The company is specialized in diversified fields and continuously identifies the current and future demands related to environment and engineering. ECO services include environmental assessments, audits, risk assessments, environmental monitoring, trainings, water, wastewater treatment and alternate energy. The ECO is serving market niche with a broad range of high technology products and services to a wide spectrum of industries in Pakistan. ECO is a member of groups of companies.

The other members are: Global Waste Management (GWM), Global ECO Laboratories (GEL) [ISO 9001:2000 Certified: ISO 17025:2005] and Global Technologies (GT)

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- **A Brief Outline of the Proposal**

The Environmental Impact Assessment (EIA) has been organized into TOC, Executive summary, following Chapters and Annexures (From A to Q).

Chapter-1: Describes the purpose of report, identification of project activities proponent, details of consultant and provides a brief description of the project nature, size and location.

Chapter-2: Describes the proposed project and process in detail.

Chapter-3: The environmental setting (Physical, Ecological and Social Baseline) of the project area

Chapter-4 & 5: Describes screening of potential environmental impacts, mitigation measures and impact significance.

Chapter-6: Describes summary of environmental and social impacts of proposed construction and their mitigation measures, proposing Environmental Management and Monitoring Plan (EMMP).

Chapter-7: Conclusion of Environmental Impact Assessment (EIA) report.

- **A Brief Description of the Proposed Project**

The proposed expansion project of Fauji Fresh n Freeze Limited involves 4 components such as (1) expansion of a French Fries Line and Potato Storage Area, (2) Installation of a Wastewater Treatment Plant (WWTP), (3) Installation of a new Boiler and (4) Installation of a Vegetable Oil Storage Tank. Currently the project is at zero stage and will be completed within a 6-7 months after getting Environmental Approval from EPA, Punjab. Fresh n Freeze factory covers an area of 76 acres out of which constructed area makes up 7.7 acres whereas R & D farms spread over 25 acres. Available plain / open area is 43.3 acres. The expansion of 4 components will take place in plain area at 4 different locations within the factory premises. Detail of area reserved for each component is as: New FF Line (878 sqm), WWTP (2,025 sqm), Boiler (884 sqm) and Vegetable Oil Storage Tank (36 sqm). A large plain area is available for more tree plantation as FFFL actively organizes an annual campaign of planting trees within its boundary by involving its workers. The estimated cost of the proposed construction project will be approx. 346 million PKR, whereas 1,374 million will be spent on purchasing of machinery for all the four components. Details of each component is summarized in following tables.

Table 1: Specification of New French Fries line

Total Area	Capacity	Temperature/Other requirements	Completion Time	Supplier
870 sqm	3 tons	No	9 months	M/s Rosenqvists

Table 2: Specification of new proposed boiler

Total Area	Capacity	Fuel Type	Design Specification	Completion Time	Supplier
884 Sqm	8 TPH	Coal	Packed Type Boiler	4 to 5 months	M/s FBL Boiler

Table 3: Specification of Wastewater Treatment Plant

Total Area	**Total Capacity**	**Technique**	**Completion Time**
2,025 sqm	60 m^3/hr	Activated-sludge process along with the up-flow anaerobic sludge blanket (UASB) process.	5 to 6 months

Table 2.7: Specification of new proposed Vegetable oil storage tank

Total Area	Storage Capacity	Storage material	Tank orientation	Tank material	Completion Time	Supplier
36 Sqm	60k liter	vegetable/cooking oil	Vertical Cylindrical Tank	Stainless steel	4 to 5 months	

Man-power requirement during construction phase will be about 95-105 persons and during operational phase, about 10-14 persons will be required for all four components. Power requirement will be 100-Kilowatt/hour and about 500-Kilowatt/hour for construction and operation phases respectively and will be met through Water and Power Developing Authority (WAPDA). The source of water is underground water. Water requirement during construction phase will be about 2 m^3/day and 20 m^3/day for operational phase.

- **The major impacts**

The proposed expansion is going to happen within the premises of FFFL plant so the impact on soil, water and air will be temporary and there will be no impact on biodiversity and local community of the area. the positive impact of the proposed expansion will be that it will hire local people as construction contractor and laborers and thus bringing employment and economic development to the area. All the impacts associated with the proposed project activities are localized, temporary and manageable. Below section describes major impacts associated with proposed project activities along with their relevant mitigation measures.

Impacts during Design & Construction Phase

- Incompatible layout plan and engineering design of the project's structures can undermine the overall aesthetic beauty and ambience of the project area.

- Inappropriate structure may rupture during the earthquake or any other natural incidence and may cause fire or hazard at the site.
- Ground water in the path of the project could be disturbed by excavation. The excavated area, if linear could act as a conduit to extend groundwater contamination to new areas.
- The water quality is likely to get affected due to the discharge of construction wastewater, domestic wastewater (sewage water, wastewater from kitchen, laundries, etc.) and surface run-off from construction site
- Dust and particulate matter pollution are likely to occur during the excavation of the topsoil and loading and transportation of the construction waste which may affect the site workers and even the neighbors' health.
- Exhaust emissions are likely to be generated during the construction period by the various construction machinery and equipment.
- The excavation activity will create solid waste and debris and lower the aesthetic value of the land during the construction period.
- The machines to be used on site contain moving parts which require continuous oiling to minimize the usual corrosion or wear and tear, it will cause accidental oil spills which will have adverse environmental effects.
- During drilling and excavation activity, the surface of project site will be disturbed and may degrade the existing soil quality.

- The construction works on site will most likely have noisy operation due to the moving machines (mixers, tippers, communicating workers), incoming vehicles to deliver construction materials, workers to site and other normal construction activities.

➢ **Recommendations for Mitigation Measure (Design & Construction Phase)**

– All structural, layout and engineering will be carried out in strict accordance with the applicable bylaws and engineering parameters.

– The proposed facility will be designed according to international standards for the prevention and control of fire and explosion hazards, including provisions for segregation of process, storage, utility, and safe areas.

– Safety distances should be derived from specific safety analysis for the facility, and through application of internationally recognized fire safety standards

– The earthquake zone of the area will be considered for the design of storage tanks and equipment's foundation to mitigate the earthquake impacts in future

– If suspected contaminated groundwater is encountered in the depths of the proposed construction area, samples will be collected and submitted for laboratory analysis.

- Adopt a general strategy to avoid contamination of ground water from construction activities i.e. minimize and control discharge of effluent
- Controlling dust during construction is useful in minimizing nuisance conditions and consequently health (respiratory and eye) complications.
- In order to control exhaust emissions vehicle idling time shall be prohibited. Also, the fueled construction equipment shall be used where feasible.
- Septic tanks of adequate capacities will be constructed for receiving and treating wastewater from all temporary worksite toilets and offices, if any. The toilet wastewater will not be discharged untreated onto the adjacent lands.
- It is recommended that excavation and construction waste should be recycled or reused to ensure that materials that would otherwise be disposed of as waste are diverted for productive uses.
- The proponent should ensure to control the dangers of oil spills during construction phase by regular monitoring.
- During excavation, the soil that is extracted should be used to cover the land. It will minimize soil erosion.
- The traffic should be properly managed during loading and unloading of construction material. Personal Protective Equipment's (PPEs) shall be

provided to the workers. The times of operation of noisy equipment vehicles shall be limited.

Impacts during Operational Phase Potential environmental issues associated with the plant operation include the following:

1. Air emissions
    a) Gases from fired equipment (proposed boiler)
    b) Sodium hypochlorite cans handling & use.
    c) Heavy NH_3 release (disaster)
    d) Smoke from Diesel Engines / Vehicles
2. Odor nuisance at WWTP site
3. Noise due to working of machines at potato process line, pumping stations of WWTP and loading unloading trucks.
4. Wastewater
    a) Drainage of wastewater from proposed potato processing line.
    b) wastewater from cooling and cleaning of boiler,
    c) Other effluents disposal to drain.
5. Solid waste
    a) Paper use & wastepaper / Combustibles disposal
    b) solid waste from ash disposal.
    c) Potato peel from proposed Potato Storage Area

d) Sludge from proposed WWTP

6. Disease vector generation & transmission due to sludge
7. Land/Soil Pollution
    a) Used oil drainage or leakage.
    b) Emergency situations (spillage of wastewater in case of damage of pipelines or other infrastructures of proposed WWTP).
8. Increased Power Demand
    a) Automatic washing, peeling, and cutting potatoes machines,
    b) Operations of WWTP and FF line.
9. Emergency situations during operations
    a) Fire accidents
    b) Medical emergencies
    c) Natural emergencies
10. Occupational hazards and accidents
11. Impacts on Ecology and Biodiversity
12. Socio-economic Impacts

➢ **Recommendations for Mitigation Measure (Operational Phase)**

– Tall Vent Stacks will be installed.

– Installation of gaseous emissions treatment system like wet scrubber will be carried out.

- To minimize the CO & NO_x emission, external analysis will be done to check the emission level.
- Gas will be washed-off in wet scrubber to eliminate carbon particles from entering atmosphere.
- Washing water will circulate in close cycle.
- The instruments and equipment should be kept well maintained.
- Wet suppression will be carried out to control dust generated from cleaning operations of boiler.
- Regular monitoring and preventive maintenance and regular tuning and servicing of boiler will be carried out.
- PPE will be provided to workers.
- It should be ensured that MSDS of all chemicals are in place.
- Emergency plan/guidelines should be in place to avoid NH_3 release. Periodic testing of emergency plan (Dry Run) should be conducted. Annual emergency response training should be provided to workers.
- For reduction in air contaminants, service vehicle regularly, use low air polluting vehicles and conduct external analysis to check the smoke level. Ensure that industry owned vehicles will be tuned and maintained time to time. Also, carry out regular oil lubrication monitoring.

- Maximum tree plantation will be ensured within the premises of the industry to keep the environment clean and peaceful.
- Ensure the odor removal systems at the main sources of odor (inlet channel, inlet pumping station, coarse and fine screen channels and conveyors, containers for screenings and grit, sludge dewatering).
- Ensure Use of PPEs and Signages in noisy areas.
- All equipment with potential of noise generation will be well maintained.
- Noise at WWTP site can be reduced by Installation of high-quality pumping stations on WWTP site.
- Regular noise mapping should be carried out by HSE.
- Follow good housekeeping practices with potato line machinery that may potentially discharge wastewater.
- Blowdown wastewater from boiler will be recycled in cooling system.
- The blowdown will be treated before disposal.
- Procure clean raw potatoes, thus reducing the concentration of dirt and organics (including pesticides) in the effluent.
- Separate waste bins will be placed for different type of wastes - plastic, paper, and metal etc.
- Non-hazardous non-recyclable wastes will be disposed-off properly.
- Potato peel and other waste from French fries' line will be sold as cattle feed.

- The boiler ash will be disposed-off properly through EPA approved vendor.
- Licensed third party vendors will be contracted on long term arrangements to manage the disposal of the sludge in an environmentally beneficial manner in accordance with international good practices.
- Cover the sludge piles present at the WWTP as far as possible.
- FFFL must maintain and up-to-date Spill Prevention Control and Counter measures (SPCC) Plan.
- An inventory must be kept of oil storage tank.
- The cooking oil storage tank must have sized secondary containment.
- The department responsible for oil storage need to be equipped and able to respond to a small spill.
- At a minimum, spill kits must be available during product transfer.
- All employees that maintain oil tank and/or handle oil, must be trained yearly regarding SPCC requirements.
- In case of fuel/oil spill, cleaning of the territory and withdrawal of the contaminated soil and ground for further remediation.
- Improve wastewater quality with reference to COD & Oil by carrying out regular analysis. Ensure regular Inspection / cleaning of drains and pits.
- All electrical appliances will be switched off when not in use.

- Energy conservation should be practiced that involves proper use of electrical appliances, lighting systems and other electrical instruments used for different purposes.
- Fire extinguishers, fire hydrants and fire alarms should be provided at convenient locations within the facility. These should be regularly inspected and maintained by a reputable fire security company.
- Fire drills should be conducted at least biannually to ensure that workers are conversant with the action to take in the event of fire or explosions.

➢ **Proposed monitoring**

The proponent will engage a third party to perform the environmental audit during the construction period consisted of one year. Three periodic audits will be carried out; one at preconstruction stage, the second will be carried out during the construction and third at post construction stage.

However, for this EIA study following environmental aspects of project site has been monitored and lab reports are provided in this EIA report.

- Drinking Water (Chemical and Physical Analysis)
- Wastewater (Chemical and Physical Analysis)
- Ambient Air Quality
- Noise Quality
- Soil Quality

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CHAPTER 1

INTRODUCTION

Chapter One

INTRODUCTION

1.1 Purpose of the Report

To evaluate likely impacts/risks associated with the proposed expansion project of Fauji Fresh n Freeze Limited (FFFL) on various components of the environment and to achieve certain environmental objectives besides the existing local legal requirements, the Fauji Fresh n Freeze Limited (FFFL) has hired Environmental Consultancies & Options (ECO) to carry out Environmental Impact Assessment (EIA) study of the proposed expansion project of Fauji Fresh n Freeze plant at District Pakpattan.

Therefore, ECO has carried out detailed impact assessment study covering all the features of the environment i.e., physical, ecological, and socio-economic. The outcome of the study is the EIA report which will be submitted to Punjab EPA to obtain Environmental Approval/NOC for the construction phase.

1.2 Identification for Project and Proponent

1.2.1 The Proposed Project

The proposed project involves an expansion of existing facility within the premises of Fauji Fresh n Freeze Limited located at 16-Km, Sahiwal Pakpattan Road, Pakpattan, Punjab. The new expansion project will comprise of the following components.

- Expansion of a French Fries Line and Potato Storage Area
- Installation of a Wastewater Treatment Plant (WWTP)
- Installation of a new Boiler
- Installation of a Vegetable Oil Storage Tank

1.2.2 Fauji Fresh n Freeze Limited (FFFL) - The Proponent

Fresh n Freeze is the No.1 Food processing company of Pakistan with a globally recognized and trusted brand name synonymous with taste and quality. Fauji Fresh n Freeze Limited (FFFL) is a wholly owned subsidiary of the Fauji Fertilizer Company Limited (FFC) that was incorporated in 1978 as a joint venture between Fauji Foundation, a charitable trust incorporated under The Charitable Endowments Act 1980, and Haldor Topsoe A/S of Denmark.

Fauji Fresh n Freeze Limited is proud to be the first IQF Technology plant in Pakistan to offer a wide variety of frozen produce, all locally sourced and processed from its state-of-the-art plant facility located in Pakpattan. FFF is the pioneers to produce French Fries and IQF Fruits & Vegetables in Pakistan and successfully serving its happy customers at national and international levels. Its customers include Texas Chicken, Jhonny Rocket, Hardees, Burger King, Nando's, Howdy, CP Five Star, Metro, Carrefour, Al-Fateh, Green valley, and Chase up.

The vision of FFF is to be a value-creation business that delights its consumers with freshly processed and environment friendly agricultural products, enabling both company and country to thrive.

Table 1.1 presents existing infrastructure of FFFL Pakpattan plant including production, storage and support facilities and utilities:

Table 1.1: Existing Infrastructure of FFFL plant, Pakpattan.

Production Facilities: Currently Fauji Fresh n Freeze has following production lines to process fruits and Vegetables: • IQF French Fries Line • IQF Fruit and Vegetable Line • Fruits and Vegetable Gyro Line • Finished Product Packing Machine • Vapor Heat Treatment Plant • Hot Water Treatment Plant • Mango Ripening Chambers	**Utilities:** To support the production, Fauji Fresh n Freeze has following utilities: • Steam Boiler • Reverse Osmosis Plant • Raw Water Network • Fire Fighting Water Circuit • Refrigeration system • Compressed Air • Thermal Oil Heater • Diesel Storage System • Electrical Substation • Vegetable Oil Storage System • Wastewater Treatment Plant • RO Reject Water Evaporation Pond
Storage Facilities: To store the finished product, Fauji Fresh n Freeze have following storage facilities: • Negative Temperature Cold Stores • Blast Chillers • Positive Temperature Cold Stores • Engineering Store • Packaging Material Store	**Support Facilities:** To support the plant, Fauji Fresh n Freeze has following support facilities: • Maintenance Workshop • QA Lab • Weight Bridge • Residential Colony • Guest House • Drivers Rest Rooms • Canteen

	• Labor Washrooms • Laundry • Offices

1.2.2.1 Contact Details of FFFL

Factory Address:

Fauji Fresh n Freeze limited, 16-Km, Sahiwal Pakpattan Road, District Pakpattan, Punjab.

Telephone: + 92 42 4227820

Contact Person: Muhammad Raza Waseem (E&I Lead)

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Head office:

5-B Main Jail Road, Next to EFU House, Gulberg II Lahore, Pakistan.

Telephone: + 92 42 38104666

1.3 Environmental Consultancies & Options (ECO) - The Consultants

The ECO is a professionally run environmental management & engineering firm with strong backup of highly qualified and experienced personnel. The company is specialized in diversified fields and continuously identifies the current and future demands related to environment and engineering. ECO services include environmental assessments, audits, risk assessments, environmental monitoring, trainings, water, wastewater treatment and alternate energy (project team names and responsibilities are attached as Annexure-E) The ECO is serving market niche with a broad range of high

technology products and services to a wide spectrum of industries in Pakistan. ECO is a member of groups of companies. The other members are:

- Global Waste Management (GWM)
- Global ECO Laboratories (GEL) [ISO 9001:2000 Certified: ISO 17025:2005]
- Global Technologies (GT)

1.3.1 Contact Details of ECO

Address: 31-Commercial Area, 3rd Floor, Cavalry Ground Lahore Cantt

Contact Person: Dr. Saamia Saif (Director)

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Email: info@eco-intl.org

1.4 Nature, Area/Size and Location of Project

1.4.1 Nature of the Proposed Project

Nature of the proposed project is expansion of the FFFL Plant in District Pakpattan within its existing boundary. The expansion involves four (04) components i.e. (i) expansion of FF line and potato storage area, installation of (ii) a WWTP, (iii) new Boiler and (iv) and a vegetable oil tank.

1.4.2 Area/Size of the Proposed Project

Fresh n Freeze factory covers an area of 76 acres out of which constructed area makes up 7.7 acres whereas R & D farms spread over 25 acres.

Table 1.2:Total Area of FFFL Pakpattan Plant

Total Area (acre)	Constructed/Structured Area (acre)	R & D farms (acre)	Plain / Open Area (acre)
76	7.7	25	43.3

Table 1.3: Component wise area of expansion/installation

Component of the proposed expansion	Component 1 New FF Line	Component 2 WWTP	Component 3 Boiler	Component 4 Vegetable Oil Storage Tank
Area to be covered	878 sqm	2,025 sqm	884 sqm	36 sqm

1.4.3 Location of the Proposed Project

The proposed expansion will be carried out within the premises of FFFL Plant, which is located at 16-Km, Sahiwal Pakpattan Road, Pakpattan, Punjab. The geographical coordinates of the proposed site are given as Table 1.4, whereas the Google Earth location map is given as Figure 1.1. Location map on A3 is given as Annexure-G, whereas Layout map of proposed expansion is given as Annexure-H.

Table 1.4: Geographical Coordinates of the Proposed Site

Sr. No.	Component	Longitude	Latitude
1.	New FF line and Potato Storage Area	73°10'19.7"E	30°32'58.8"N
2.	Wastewater Treatment Plant	73°10'31.3"E	30°32'51.9"N
3.	New Boiler	73°10'23.6"E	30°32'56.1"N
4.	New vegetable oil tank	73°13'03.0"E	30°54'95.6"N

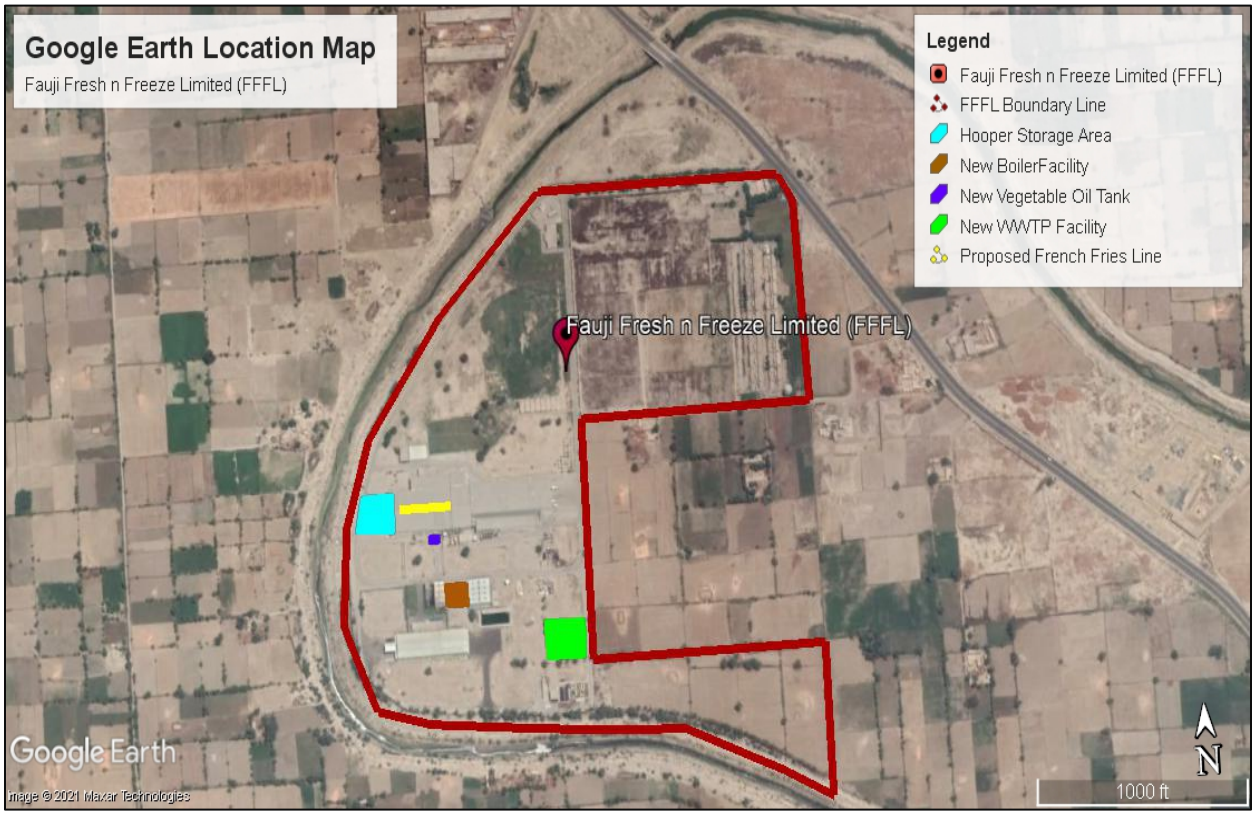


Figure 1.1 Google earth location of Proposed Project Components and Project site

CHAPTER 2

SCREENING

Chapter Two

SCREENING

2.1 Screening for Environmental Assessment

The preparation and submission of an Environmental Impact Assessment (EIA) report for any development project is a statutory obligation under Punjab Environmental Protection Act, 1997 (PEPA, 1997) amended in 2012 in terms of Section 12 of the Act which states as under:

"No proponent of a project shall commence construction or operation unless he has filed with the Government Agency designated by Federal Environmental Protection Agency or Provincial Environmental Protection Agencies, as the case may be or where the project is likely to cause an adverse environmental effects an Environmental Impact Assessment (EIA) and has obtained from the Government Agency approval in respect thereof."

According to Review of IEE and EIA Regulations, 2000; the proposed project (Expansion of French Fries and Potato Storage Area, Installation of New Boiler, Installation of WWTP and Installation of Vegetable Oil Tank at Fauji Fresh N Freeze Limited Plant) falls under Schedule II, Category B (4). Thus, an EIA Report is being prepared for duly submission in EPA, Punjab.

CHAPTER 3

SCOPING

Chapter Three

SCOPING

3.1 Introduction

The scoping identifies the key issues and impacts that should be further investigated. The Scoping defines the spatial and temporal boundaries, important issues and concerns raised during consultation and significant impact factors to be determined.

3.1.1 Spatial and Temporal Boundaries

The proposed expansion will take place within the premises of EPA approved facility of Fauji Fresh n Freeze Limited (FFFL), located at 16-km Pakpattan road, district Pakpattan. Currently the proposed expansion project is at zero stage. Although the design phase is complete and layout plan of all four components has been prepared, but the construction work is not initiated until EPA approval is granted. Land reserved for each of the four components is flattened and empty plain area. The new FF line will be installed as an extension of current FF line.

Within 5-km aerial distance of project site various residential and industrial facilities exist but the proposed expansion will be carried out within the boundary of FFFL plant so the pollution loads during construction phase will be limited to the FFFL boundary. The spatial and temporal boundaries of proposed expansion project are given below in a map.

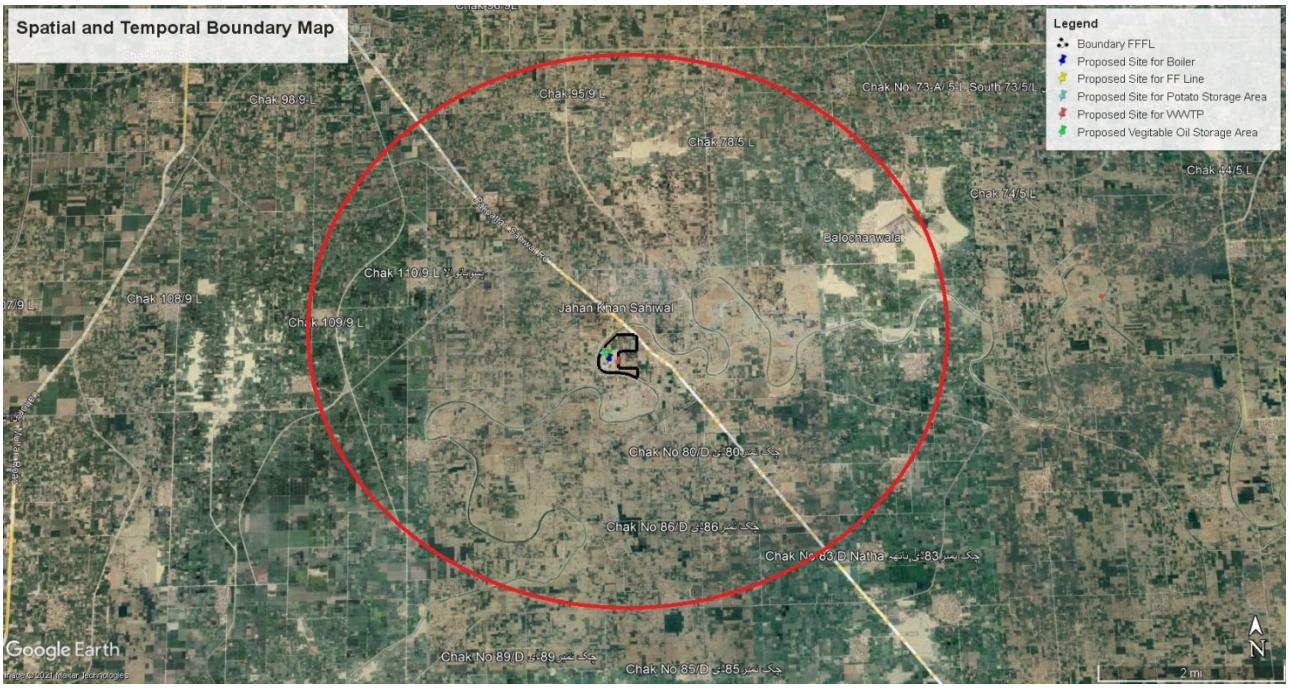


Figure 3.1 Spatial and Temporal Boundaries of Project

3.1.2 Important Issues and Concern Raised During Consultation

The consultation, scoping meeting was carried out in the project area to disseminate information about the project and its expected impact on the primary and secondary stakeholders. During survey number of relevant stakeholders was consulted i.e. local community, Government Officials and Environmental Practitioners and Experts. After consultation, it was observed that maximum people were in favor of proposed expansion project. On the other hand some of the stakeholder seems not satisfied with the proposed expansion. As they said that such projects may bring disturbance to them.

They were afraid of usage of heavy machinery that will lead to public nuisance i.e., water pollution and air pollution.

Following concerns of the local community, Government Departments and Environmental Practitioners and Experts were noted:

- Environmental Monitoring should be done regularly
- Locals should be preferred for the job opportunities
- Install wastewater treatment plants in order to avoid water pollution problems as wastewater is one of the main environmental concerns.
- Biodiversity of the area should not be damaged and proper management should be done
- An effective EMMP should be designed and enforced with true spirit
- Environmental and safety trainings should be arranged for the workers to avoid any mishap.

3.1.3 Significant impacts and factors to be determined

Main impacts and factors to be determined are:

- Occupational Health and safety
- Traffic Management
- Hygiene Management
- Job Opportunities for Locals
- Resource Conservation

- Avoid Excessive Water Consumption
- Energy Efficient Techniques must be Adopted
- Proper Site Restoration after construction
- Emergency Preparedness

CHAPTER 4

CONSIDERATION OF ALTERNATIVES

Chapter Four

CONSIDERATION OF ALTERNATIVES

4.1 General

This chapter deals with an analytical overview of the different alternatives that have been considered during the development of strategic development plan of proposed project. The following alternatives were considered during the study:

- Location/Site Alternatives, their selection and rejection criteria.
- Design/Technology Alternatives, their selection and rejection criteria.
- Environmental Alternatives, their selection and rejection criteria.
- Economic Alternatives, their selection and rejection criteria.

4.2 Site Alternative

The proposed project involves extension of an already EPA approved facility; therefore no site alternatives were considered.

4.3 Design / Technology Alternatives in terms of Wastewater Treatment Plant

Various technological options are available in case of wastewater treatment plant for the proposed project. Based upon available and practically implemented alternative Moving Bed Bio-Reactor (MBBR) and Activated Sludge Process (ASP) were considered for comparison purpose. The detail of these technological options is given below-:

Option I- Moving Bed Bio-Reactor (MBBR)

Moving Bed Bioreactors (MBBR) biologically treat wastewater through the use of circulating moving media in aerobic activated sludge environments. The moving media is typically a floating plastic substrate colonized by a community of bacteria called a biofilm. Increased levels of biofilm enhance the biological treatment process by introducing a more robust microbial community to break down nutrients. A high treatment capacity and low maintenance requirements make MBBR systems ideal to most industrial and sewage applications.

Advantages

- There are no limitations of height as long as compressors can be suitably used
- Circular structures can be used to economize on construction costs & time
- The structures can be easily covered for indoor air quality when needed
- Requires lower footprints compared to conventional activated sludge
- Easy to operate and maintain

Disadvantages

- The area per unit volume of the media offered by various vendors are different and also each vendor advocates his own criteria for the relative ratio of volume of media to volume of aeration tank, which makes it difficult to bring about a common and validated standard design criteria.
- The quality of plastic of media varies

- The verification of whether the media is moving about the entire volume of the tank or merely clumping at the top layers and if so the method of mixing it up through the tank volume without shearing of the biomass on it are issues of infirmity and which may need gentle movers of the media through the volume of the tank
- Furthermore, the media is a patented product
- Higher energy input if used without biomethanation

Option II- Activated Sludge Process

Activated Sludge Process is the most common suspended growth process used for municipal wastewater treatment. Activated Sludge Process involved-:

- Wastewater aeration in the presence of a microbial suspension,
- Solid-liquid separation following aeration,
- Discharge of clarified effluent,
- Wasting of excess biomass, and
- Return of remaining biomass to the aeration tank.

In activated sludge process wastewater containing organic matter is aerated in an aeration basin in which micro-organisms metabolize the suspended and soluble organic matter. Part of organic matter is synthesized into new cells and part is oxidized to CO2 and water to derive energy. In activated sludge systems the new cells formed in the reaction are removed from the liquid stream in the form of a flocculent sludge in

settling tanks. A part of this settled biomass, described as activated sludge is returned to the aeration tank and the remaining forms waste or excess sludge. The advantages and disadvantages of this technology are given below-:

Advantages

- Retention time in reactor tank is relatively short resulting in lesser foot print
- BOD removal rate is superior, 85-95%
- Transparency of treated effluent is high
- Stability in sewage temperature fluctuation is inferior in comparison with other methods

Disadvantages

- Primary Sedimentation Tank is required to reduce loading
- Sludge treatment facility is required
- Generated sludge volume is larger than from other methods
- The system has many maintenance and inspection points. Thus, advanced/complicated operational techniques are needed
- Energy Consumption is more

After detailed analysis in terms of capital cost, O & M cost, site suitability, land area requirement, ease of maintenance, advantages & disadvantages and neighborhood environment. The Option-II (Activated Sludge Process) was chosen as a preferred technology over other technological option.

4.4 Environmental and Economic Alternatives

As the proposed project involves extension of an already EPA approved facility; the proposed expansion is within the existing factory premises. Therefore, devising another location for the proposed expansion would make the project environmentally, economically and physically not viable. Hence, no Environmental and Economic alternatives are required to take in consideration.

CHAPTER 5

PROJECT DESCRIPTION

Chapter Five

PROJECT DESCRIPTION

5.1 Type and Category of the Project

According to Section 12 of Punjab Environmental Protection Act 2012 and its regulation "Review of Initial Environmental Examination and Environmental Impact Assessment Regulations, 2000", the present construction project which is Expansion of Fauji Fresh n Freeze Limited (FFFL) plant located at 16-Km, Sahiwal Pakpattan Road, district Pakpattan, Punjab, falls under schedule II Category B (4) and requires Environmental Impact Assessment (EIA).

5.2 Objectives of Project

The proposed project has following objectives to meet:

- Efficient usage of potential and existing resources for the benefit of The Group, country, and humanity accordingly.
- Expansion of French Fries Line to achieve sales volumes.
- To comply with country environmental and quality legal standards.
- Pursuing for further construction and contracting project opportunities in national market among public and private sector development programs
- Broader market accessibility for consumer fresh and frozen food products

- Improve people's lives, by offering frozen foods that bring pleasure, sustainability, health, and convenience.
- Ensure the supply of frozen food in high quality.

5.3 Site Alternative

As the proposed project involves extension of an already EPA approved facility, therefore no site, technology, environmental or economic alternatives are required to take in consideration.

5.4 Location and Site Layout of the Project

The proposed expansion will take place within the premises of EPA approved facility of Fauji Fresh n Freeze Limited (FFFL), located at 16-km Pakpattan road, district Pakpattan. Google Earth Map showing location of the proposed components is attached as Annexure-G and Site Layout of project is attached as Annexure-H.

5.4.1 Project Area

The FFFL Plant, Pakpattan is spread over an area of about 76 acres.

Table 5.1: Breakdown of Land Area covered by FFFL.

Total Area (acre)	Constructed/Structured Area (acre)	R & D farms (acre)	Plain / Open Area (acre)
76	7.7	25	43.3

The proposed expansion involves 4 components, area detail of each component is given in table 5.2.

Table 5.2: Area of Land for the Proposed Project

Component 1 (Sq. m) New French Fries Line and Hopper/Potato Storage Area	Component 2 (Sq. m) Boiler	Component 3 (Sq. m) WWTP	Component 4 (Sq. m) Vegetable oil tank
878	884	2,025	36

5.5 Land use of Site

Currently the proposed expansion project is at zero stage. Although the design phase is complete and layout plan of all four components has been prepared, but the construction work is not initiated until EPA approval is granted. Land reserved for each of the four components is flattened and empty plain area. The new FF line will be installed as an extension of current FF line. Figure 5.1 presents the current land use of proposed project components.

The industries near FFFL plant are Master Cattle Feed Industry (approx. 2.3 km), Fuelers Oil Depot (approx. 3.8 km), Euro oil private limited (approx. 1.2 km), Ch Poultry Farm (approx. 1.4 km), Rana Brothers Rice Mills (approx. 5.5 km), Himalayan Salt Lamps Factory (approx. 07 km), Al-Hamd Floor Rice Mills (approx. 10 km) and Engro Food Limited (approx. 13 km).

Nearby drain called as Sukh Bias Drain is approximately 500 m away from the FFFL Plant, District Pakpattan. Adjacent residential areas include Jahan Khan (approx. 01

km), Chak 110/9-L (approx. 5.5 km), Chak 109/9-L (approx. 8.5 km), Chak 95/9-L (approx. 10 km), Chak No 86-D (approx. 5.5 km) and Chak no 85-D (approx. 8.5 km). Land use map is given as Annexure-I.

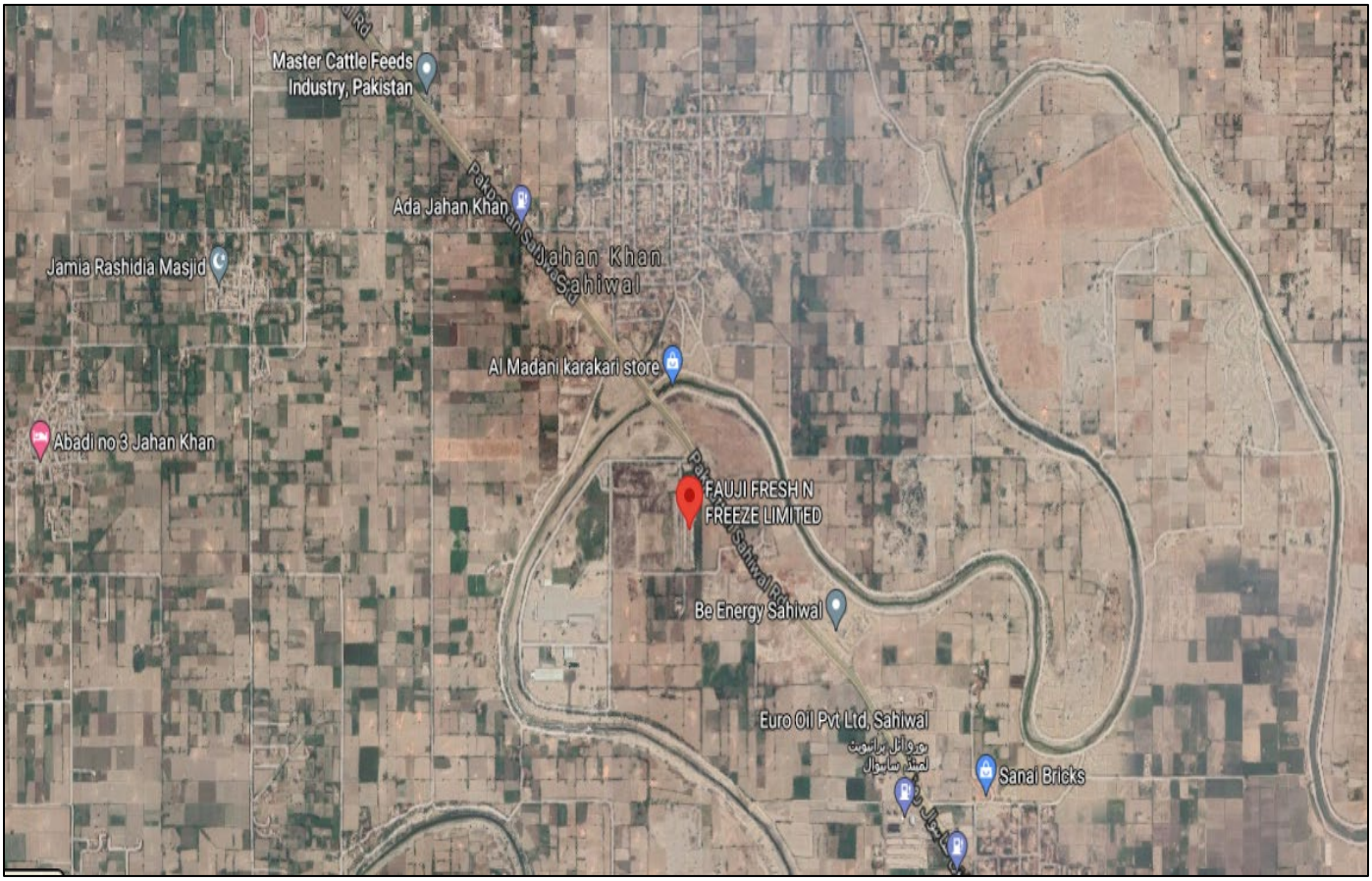


Figure 5.1: Nearby land use features

Proposed Potato Storage Area

Proposed Boiler Area

Proposed WWTP Site

Proposed Oil tanker site

Figure 5.2 Current land use of proposed project components.

5.6 Road Access

The proposed project is easily accessible through Sahiwal Pakpattan road. The road access map is given as Annexure-J.

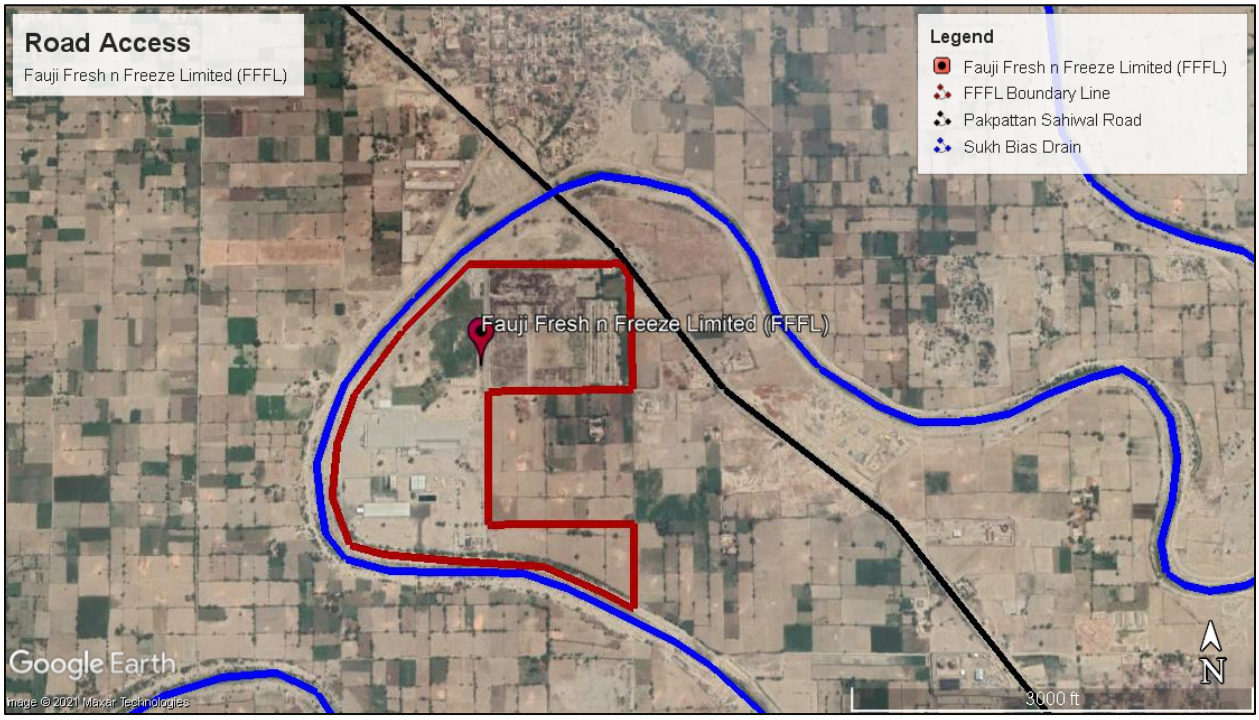


Figure 5.3: Road access map

5.7 Vegetation Features on the Site

The proposed extensions do not require any removal and replacement of the existing vegetation/plantation within the factory as four of the components will be constructed at leveled area with almost no vegetation. However, the trees observed on factory site during survey included Jambulan, Eucalyptus, Eichhornea crassipes Zizyphus, Nilotica

etc. The important shrubs found included Euphorbia milli, Scenturia heteromale, and Citrus spp. etc.

5.8 Cost and Magnitude of Operation

Estimated Cost of the Project along with its breakdown (Land, Construction and Machinery Cost) will be 1.7 billion. Table 5.3 presents component wise cost breakdown.

Table 5.3: Component wise cost breakdown of proposed project.

Proposed expansions	Cost of Land (Rs)	Cost of Construction (Rs)	Cost of Machinery (Rs)
Component 1 (New FF Line and Potato Storage Area)	N/A	267 million	1,100 million
Component 2 (Boiler)	N/A	46 million	189 million
Component 3 (WWTP)	N/A	30 million	70 million
Component 4 (Oil Tank)	N/A	3 million	15 million

5.9 Schedule of Implementation

The proposed expansion will be completed in a period of six months after getting Environmental Approval from EPA, Punjab.

5.10 Description of the Project

5.10.1 Components of the Expansion Project

The proposed expansion project comprises of four (04) new components.

- Expansion of Potato Storage Area and French Fries Line
- New Boiler
- Installation of Wastewater Treatment Plant
- Installation of Vegetable Oil

5.10.1.1 Expansion of Potato Storage Area and French Fries Line

The current potato processing line will be extended up-to an area of 870 sqm with a storage capacity of 260 tons. Location of new FF line and potato storage area is marked on layout map given as Annexure-H. Specifications are given in Table 5.4.

Table 5.4 Specification of New French Fries line

Total Area	Capacity	Temperature/Other requirements	Completion Time	Supplier
870 sqm	3 tons	No	9 months	M/s Rosenqvists

a. Process description of IQF French fries

Following steps will take place during the process:

- **Offloading:** The RM vehicle docked at the grader and bags of potatoes are offloaded onto grader which sorts out of the undersize potato.
- **Storage and feeding**: Grader accepted potatoes are stored in hoppers which then evenly feeds potatoes on to the processing line.

- **Washing and Peeling**: The potatoes are peeled by the abrasive/steam peelers along with the continuous washing with water. It is a two-stage process with a destoner to remove the stones if they pass along the potatoes.
- **Trimming:** After peeling the damaged, rotten parts are cut manually. The rotten potatoes and trimmings are collected into the baskets having a liner bag. The waste is deposed off properly after every shift.
- **Cutting**: The cutter cuts the potatoes into required cut size and shape. It does not involve human interaction. The raw water continuously flows into the cutter to aid the cutting Process.
- **Sliver & Fine remover**: At this stage small shavings/nubbins and sliver are sorted out automatically. These nubbins are disposed-off after every shift.
- **Inspection**: The visual inspection and sorting of the defective strips to ensure specification compliance.
- **Blanching**: Blanching of potato strips is done in hot water to remove sugars and reduce enzymatic activity
- **SAP Dip**: Product is passed through a SAP dip to maintain its flesh color
- **Drying**: The product is then passed through a drier to remove surface moisture. Dryer uses hot air to dry the strips.
- **Equilibrium belt**: This gives stay time for equalization of the product after hot drying.

- **Frying**: Partial frying of fries is done in a continuous fryer
- **De-Oiling shaker**: In this step surface oil of fries is reduced.
- **Pre-Cooling**: Precooling of fries is done to reduce its temperature before entering freezing tunnel.
- **IQF Freezing**: IQF freezing of French fries is done to -12C.
- **Inspection**: Final inspection of product is done for defects.
- **Packing**: Frozen fries are packed in bulk carton lined with blue liner
- **Printing**: Carton is weighed, tapped, and printed with a batch code for traceability
- **Storage**: Packed product is then stored in cold storage rooms
- Process flow diagram with inputs and outputs is given as figure 2.4.

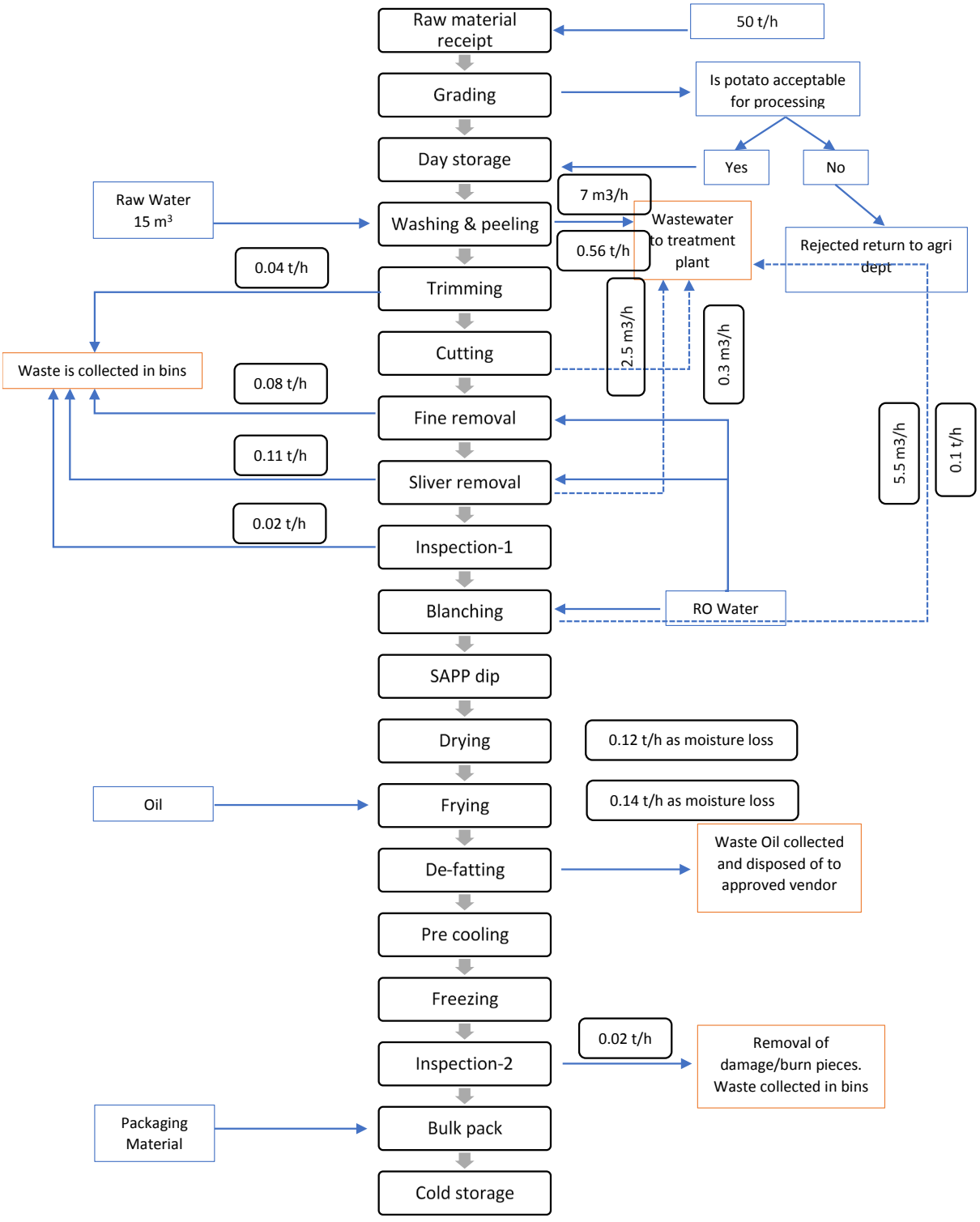


Figure 2.4: Process flow of IQF French Fries

5.10.1.2 New Boiler

A coal fired boiler of 8TPH capacity will be installed during expansion. Layout of boiler is attached as Annexure-K whereas its location is marked on layout map given as Annexure-H. Table 5.5 presents its specification.

Table 5.5 Specification of new proposed boiler

Total Area	Capacity	Fuel Type	Design Specification	Completion Time	Supplier
884 Sqm	8 TPH	Coal	Packed Type Boiler	4 to 5 months	M/s FBL Boiler

5.10.1.3 Installation of Wastewater Treatment Plant (WWTP)

a. Components of WWTP are Influent Sump, Bucket Screen, Primary Lamella Clarifier, Equalization Tank, Up flow Anaerobic Sludge Blanket (UASB) Unit, Aeration Tank, Secondary Lamella Clarifier and Sludge Dewatering System. Design and Specification of WWTP is given in Table 5.6, its location is marked on layout map given as Annexure-H.

Table 5.6 Specification of Wastewater Treatment Plant

Total Area	Total Capacity	Technique	Completion Time
2,025 sqm	60 m^3/hr	Activated-sludge process along with the up-flow anaerobic sludge blanket (UASB) process.	to 6 months

b. Process Description of WWTP

The process adopted for wastewater treatment is ***activated-sludge process*** along with the ***up-flow anaerobic sludge blanket (UASB) process.***

- The up-flow anaerobic sludge blanket reactor (UASB) is a single tank process. Wastewater enters the reactor from the bottom and flows upward.
- Suspended sludge blanket filters treat the wastewater as the wastewater flows through it.
- Biogas is also generated as by-product and treated wastewater is sent for further treatment to activated-sludge process.
- In activated sludge process aerobic bacteria are kept in the perfect aerobic environment for oxidation of organic matter at maximum efficiency.
- The aerobic mix culture bacteria, release carbon dioxide and ammonia after digestion in the air and generate new cells as well.
- However, the aerobic bacteria consume oxygen in the oxidation process of organic matter. This air is continuously supplied to keep them alive and enhance their growth.
- Finally, the bacterial cells are separated from the mixed liquor in the Clarifier.
- The supernatant from Clarifier will be stored in the final storage tank.

- The treated effluent can then be used for irrigation purposes or can be drained otherwise (as it will be complying PEQs).
- Flow diagrams are given below as Figure 5.2 & 5.3.

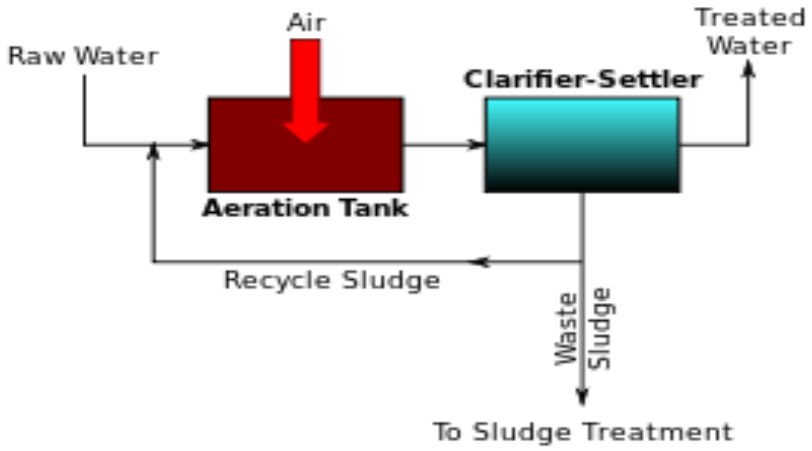


Figure 5.5: Activated Sludge Process

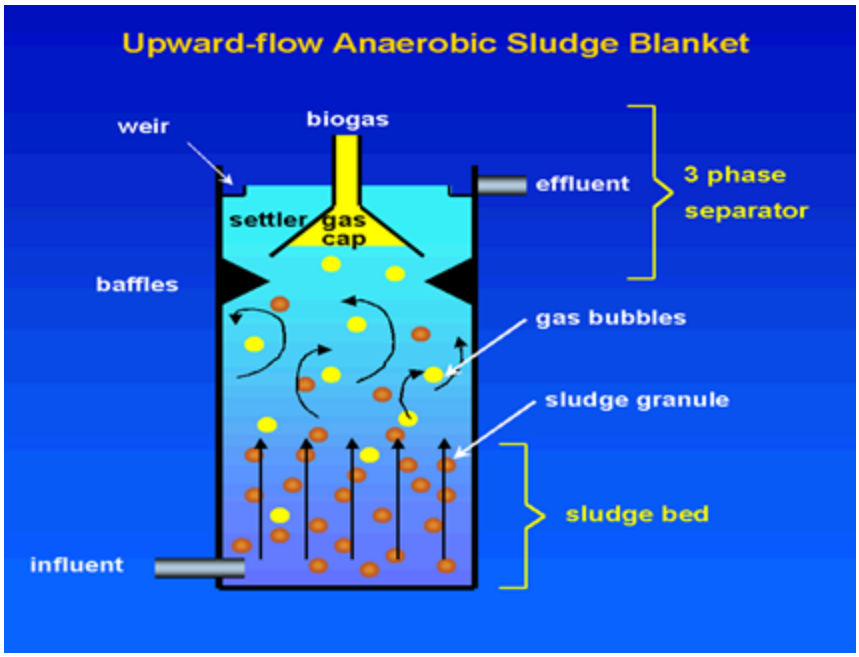


Figure 5.6: Upward flow Anaerobic Sludge Blanket

5.10.1.4 New Vegetable Oil Tank

A vegetable oil tank of 60,000 liters storage capacity will be installed during expansion. The cooking oil will be supplied to new FF line through a pipeline to be used for frying purpose. Its location is marked on layout map given as Annexure-H. Table 5.7 presents its design specifications.

Table 5.7 Specification of new proposed Vegetable oil storage tank

Total Area	Storage Capacity	Storage material	Tank orientation	Tank material	Completion Time	Supplier
36 Sqm	60k liter	vegetable/cooking oil	Vertical Cylindrical Tank	Stainless steel	4 to 5 months	

5.10.2 Estimated Manpower Requirement

Man-power requirement during construction phase will be about 95-105 persons and during operational phase, about 10-14 persons will be required for all four components. In addition, there will be two (02) working shifts during construction phase and three (03) working shifts during operation phase.

5.10.3 Electricity / Power Requirement

a) Source of Electricity

Electricity/Power requirement for both construction and operation phases will be met through Water and Power Developing Authority (WAPDA).

b) Estimated Electricity/Power Requirement

Electricity/Power Requirement for construction phase will be about 100-Kilowatt/hour and power requirement for operational phase will be about 500-Kilowatt/hour.

5.10.4 Water Balance

a) Source of Water

The source of water for proposed activities will be underground water.

b) Water Requirement

Estimated water requirement during construction phase will be about 2m^3/day and for operation phase about 20m^3/day water will be required.

c) Disposal of Municipal and Process Water

Estimated WW amount to be generated during construction will be 1 m^3. Whereas during operation phase, about 18 m^3/hr WW will be generated mainly from French Fries Line & Boiler that will be treated in the proposed WWTP. The treated water will be disposed-off in nearby drain. Agreement with Irrigation Department is attached as Annexure-L.

5.10.5 Solid Waste Disposal

The solid waste to be generated during construction phase will consist of metal scrap from Fabrication Work and debris from construction activities. Debris will be re-used for refilling purposes whereas metal scarp is saleable item. During operation phase, potato waste (420Kg/hr) will be generated from French Fries Line that will be sold to vendors who make cattle feed. Ash will be produced from proposed boiler that will be given as

a fertilizer to nearby farmers. The sludge will be produced as a by-product of the operations of the proposed WWTP, that will be transferred from recycle pit to sludge drying bed for dewatering. There will be 02 sludge drying beds each with a surface area of 128 m^2. Sludge will be dried and then disposed on periodic basis to the nearest solid waste dump site. A detailed strategy of sludge management is mentioned in Design Report of WWTP attached as Annexure-M.

Other solid waste to be generated during operation phase will be in the form of wood, plastic, paper, foil, and cardboard / cartons. Estimated amount of solid waste to be generated during operation phase will be 100 kg/day.

All waste (Non-saleable and Saleable) and scrap items will be received at Waste Warehouse of the factory, segregated & stored according to the type and category of the material and with proper labeling. The location of the Waste Warehouse is marked on the lay out map provided as Annexure-H. The factory also has a designated Scrap Warehouse and Sludge Area from where vendor's vehicles collect the waste. Non-saleable waste will be sent to certified vendor for incineration. Moreover, saleable solid waste is given to licensed vendor for proper disposal.

Contract is in place for disposal of waste/general scrap with Global Waste Management (GWM). Evidence of handling waste by GWM is provided as Annexure-N.

5.11 Restoration and Rehabilitation Plan

The main areas to be considered for site restoration include the construction area for all four (04) components, camp sites area, temporary tracks; land used for vehicle and material stores etc. These areas should be restored to its original condition with the maximum possible effort. The restoration work comprises the removal of temporary construction work and removal of any fence installed, levelling of areas (wherever required) etc. The following procedures should be adopted for the restoration of the site:

- All temporary construction built for the site development should be removed.
- Site for construction camps should be restored to its previous conditions as much as possible.
- All the toxic and hazardous chemicals/materials will be completely removed from the site.
- Efforts will be made to completely remove the oils and chemical spills during the construction.
- Any debris from construction activities should be removed properly from the site.
- All fencing and gates will be removed, and pits will be backfilled.
- Whole of the site will be covered with the original soil to the original levels and grades and vegetation will be done, where required.

Finally, after the completion of the restoration process, the proponent and the supervisory consultants should inspect the site and the proponent should give the restoration clearance to the contractor.

5.12 Government Approvals/Certificates

Approvals from the concerned departments are attached as Annexures L and O. Also, FFFL has following certifications:

CHAPTER 6

DESCRIPTION OF ENVIRONMENT

Chapter Six

DESCRIPTION OF ENVIRONMENT

6.1 Introduction

An environmental baseline study is intended to establish a database against which potential impacts can be predicted and managed later. The prevailing environmental conditions need to be assessed before the preliminary stages of planning and execution of the project. The EIA of the proposed project covers a comprehensive description of the project area. The existing environmental conditions of Pakpattan District and around the proposed project have been considered with respect to physical, biological and socio-economic aspects. A site visit was conducted to collect environmental data on physical, biological and socioeconomic parameters. Furthermore, interviews were also taken with the public to seek the public opinion on the implementation of the proposed project. The below section provides an overview of the current situation of the Pakpattan district with respect to Physical, Ecological, Socioeconomic Environment. Moreover, this chapter has also highlighted the quality of life of people of the project area.

6.2 Study Parameters

The information - data for use in the report has been secured from two main sources: published literature and field surveys. Published literature was reviewed to collect available environmental information about Pakpattan including climate, ecological, biological, socioeconomic, cultural conditions and land use. A site visit was conducted to survey the field area and to collect environmental data on physical, biological and socio-economic parameters. Further, consultations were held with the public and stakeholders of the project area in order to pursue the public opinion on the enactment of the proposed project.

6.3 Profile-District Pakpattan

Pakpattan District is one of the 36 Districts of Punjab Province of Pakistan. According to Census 2017 total population of District Pakpattan is 1,823,687[1]. The capital Pakpattan is located about 169 km from Lahore and 205 km from Multan. The district is bounded to the northwest by Sahiwal District, to the north by Okara District, to the southeast by the Sutlej River and Bahawalnagar District, and to the southwest by Vehari District.

[1] District Census Report Pakpattan

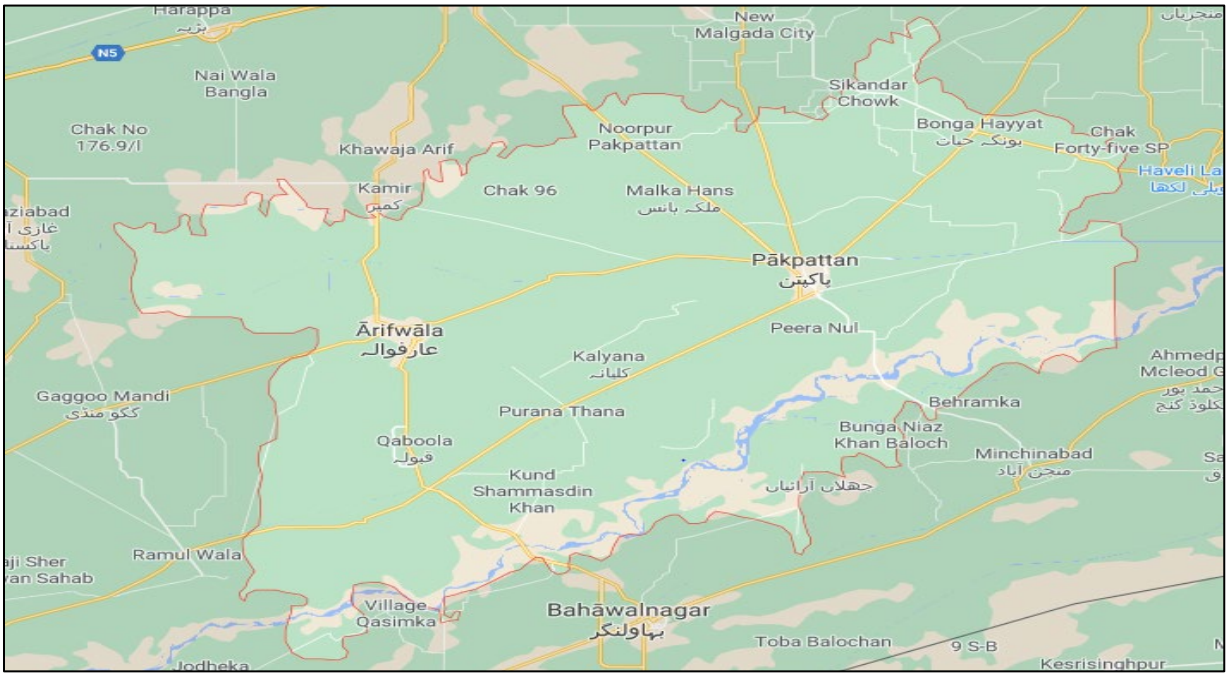


Figure 6.1 Map of District Pakpattan[2]

6.3.1 Administration

The District Pakpattan, is divided into two tehsils, which contain a total of 63 Union Councils. Table 6.1 showing the Administration in Pakpattan.

Table 6.1 Administration District Pakpattan[3]

Tehsils	Union Councils
Arifwala Tehsil	26
Pakpattan Tehsil	28

[2] http://www.maplandia.com/pakistan/punjab/sahiwal/pakpattan/

[3] https://en.wikipedia.org/wiki/Pakpattan_District

6.4 Physical Environment[4]

Physical environment consists of existing landform and land use of the project site, geology and geomorphology, soils, groundwater, surface water, meteorology, and climate. The pre-project condition (i.e., baseline) of each these components of the physical environment are described here below. The baseline environmental conditions based on the said data sets have subsequently been used to identify the potential impacts on the physical, biological and socio-economic environment that are likely to arise from the project activities.

6.4.1 Geography

Pakpattan, a largely rural district, is situated in central Punjab and surrounded by Sahiwal District to the northwest, Okara District to the north,

Sutlej River and Bahawalnagar District to the southeast, and Vehari District to the southwest. Its distance from the provincial capital Lahore is 207 km.

6.4.2 Climate

Pakpattan has the desert climate prevailing. The daytime temperature is warm to hot, while it can also be cold at night. The average annual temperature for Pakpattan is 29° degrees and there is about 376 mm of rain in a year. It is dry for 207 days a year with an average humidity of 36% and an UV-index of 6.

[4] https://www.worldweatheronline.com/pakpattan-weather-averages/punjab/pk.aspx

6.4.3 Temperature

In general, the Project corridor is subject to pronounced variations in temperature, directly and indirectly influencing the environment. **Table 6.2** shows a variation in temperature of Pakpattan.

Table 6.2 Temperature Pakpattan (°C) (Maximum, Average & Minimum)

Temperature (°C)												
2018												
	Jan	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
Max.	27	29	35	40	44	45	41	41	40	38	32	26
Min.	13	14	19	26	33	36	34	33	28	25	20	15
Avg.	21	24	30	36	41	42	39	38	36	33	27	21
2019												
Max.	22	23	30	40	42	45	42	41	42	37	29	23
Min.	11	12	16	27	32	35	33	31	29	24	19	14
Avg.	18	19	25	36	39	42	39	38	38	33	25	19
2020												
Max.	19	27	28	37	43	45	44	41	41	39	30	25
Min.	11	14	17	25	31	35	35	32	31	26	18	14
Avg.	15	22	24	33	39	42	41	38	37	34	25	20
2021												
Max.	24	31	36	-	-	-	-	-	-	-	-	-

Min.	13	17	21	-	-	-	-	-	-	-	-	-
Avg.	19	26	31	-	-	-	-	-	-	-	-	-

6.4.4 Rainfall

Average annual rainfall ranges between 23 mm and 52 mm. The maximum rainfall (about 60 percent of the total annual rainfall) occurs during the monsoon season (July, August and September), while the period of minimum rainfall or drier period is October and November. **Table 6.3** shows the mean monthly rainfall data for Pakpattan.

Table 6.3 Rainfall (Pakpattan)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2018												
Rainfall (mm)	0	3.6	4	12.11	16.9	132.2	37.5	9.5	3.9	0.1	0	6.8
Rainfall Days	0	4	2	4	3	14	9	4	1	0	0	0
2019												
Rainfall (mm)	9.9	25.7	7.3	23.3	37.7	25.5	81.4	51.7	6.3	1.8	11.3	26.6
Rainfall Days	1	5	4	4	7	8	16	14	2	3	5	1
2020												
Rainfall (mm)	39.8	6.4	78	17.3	26.9	16.6	88	62.4	65.5	0	3.2	2
Rainfall Days	7	5	6	12	12	12	13	19	16	8	0	1
2021												
Rainfall (mm)	20.3	0.1	2.1	-	-	-	-	-	-	-	-	-
Rainfall Days	3	1	4	-	-	-	-	-	-	-	-	-

6.4.5 Sun Hours & Sun Days

Table 6.4 Sun Hours & Sun Days

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2018												
Sun Hours	371	332	372	357	372	359	372	369	360	372	359	372
Sun Days	31	23	26	22	18	14	21	25	29	30	30	28
2019												
Sun Hours	347	326	365	359	372	360	368	372	360	372	350	355
Sun Days	26	20	26	23	18	16	10	13	25	25	24	29
2020												
Sun Hours	326	337	344	348	358	342	345	348	324	372	356	367
Sun Days	23	22	17	16	17	15	12	16	22	31	28	27
2021												
Sun Hours	307	323	369	-	-	-	-	-	-	-	-	-
Sun Days	27	27	27	-	-	-	-	-	-	-	-	-

6.4.6 Humidity

July, August and September are the most humid months in the area. May and June are the least humid.

6.4.7 Wind Direction

The predominant average hourly wind direction in Pakpattan varies throughout the year. The wind is most often from the west for 1.8 months, from April 23 to June 18 and

for 1.1 months, from September 11 to October 14, with a peak percentage of 42% on May 30. The wind is most often from the south for 2.8 months, from June 18 to September 11 and for 2.0 days, from October 14 to October 16, with a peak percentage of 46% on August 10. The wind is most often from the north for 6.1 months, from October 21 to April 23, with a peak percentage of 43% on January 1.

6.5 Environmental Monitoring Parameters Results[5]

Following tables present analysis results of noise, soil, water, air quality tested by EPA certified Global Eco Lab (GEL).

6.5.1 Water Sources

To check the existing water quality of the area, a sample was collected from the proposed project site. Following table 6.5 presents summary of results.

Table 6.5 Summary of Parameters for Ground Water Quality

Sr. No.	Parameters	Units	PEQS	Concentration
1.	pH Value	....	6.5-8.5	7.82
2.	TDS	mg/l	1000	1075
3.	Turbidity	mg/l	5.0	1.10
4.	Chloride	mg/l	250	395
5.	Sodium	mg/l	---	246.3
6.	Potassium	mg//	---	5.2
7.	Sulphate	mg/l	---	130

[5] Global Eco Lab (EPA Certified)

6.5.2 Ambient Air Quality

Ambient air quality was also monitored by taking 04 different sites of the proposed scheme. Table 6.6 shows that all parameters monitored for ambient air quality are under compliance with PEQS.

Table 6.6 Ambient Air Monitoring Results

Sr. No.	Source	CO	O_3	SO2	NO_2	PM_{10}
	Unit	mg/m^3	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$
	PEQS	**10**	**130**	**120**	**80**	**150**
1	Proposed Site of Boiler	1.1	8	7.8	38	37
2	Hopper Area Extension	1.6	6	2.6	26	38
3	Vaporize Heat Treatment	1.2	9	7.8	36	35
4	WWTP	1.3	7	5.2	34	33

6.5.3 Noise

The noise levels recorded at the selected spots of the proposed project area were within the acceptable range as shown in Table 6.7.

Table 6.7 Noise Monitoring Results

Sr. No.	Sources	Result	Noise Level dB (A)
1	Proposed Site of Boiler	52.0	
2	Hopper Area Extension	52.8	75 dBA
3	Vaporize Heat Treatment	50.4	
4	WWTP	47.9	

6.5.4 Soil Analysis

Soil sample was collected from the proposed project site. Table 6.8 shows results analysis of soil quality.

Table 6.8 Summary of Parameters for Soil Quality

Sr. No.	Parameter	Unit	Concentration
1	pH	------	8.16
2	Sulphate	mg/kg	360
3	Sulphide	mg/kg	3.5
4	Chloride	mg/kg	340
5	Fluoride	mg/kg	8.4
6	Sodium	mg/kg	356
7	Potassium	mg/kg	54
8	Calcium	mg/kg	360
9	Magnesium	mg/kg	120

10	Iron	mg/kg	25
11	Barium	mg/kg	9.6
12	Zinc	mg/kg	36.8

Lab Reports from EPA Certified Lab of all the quality parameters is attached as Annexure-P.

Environmental Monitoring of Air, Noise, Soil and Water









6.6 Biological / Ecological Environment[6,7]

A survey of the local biological environment was conducted which includes the study of flora and fauna of the project area. The detail flora and fauna study along with the conditions of surrounding areas is the main requirements of the EIA study. Ecological

[6] Arifa, Z., Ahmad, S. S., Sardar, A. A., & Zaheer-ud-Din, K. (2014). Evaluation of ecological aspects of natural vegetation of Pakpattan District using multivariate techniques. *Journal of Biodiversity and Environmental Sciences (JBES)*, *5*(4), 230-238.

[7] Zereen, A. Z. (2011). *Ethnoecological studies of wild flora of central Punjab, Pakistan* (Doctoral dissertation, GC UNIVERSITY, LAHORE).

data is necessary to identify and assess the main effects, which that development is likely to have on the environment in this case.

6.6.1 Flora

In Pakpattan district, the most important species of trees are as follows:

- Kikar (Acacia Arabica);
- Shisham or Tahli (Delbergia sissoo);
- Beri (Zizyphus jujube);
- Toot (Morus alba);
- Sharin (Albizzia lebbek);
- Dherek (Melia azeharach);
- Phulai (Acacia modesta);
- Pipal (Ficus religiosa);
- Bohr (Ficus bengalansis);
- Jand (Prosopis spicigera);
- Karir (Capparis aphylla); and
- Wan (Salvadora oleoides)

The entire Pakpattan District has no natural forests, mainly due to vast agricultural activities. Until a few decades ago Sutlej River was well known for riverain forests, known as Bela forests, which have almost become extinct due to lack of water. Except a small patch of Arifwala irrigated plantations of 1,575 acres, the district has no other reserved forests. However, according to an old provincial notification, the trees

along canals, provincial highways and rural roads are the responsibility of the forest department, which fall in the category of reserved forests.

6.6.2 Fauna

Several species of wildlife have adapted to the changed habitat which include, the jackal; jungle cat; Bengal fox; small Indian mongoose; shrew; hog deer; ravine deer; black buck; blue bull; wild hare; and rodent pests, including porcupine; fruit bats; and wild boar.

6.6.3 Birds

The avifauna that has survived the modified habitat include doves; black partridge; cuckoos; koel; woodpeckers; parakeets; bulbuls; babblers; black drongo; bee eaters; finches; owls; hawks; and house sparrow.

6.6.4 Reptiles

The reptilian species include krait; cobra; saw scaled viper; rat snake; and monitor lizard.

6.7 Socio-Economic Environment

This section describes the key socio-economic features of the district and study area, including the administrative setup, population, education, health, infrastructure, occupations, and other cultural resources. Primary and secondary data sources were used to develop the socioeconomic baseline of the area.

6.7.1 Population

According to census 2017 total population of Pakpattan City is 176,693. Average annual growth rate is 1.65 from 1998 to 2017.

6.7.2 Religion

Islam is the predominant religion in Pakpattan which covers over 98.2 percent of the population.

6.7.3 Language

Punjabi is the native spoken language, but Urdu is also widely understood. Haryanvi also called Rangari is spoken among Ranghar, Rajput. Meo have their own language which is called Mewati.

6.7.4 Agriculture

The Pakpattan is known for the fertility of its soil and most of the population of Pakpattan district makes a living on agriculture. The main crops are wheat, rice, cotton, maize (corn), sugar cane, etc. The primary fruits and vegetables that are harvested are mango, guava, carrots, potatoes, oranges and okra.

6.7.5 Industry

Some industrial entities in District Pakpattan and Sahiwal which surrounds the project area Master Cattle Feed Industry, Fuelers Oil Depot, Euro oil private limited, Ch

Poultry Farm, Rana Brothers Rice Mills, Himalayan Salt Lamps Factory, Al-Hamd Floor Rice Mills, Engro Food Limited etc.

6.7.6 Transportation

Different mode of transportation is available in the district and being used by the locals which includes Cars, Rickshaw, Bus, Taxi and others.

6.7.7 Ethnic Structure

The main castes and groups of the Pakpattan district are Joiya, Arain, Watto, Sukhera, Dhuddi, Sheikh, Chohan and Bhatti. Besides, there are also village artisans, which include Lohars (blacksmiths), Tarkhan (carpenter), Kumhars (potters), Mochis (cobblers), Machhis (water-carries), barbers and weavers etc.

6.8 Quality of Life Values[8]

This section covers the social structure of this area. Consultants carried out a detailed survey in the project area and collected the desired information. Socioeconomic questionnaire was used as survey tool by the survey team to collect desired information. Graphical representations of results of socio-economic survey are given as follows.

[8] Survey Conducted by ECO team on 04/04/2021.

6.8.1 Age

The people interviewed for the socio-economic assessment belongs to different age groups. 41% belongs to age group between 15 to 25 years, 39% belongs to 26 to 35 years, 04% belongs to 36 to 45 years, 07% belongs to 46 to 55 years and 09 % belongs to age above 56 years.

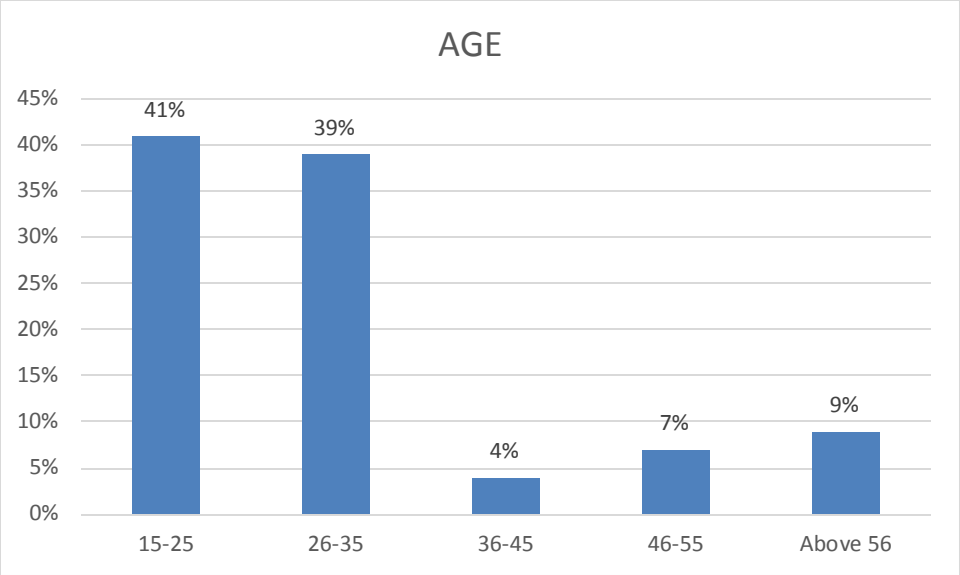


Figure 6.2: Graph showing age comparison of local community

6.8.2 Education

Majority of the population (56%) has done intermediate. Population up to graduate level was about 5%. Moreover, 31% were educated up to middle level and 8% population was up to primary level.

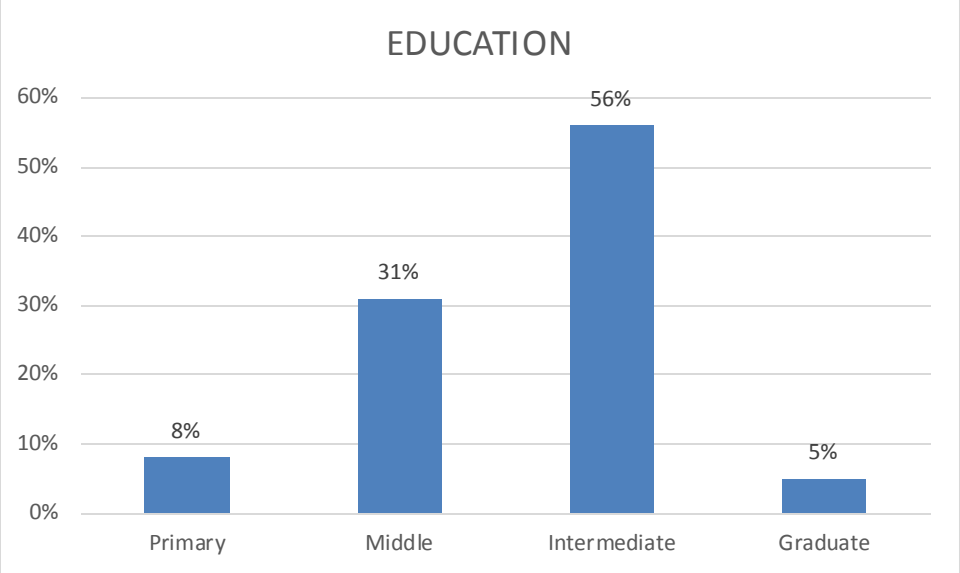


Figure 6.3: Graph showing education level

6.8.3 Income Level

During survey, it was found that 53% respondents fall within the income range of above Rs. 15,000 to 20,000. 36% respondents earn Rs. 20,000 to 30,000. While 8% earn Rs. 35,000 to 40,000 and only 3% people earn above Rs. 40,000.

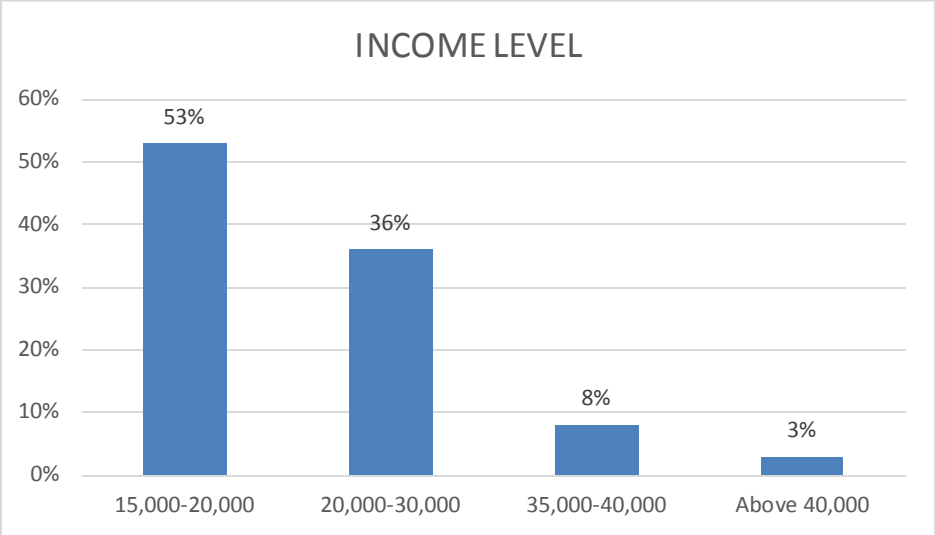


Figure 6.4: Graph showing income level

6.8.4 Employment Status

It was observed from the survey that 47% of the people who were interviewed in a general survey were employed. 40% of the people running their small business, whereas 13% were unemployed.

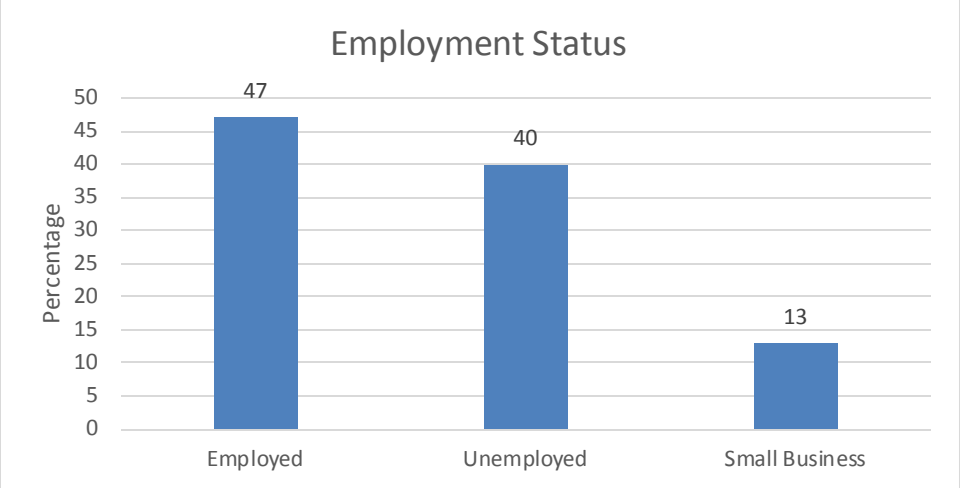


Figure 6.5: Graph showing employment status

6.8.5 Family System

It was found during survey that 97% respondents are living separately/individually, while only 3% respondents are living in joint family system.

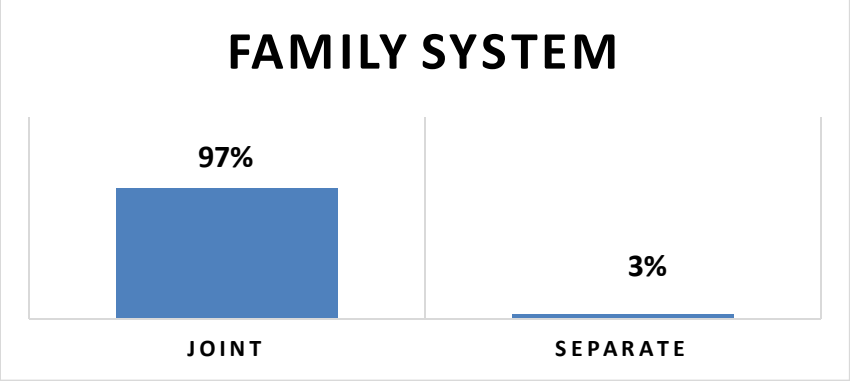


Figure 6.6: Graph showing family system

6.8.6 Educational Facilities

The proposed project is surrounded by many educational facilities including well known and famous schools which are as follows:

- Government High School Jahan Khan
- Government High School Chak 110/9-L
- Government Primary School Chak 82/D
- Government Primary School Chak 82/D
- Comsat Institute Sahiwal
- GC University Faisalabad, Sahiwal Campus

6.8.7 Health Facilities

Medical Facilities near the proposed project are bit poor. Well-known public sector hospitals serving the area which are far more than 5 to 10 km includes District Headquarter Pakpattan and District Headquarter Sahiwal. Whereas small dispensaries serving the nearby area includes Rural Dispensary Jahan Khan, Rural Dispensary 110/9-L, Rural Dispensary 112/9-L and Rural Dispensary 82/D

6.8.8 Caste

The local citizens living nearby the project site belongs to different castes. Mostly people belong to the, Joiya, Watto, Chohan and Arain Families.

6.8.9 Language

The mostly spoken languages in the area are Urdu and Punjabi.

6.8.10 Dress

Both Eastern & Western dresses are used by local public. Mostly wears eastern dress Shalwar & Qameez while other wears jeans and shirts.

CHAPTER 7

IMPACT CHARACTERIZATION

Chapter Seven

IMPACT CHARACTORIZATION OF FFFL'S PROPOSED EXPANSION PROJECT

7.1 Characterization of Environmental Impacts

An environmental impact is limited to a single environmental factor variation, and this change is caused by the development actions' particular activities.

1) An environmental impact can be good (favorable for the crowd) or not (negative for the crowd). However, for one kind of influence's judgment is good or not has its social nature. Environmental impact is applied to humans and populations, the consequences cannot be evenly distributed in the whole society or everyone. It is important to fully understand who benefit and the extent of benefit, who suffer and the extent of victimization.
2) An environmental impact can be obvious and significant, and it also can be potential and possible (or latent). In many cases, the potential (latent) impact is often more severe and significant than significant impact.
3) Under an environmental impact factors, changes in environmental factors have the character of spatial distribution.

4) An environmental impact is time varying; the impact of this change can be long or short. Different time of the proposed action have different effects. As time continues, changes have taken place in the intensity and nature of the impact.
5) An environmental impact factors causes the likelihood of environmental factor changes is random, it has a certain probability distribution characteristic.
6) Reversible or irreversible. The impact of reversible and irreversible is relative. Reversible effects can be restored, while irreversible effects cannot. Unrecoverable also refers to certain values of environmental resources loss and unrecoverable. A resource development project can also be induced to produce irreversible and non-restorative effects action. Such as: a transport facility will facilitate land development, resource extraction and tourism that have irreversible impact on operations in the region.
7) The connections among the various effects can be transformed.
8) Primary (junior) environmental impact tends to produce secondary impact. Primary (junior) effects are a direct result of the development of actions, and secondary effects are induced by the primary effects. Secondary influence should be attentive as primary influence.
9) Effect is short-term or long-term. Short-term effects are produced by the direct action; long-term effects often cause secondary impacts. A development action is often both short-term and long-term effects.

Tables 4.1, 4.2 and 4.3 present impact characterization of new expansion project proposed by FFFL.

Table 4.1: Impact characterization key

✓ Nature	(direct/indirect)
✓ Duration of impact	(short term, medium term, long term)
✓ Geographical extent	(local, regional)
✓ Timing	(project phase: before, during and after construction
✓ Reversibility of impact	(reversible/irreversible)
✓ Likelihood of the impact	(certain, likely, unlikely, rare)
✓ Impact consequence severity	(severe, moderate, mild).
✓ Impact significance	(High, medium, low)

Table 4.2: Environmental Impact Characterization for Project Construction Phase

Impact	Nature	Duration	Geo Extent	Timing	Reversibility	Likelihood	Consequence Severity	Impact Significance
Physical Environment								
Soil Erosion,	Direct	Short Term	Local	During Construction	Reversible	Likely	Moderate	Medium
Soil Degradation	Indirect	Short Term	Local	During Construction	Reversible	Likely	Mild	low
Air Quality Deterioration	Direct	Short Term	Local	During Construction	Reversible	Likely	Moderate	low
Surface water Contamination	Indirect	Short Term	Local	During Construction	Reversible	Unlikely	Mild	Low
Groundwater Contamination	Direct	Short Term	Local	During Construction	Reversible	Likely	Moderate	Medium
Water Consumption	Direct	Short Term	Local	During Construction	Reversible	Likely	Moderate	Medium
Availability	Direct	Short Term	Local	During	Reversible	Likely	Moderate	Medium

				Construction				
Biological Resources								
Loss of/Damage to Natural Vegetation	Indirect	Short Term	Local	During Construction	Reversible	Rare	Mild	Low
Loss of/Damage to Wildlife	Indirect	Short Term	Local	During Construction	Reversible	Rare	Mild	Low

Table 4.3: Environmental Impact Characterization for Operation Phase

Impact	Nature	Duration	Geo Extent	Timing	Reversibility	Likelihood	Consequence severity	Impact significance
Soil Contamination	Indirect	Short Term	Local	After Construction	Reversible	Rare	Mild	Low
Water Contamination	Direct	Short Term	Local	After Construction	Reversible	Likely	Mild	Low

Health and Safety	Direct	Short Term	Local	After Construction	Reversible	Likely	Moderate	Medium
Solid Waste	Indirect	Short Term	Local	After Construction	Reversible	Likely	Mild	Low
Air pollution	Direct	Short Term	Local	After Construction	Reversible	Likely	Moderate	Medium
Biological Environment	Indirect	Short Term	Local	After Construction	Reversible	Rare	Mild	Low

CHAPTER 8

SCREENING OF POTENTIAL ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Chapter Five

SCREENING OF POTENTIAL ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

8.1 Introduction

This section discusses the potential impacts of expansion project on the area's physical and biological resources along with socioeconomic conditions and, where appropriate, identifies mitigation measures that will lessen, if not eliminate, the potential adverse impacts. The assessment carried out in this section is based on project potential positive and negative impact on overall environmental and social receptors present within the project area or in its immediate vicinity.

8.2 Potential Impacts of proposed activities and their Environmental Enhancement or Mitigation Measures

8.2.1 Project Location

The proposed expansion is going to happen within the premises of FFFL plant so the impact on soil, water and air will be temporary and there will be no impact on biodiversity and local community of the area. the positive impact of the proposed expansion will be that it will hire local people as construction contractor and laborers and thus bringing employment and economic development to the area. Following impacts must be kept in mind while choosing location of the proposed expansion:

- ✓ Areas free from objectionable odors, smoke, flies, ash, and dust or other sources of contamination shall be considered in choosing the location for the potato processing plant.
- ✓ Frozen food preparation plants shall be completely separate from areas used as living or sleeping quarters by solid partitions with no connecting openings.
- ✓ Product preparation and processing (including freezing) departments shall be of sufficient size to permit the installation of all necessary equipment with proper space for plant operations.
- ✓ The proper flow of the product shall be arranged in the plant, without backtracking, from the time raw materials are received until the frozen, packaged article is shipped from the plant.
- ✓ Raw material storage rooms and areas where pre-freezing operations (e.g., washing and peeling of vegetable, and preparation of potato fries) are carried out shall be separated from rooms or areas where frozen food is formulated, processed, and packaged.
- ✓ Doors connecting various rooms or openings to the outside shall be tight-fitted, solid, and kept in a closed position by self-closing devices.
- ✓ Facilities for efficient quick-freezing of the product shall be provided and conveniently located near the food processing and packaging departments. Proper

freezer storage shall be provided with convenient access to the quick-freezing facilities.

- ✓ Inedible materials such as vegetable peels will be placed in scrap yard before disposing them off properly.
- ✓ The discharge from the exhaust system, if used, shall be located far away from fresh air inlets into the plant. Packaging and labeling material shall be stored in a separately enclosed space convenient to the packaging department.
- ✓ The WWTP should be at a sufficient distance from drinking water sources or pipes to prevent any possibility of cross-contamination.
- ✓ A WWTP should ideally not be built on any land that is susceptible to flooding.
- ✓ The location of the WWTP should be suitable for the work of the wastewater collection system according to the topography of the earth. It is preferable that the sewage flow into the site by the natural slope of the drainage and thus the pumping station can be dispensed with.

8.2.2 Anticipated Impacts during Design Phase

i. Site Selection Impacts

The proposed expansion site is a cleared leveled empty plot within the premises of FFFL plant located at 16-Km, Sahiwal Pakpattan Road, Pakpattan, Punjab. There is no resettlement and relocation of existing infrastructure is involved.

ii. Potential Design & Layout Planning Impacts

- Incompatible layout plan and engineering design of the project's structures can undermine the overall aesthetic beauty and ambience of the project area. Also, low utilization of the available space and not designing the structures considering, the prospective and futuristic needs can result in structures with low social acceptability and functionality. This impact will be temporary and moderate negative in nature.
- Inappropriate structure may rupture during the earthquake or any other natural incidence and may cause fire or hazard at the site.

Environmental Enhancement Measures

- ✓ All structural, layout and engineering will be carried out in strict accordance with the applicable bylaws and engineering parameters.
- ✓ The proposed expansion will be designed according to international standards for the prevention and control of fire and explosion hazards, including provisions for segregation of process, storage, utility, and safe areas.
- ✓ Safety distances should be derived from specific safety analysis for the facility, and through application of internationally recognized fire safety standards.
- ✓ The earthquake zone of the area will be considered for the design of storage hall, WWTP, and equipment's foundation to mitigate the earthquake impacts in future.

iii. Impacts on Public Utilities

The construction and installation activities will take place within the premises of FFFL, so damage to public utilities is not a creditable scenario.

Environmental Enhancement Measures

- ✓ Incorporate technical design features to minimize effect on public utilities.
- ✓ Layout plans of the existing underground alignment near the work site should be circulated to the site workers.
- ✓ Any damage to utility services should be reported to the relevant department engineer and the contractor on immediate basis.

8.2.3 Anticipated Impacts during Construction Phase

i. Topography

The changes at the site may occur due to construction activities at the site. However, this impact will be of localized, temporary, and minor negative in nature and will be within the boundary wall of project site.

Environmental Enhancement Measures

Excavations should be kept confined to the specified location as per the approved engineering drawings and unnecessary excavations should be avoided.

ii. Water Resources

- The proposed project will have no impact on surface water as there is no surface water body present near the proposed site.

- To avoid spillage, various materials like fuel, lubricant oil, and other oily products, which will be used during the construction phase should be stored properly. During proposed expansion, very little quantity of such material will be stored.
- Uncontrolled dumping of wastes, sewage, dredge materials, and accidental spillage of fuels and chemicals into the water bodies may greatly pollute the water resources.
- Disposal of sewage and wastes from the construction camps to surface water bodies without treatment will deteriorate the water quality or if stagnate on site can percolate into the soil and contaminate the ground water.

Environmental Enhancement Measures

To avoid any undesirable impact on water resources following mitigation measures are recommended.

- ✓ Best effort/measures to be adopted against accidental discharge.
- ✓ Proper construction management including, training of operators and other workers should be ensured to avoid pollution of water bodies by the operation of construction machinery and equipment.
- ✓ Temporary construction facilities including structures and material stockpiles shall be located at least 50 m away from water bodies.
- ✓ Avoid disposal of wash water, solid waste as discarded packing etc., waste from concrete agitator cleaning operations and excavated material on water bodies adjacent to or in the vicinity of the sites.

✓ Water quality monitoring should be carried out on quarterly basis by 3rd party.

iii. Wastewater

Construction operation will produce a significant amount of wastewater. This wastewater is generally non-hazardous. But it creates nuisance to the environment if dispose of without treatment. It will also choke the sewerage lines due to the presence of construction debris. The following activities in construction generate wastewater:

- Watering of concrete structure.
- Municipal wastewater generates during construction.
- Water sprinkling

Environmental Enhancement Measures

✓ Proper drainage and sanitation facilities shall be provided at construction site.

✓ To reduce the impact from wastewater on surface and ground water resources, construction wastewater to be collected will be treated in already installed WWTP of FFFL.

✓ The construction activities would be limited to possible smallest area.

✓ Recycling & reuse of the construction wastewater to reduce the volume of the whole wastewater.

✓ Wastewater sampling shall be conducted on monthly basis by 3rd party lab.

iv. Air Quality and Dust Emissions

Exhaust emissions are likely to be generated during the construction period by various construction machinery, vehicles, and equipment such as generators. However, as all construction activity will be carried out within the premises of FFFL plant, therefore, no emission of dust and exhaust gases will affect the surrounding communities.

Environmental Enhancement Measures for maintaining Air Quality.

- All personnel working on the project should be trained prior to start construction on methods for minimizing air quality impacts.
- Training should be focused on minimizing dust and exhaust gas emissions from heavy construction vehicles.
- Construction vehicles drivers should be under strict instructions to minimize unnecessary trips, refill petrol fuel tanks in the afternoon, and minimize idling of engines.
- Dust emissions should be controlled by watering all active construction areas when necessary.

Environmental Enhancement Measures for controlling Exhaust Emissions.

- ✓ Vehicle idling time should be prohibited.
- ✓ Diesel generator if used should be selected on the basis of high combustion efficiency to minimize dark smoke generation.
- ✓ Equipment/machinery to be used should be properly tuned and maintained.

- ✓ Emissions monitoring should be done on quarterly basis by 3rd party.

v. Soil Erosion and Contamination

Soil erosion may occur due to excavation and land leveling activities. While the possibility of soil contamination is very low as construction activity will be within the boundary wall of FFFL plant Pakpattan.

Environmental Enhancement Measures

- ✓ All spoils should be disposed of as properly and the site should be restored back to its original conditions.
- ✓ Excavations should be kept confined to the specified foundation spots as per the approved engineering drawings. Unnecessary excavations should be avoided.
- ✓ All machineries and materials should be stored at the designated areas and compounds.
- ✓ All the unspent and leftover materials should be completely removed offsite upon completion of construction and the site should be restored to original or near to original condition; and contractor will be asked to clean the site.
- ✓ Wastes (debris) from construction activities should be used for refilling, leveling and restoration purposes.

vi. Impacts related to Solid Waste.

During construction activities solid waste will be generated such as concrete waste, steel, wooden scaffolding, cement bags, excavated soil, wood remains etc. This waste

has the potential to cause negative impact on the surroundings also lower the aesthetic value of land if not properly managed and disposed. It is likely to block drainage channels in the vicinity and irregular storage of this waste poses danger to the workers as well.

Environmental Enhancement Measures

- ✓ Excavation and construction waste should be recycled or reused to ensure that materials that would otherwise be disposed of as waste are diverted for productive uses.
- ✓ In this regard, the proponent should commit to ensure that construction materials left over at the end of construction will be used in other projects rather than being disposed-off.
- ✓ The wastes which are reusable/recyclable (iron bars, aluminum) should be sold to waste vendors and those which cannot be sold out (brick pieces) should be used as a filling material for leveling the depressions, subject to technical feasibility.
- ✓ Construction workers and supervisory staff should be encouraged and educated to practice waste minimization, reuse, and recycling to reduce quantity of the waste for disposal.
- ✓ Open burning of solid waste should be prohibited.

vii. Impacts of Noise Pollution

The construction works on site may cause noise. However, all construction activities will be confined within the boundary wall of FFFL Plant, Sahiwal. Therefore, no disturbance will be caused to the surrounding residential areas.

Environmental Enhancement Measures

- ✓ Limit pickup trucks and other small equipment to an idling time of one minute, observe a commonsense approach to vehicle use, and encourage workers to shut off vehicle engines whenever possible.
- ✓ Earmark parking place for construction equipment and vehicles when idling; no parking shall be allowed on the roads, that may disturb the traffic movement.
- ✓ The traffic should be properly managed during loading and unloading of construction material.
- ✓ Provide personal protection equipment like ear plugs to the workers at the noisy working site.
- ✓ Generator to be used at the site should be enclosed in a sound dampening enclosure.
- ✓ All the construction equipment and vehicles used should be in good working condition, properly lubricated and maintained to keep noise within the permissible limits.
- ✓ Engines should be tuned off when not in use to reduce noise.
- ✓ Noise monitoring should be done on quarterly basis by 3rd party.

viii. Health and Safety

- Haphazardly placed materials and debris presents higher risks of personal injury and inconvenience during the construction activities which may expose to safety risks for the construction workers, and nearby communities.
- Exposure to the use of sharp instruments on the site.
- Lack of warning/informative signs at the time of construction
- Hand and vibration syndrome may occur when a worker continually working on handheld power tools.

Environmental Enhancement Measures:

✓ Enough infrastructure facilities and safe conditions for the workers will be ensured on the site during construction activities.

✓ Construction material should be trucked to the site during peak working hours.

✓ Ensure the provision of Personnel Protective Equipment's (PPE's) such as helmet, shoes, gloves, glasses and earmuffs to workers to avoid worksite accidents.

✓ Continuous provision of drinks and sheltered/shaded areas for workers, especially during the summer months to avoid heat stress.

✓ Training and awareness of workers regarding safety issues will be ensured once a week on once in a month.

✓ Protective fencing will be used around the construction sites, excavated areas, and voids.

- ✓ For every shift, FFFL will hire safety inspectors during construction phase to ensure occupational safety.

ix. Impacts of construction on Biological Environment.

No endangered species of fauna and flora are reported near the project area as it falls within the FFFL Plant; hence the impact on flora and fauna will be insignificant.

Environmental Enhancement Measures

- ✓ All the necessary precautions should be taken to ensure the minimum disturbance to the local flora and fauna.
- ✓ Strict instructions should be given to all personnel working in project area to refrain from killing, capturing, or disturbing any species of bird, reptile or mammal encountered during project activities, except in self-defense.
- ✓ Landscaping and gardening will be done to restore aesthetic value as well as greening of the site.

x. Impacts on Socio Economic Environment

- **Positive Impact:** The project would be beneficial from a socioeconomic viewpoint. Social impacts of the proposed project are as follows:

Displacement: No displacement of population is envisaged.

Employment: All the activities to be carried out during construction and operation phases will require skilled and unskilled labors, hence creating temporary as well as permanent employment for local people. The proposed project is likely to have positive

socio-cultural economic impact. Employment opportunities will preferably be provided to the locals in case of new recruitment, if any. Reliance on local markets for provision of construction materials and other supplies will lead to the increase in income.

- **Negative Impact**

Impact on Livelihood: No impact foreseen.

Disruption to Public Access: The proposed project site has a direct access to Pakpattan Sahiwal road through which raw material for the construction will be easily transported to the site.

Table 5.1 presents a Checklist of Potential Impacts of Proposed Construction Phase.

Table 8.1: Checklist of Potential Impacts of Proposed Construction Phase

Environmental Aspects (Construction Phase)		Impact Categorization									
		N/A	Mild			Moderate			Severe		
			*	**	***	*	**	***	*	**	***
1. Land Resources											
1.1	Site for disposal of waste generation and disposal of waste material		✔								
1.2	Location of labor camps, material camps, equipment yards and approach roads		✔								

1.3	Access tracks		✔								
1.4	Contamination from diesel and other spills from construction machinery		✔								
1.5	Drainages paths roads crossed. Damages by moving machinery		✔								
1.6	Waste disposal Management		✔								
1.7	Damage to vegetation		✔								
1.8	Any discharge or diversion of water to a graveyard or archaeological site		✔								
1.9	Electrical and mechanical works		✔								
2. Hydrology and Water Resources											
2.1	Impact on source of construction water		✔								
2.2	Contamination of surface water due to diesel and other fluids spilling over from machinery.		✔								
2.3	Protection of construction work from floods		✔								
3. Air Quality and Noise Pollution											
3.1	Dust and smoke and other		✔								

	pollutants										
3.2	Dust or other pollutant from stored materials and spoil heaps		✔								
3.3	Smoke from burning of waste materials or burning firewood		✔								
3.4	Noise control from use of old or outdated machinery		✔								
4. Biological Resource											
4.1	Damage to biological resource flora, fauna, biota		✔								
4.2	Impact of construction on aquatic life (if any)		✔								
5. Socioeconomic and Cultural Issues											
5.1	Existing services; education health, electricity, and water supply		✔								
5.2	Tribal tensions and local rivalries on canals and aquatic life		✔								
5.3	Land ownership and land acquisition		✔								

5.4	Access to other construction materials			✔							
5.5	Effects on sites of archaeological, historical, cultural, or religious significance	✔									
5.6	Public safety at construction sites		✔								
5.7	Health and safety of labor and employees on construction site		✔								
5.10	Aesthetic / scenic value		✔								

Key:
* Avoidable through design (Preventive)
**Mitigation through contractor's obligation
***Non-reversible permanent change.

8.2.4 Anticipated Impacts during Operational Phase

Potential environmental issues associated with the plant operation include the following:

1. Air emissions
    a) Gases from fired equipment (proposed boiler)
    b) Sodium hypochlorite cans handling & use.
    c) Heavy NH_3 release (disaster)
    d) Smoke from Diesel Engines / Vehicles
2. Odor nuisance at WWTP site

3. Noise due to working of machines at potato process line, pumping stations of WWTP and loading unloading trucks.
4. Wastewater
    a) Drainage of wastewater from proposed potato processing line.
    b) wastewater from cooling and cleaning of boiler,
    c) Other effluents disposal to drain.
5. Solid waste
    a) Paper use & wastepaper / Combustibles disposal
    b) solid waste from ash disposal.
    c) Potato peel from proposed Potato Storage Area
    d) Sludge from proposed WWTP
6. Disease vector generation & transmission due to sludge
7. Land/Soil Pollution
    a) Used oil drainage or leakage.
    b) Emergency situations (spillage of wastewater in case of damage of pipelines or other infrastructures of proposed WWTP).
8. Increased Power Demand
    a) Automatic washing, peeling, and cutting potatoes machines,
    b) Operations of WWTP and FF line.
9. Emergency situations during operations

a) Fire accidents

b) Medical emergencies

c) Natural emergencies

10. Occupational hazards and accidents

11. Impacts on Ecology and Biodiversity

12. Socio-economic Impacts

These impacts during operations phase are discussed further in detail.

i. Impacts related to Air Emission.

Impacts on local air quality may arise from the following project activities:

- Gases from fired equipment (boiler) such as SO_2, NO_x, CO_2 and particulates.
- Sodium hypochlorite cans handling & use in WWTP.
- Quite a large amount of vapor emissions may also be emitted to the atmosphere during normal operation.
- Heavy NH_3 release (disaster) from refrigeration area
- Smoke from Diesel Engines / Vehicles. Operational activities will involve the use of trucks for transportation of products within and outside the city.

Environmental Enhancement measures

✓ Tall Vent Stacks will be installed. To minimize the CO & NO_x emission, external analysis will be done to check the emission level. Gas will be washed-off in wet scrubber to eliminate carbon particles from entering atmosphere. Washing water will

circulate in close cycle. The instruments and equipment should be kept well maintained. Try to reduce unnecessary use of machinery whenever possible. The less fuel is consumed, the more environmentally friendly operation is. Monitoring of Ambient air parameters (PM_{10}, SO_2, and No_x) emissions shall be carried out on quarterly basis to ensure compliance with the PEQS.

- ✓ Installation of gaseous emissions treatment system like wet scrubber will be carried out.
- ✓ Wet suppression will be carried out to control dust generated from cleaning operations of boiler.
- ✓ Regular monitoring and preventive maintenance and regular tuning and servicing of boiler will be carried out.
- ✓ Awareness & commitment should be created among workers for environmental protection .
- ✓ PPE will be provided to workers. There will be proper water showering arrangements. There should be enough emergency response training/procedures in place to minimize environmental damage.
- ✓ Emergency plan/guidelines should be in place to avoid NH_3 release. Ammonia detector will be installed in case of Ammonia leakage. Periodic testing of emergency plan (Dry Run) should be conducted. Annual emergency response training should be provided to workers.

- ✓ For reduction in air contaminants, service vehicle regularly, use low air polluting vehicles and conduct external analysis to check the smoke level. Ensure that industry owned vehicles will be tuned and maintained time to time. Also, carry out regular oil lubrication monitoring.
- ✓ Tree plantation will be ensured within the premises of the industry to keep the environment clean and peaceful.
- ✓ Equipment should be in good working condition and will be tuned on a regular basis and trucks engines will be turned off when not in use.
- ✓ Ambient Air Monitoring will be scheduled on quarterly basis by 3rd party.

ii. Odor Nuisance

The WWTP could result in the release of a moderate amount of potential nuisance odors within the work zone and in the ambient air.

Environmental Enhancement Measures

- ✓ Ensure the odor removal systems at the main sources of odor (inlet channel, inlet pumping station, coarse and fine screen channels and conveyors, containers for screenings and grit, sludge dewatering).
- ✓ Plant trees in landscaping areas to prevent odor dispersion.

iii. Impacts of Noise.

The proposed potato line and electric motors of WWTP may result in increase in noise. The increased noise may be the source of disturbance for plant workers.

However, noise from operational activities will not pose any significant impact on the nearby community because nearby community is approximately 2-3 km away from the proposed project.

Environmental Enhancement measures

- ✓ Ensure Use of PPEs and Signages in noisy areas.
- ✓ All equipment with potential of noise generation will be well maintained.
- ✓ Noise at WWTP site can be reduced by following measures:
    - Installation of high-quality pumping stations on WWTP site
    - Using noise-insulation materials during installation of pumping station
    - Arrangement of pumps on vibro-isolating platform, for that thick rubber sheets can be used.
    - Place pumps in closed containers, special shells.
    - Frequent shift of workers, working with noisy devices.
- ✓ Regular noise mapping should be carried out by HSE.
- ✓ Noise monitoring should be done on quarterly basis by 3rd party.

iv. Impacts related to wastewater.

Wastewater will be generated from proposed potato processing line during washing process and cooling and washing of boiler. The effluents may contain high organic loads, cleansing, salt, and suspended solids such as fibers and soil particles. They

may also contain pesticide residues washed from the raw materials. After treatment in the proposed WWTP, effluents will be disposed-off into nearby drain.

Environmental Enhancement measures

- ✓ A water management strategy will be developed to ensure minimal water use during washing process; hence volume of discharge will be minimum.
- ✓ Follow good housekeeping practices with potato line machinery that may potentially discharge wastewater.
- ✓ Blowdown wastewater from boiler will be recycled in cooling system.
- ✓ The blowdown will be treated before disposal.
- ✓ Procure clean raw potatoes, thus reducing the concentration of dirt and organics (including pesticides) in the effluent.
- ✓ Effluent will be treated in proposed WWTP prior to its release into the environment.
- ✓ Choking, blockage and overflow of the sewerage system will be prevented by preventing entry of the solid wastes into the sewer lines. screens will be installed at appropriate points in the waste line for removing the solid from the wastewater stream.
- ✓ Minimize disposal of polluted effluents & compliance to PEQS must be ensured.
- ✓ Regular and scheduled monitoring to ensure that no contamination of soil and water has taken place.

- ✓ Wastewater sampling and analysis will be scheduled on quarterly basis by 3rd party.

v. Impacts related to Solid Waste.

There will be generation of wastepaper / combustibles that should be disposed-off properly. Wash water, culls, peels, potato pieces (nubbins) from the slicers and inspection tables, and used oil will be produced from new proposed FF line. Ash will be produced from proposed boiler whereas the sludge will be produced as a by-product of the operations of the proposed WWTP, and it may impact on the surrounding environment and the workers who will be responsible for WWTP operation and sludge handling.

Environmental Enhancement measures

- ✓ Take measures to ensure paperless environment. There should be maximum utilization of electronic media.
- ✓ There should be a control over Issuance of paper in order to restrict its excessive use.
- ✓ Separate waste bins will be placed for different type of wastes - plastic, paper, and metal etc.
- ✓ Non-hazardous non-recyclable wastes will be disposed-off properly.
- ✓ No waste will be dumped at any location outside the plant boundary.

- ✓ Records of all waste generated will be maintained. Quantities of waste disposed, recycled, or reused will be logged on a Waste Tracking Register.
- ✓ Training will be provided to personnel for identification, segregation, and management of waste.
- ✓ Potato peel and other waste of FF line will be sold to vendors who make cattle feed.
- ✓ The boiler ash will be disposed-off properly through EPA approved vendor.
- ✓ A detailed strategy will be developed on management and disposal of the sludge.
- ✓ Licensed third party vendors will be contracted on long term arrangements to manage the disposal of the sludge in an environmentally beneficial manner in accordance with international good practices.

vi. Disease vector generation & transmission

Sludge being generated from the wastewater treatment process may spread different types of diseases due to disease vectors that could be generated from the stagnant water and the sludge, such as mosquitoes (including the specific mosquitoes responsible for spreading of dengue fever), flies, moths etc. that could carry the diseases to the receptors in the project area.

Environmental Enhancement measures

- ✓ Minimize the sludge inventory present at the WWTP as far as possible to prevent breeding of disease vectors.

- ✓ Cover the sludge piles present at the WWTP as far as possible.
- ✓ Maintain good housekeeping.
- ✓ Provide and require use of suitable personal protective clothing and equipment to prevent contact with wastewater (e.g., rubber gloves, aprons, boots, etc.). Especially provide prompt medical attention and cover any skin trauma such as cuts and abrasions to prevent infection and use protective clothing and goggles to prevent contact with sludge.
- ✓ Encourage workers at WWTP to wash hands frequently.

vii. Oil Leakage and spill control

Oil transport, storage, and handling provide opportunities for spills or other types of releases with potentially negative impacts to soil and water resources. Their flammability and other potentially hazardous characteristics also present a risk of fire and explosions.

Environmental Enhancement measures

- ✓ FFFL must maintain and up-to-date Spill Prevention Control and Counter measures (SPCC) Plan.
- ✓ An inventory must be kept of oil storage tank.
- ✓ The cooking oil storage tank must have sized secondary containment.
- ✓ The department responsible for oil storage need to be equipped and able to respond to a small spill.

- ✓ At a minimum, spill kits must be available during product transfer.
- ✓ Monthly inspections of systems and equipment must be conducted.
- ✓ All employees that maintain oil tank and/or handle oil, must be trained yearly regarding SPCC requirements.
- ✓ All inspections and trainings must be documented, and records retained for three years.
- ✓ An SOP for loading/unloading, cleaning and maintenance of vegetable oil storage tank is given as Annexure-S.

viii. Impacts related to Land/Soil Pollution

Soil pollution may result due to used oil drainage or leakage from machinery or vehicles. Emergency situations such as spillage of wastewater in case of damage of pipelines or other infrastructures of WWTP may also result in soil pollution.

Environmental Enhancement measures

- ✓ In case of fuel/oil spill, cleaning of the territory and withdrawal of the contaminated soil and ground for further remediation.
- ✓ Improve wastewater quality with reference to COD & Oil by carrying out regular analysis. Ensure regular Inspection / cleaning of drains and pits.
- ✓ There should be controlled waste management.

ix. Increased Power Demand

There will be high power consumption after expansion project mainly for automatic washing, peeling, and cutting potatoes machines and WWTP. Electricity will also be required for lighting and air conditioning of the proposed facilities. The proposed developments will connect to the existing power line and this might strain the resource.

Environmental Enhancement measures

- ✓ All electrical appliances will be switched off when not in use.
- ✓ Energy conservation should be practiced that involves proper use of electrical appliances, lighting systems and other electrical instruments used for different purposes.

x. Emergency situations during operations

During operation of proposed project components, following emergency situations can occur:

- **Fire accidents**

  Fire may occur at Boiler House, fire to paper or any other place where combustible solid waste is present.

- **Medical emergencies**

  During routine plant operations, any working personnel may need immediate medical attention.

- **Natural emergencies**

  These include earthquake, floods, bomb threat, security breach or heavy windstorm etc.

Environmental Enhancement measures

- ✓ The proposed expansion will be carried out according to international standards for the prevention and control of fire and explosion hazards, including provisions for segregation of process, storage, utility, and safe areas.
- ✓ Early release detection for smoke and heat should be provided at the site.
- ✓ Fire extinguishers, fire hydrants and fire alarms should be provided at convenient locations within the facility. These should be regularly inspected and maintained by a reputable fire security company.
- ✓ Fire drills should be conducted at least biannually to ensure that workers are conversant with the action to take in the event of fire or explosions.
- ✓ Fire awareness materials should be placed in strategic locations within the facility to educate the workers and customers on what to do in the event of fire.
- ✓ An elaborate emergency response plan has been developed by FFF to address the risks associated with the facility 's operations.
- ✓ Leak detection devices should also be installed at appropriate areas to warn on leakages that are likely to trigger fires.

- ✓ Workers should be trained on handling accidental spillage or leakages (diesel) that may trigger fires.
- ✓ Train the respective area owner and his team to act as firefighting squad in case of low fires. Use portable fire extinguishers for initial fires. In case of out-of-control fires, handle emergency by using Emergency Response Plan (ERP) and available firefighting system.
- ✓ In case of medical emergencies, there is a dispensary within factory. If the injuries are serious, the dispenser can assess and send the worker to nearby hospital.
- ✓ In case of fire, medical or natural emergencies, the FFFL has prepared and practiced a detailed ERP attached as Annexure-Y.

xi. Occupational hazards and accidents

There could be several safety issues during operational phase. General impression in the industrial operations is that the workers hesitate to use the safety equipment. To reduce the occupational health and safety impacts during the operation phase of the proposed project, the proponent is committed to adherence to the occupational health and safety rules and regulations.

Environmental Enhancement measures

In order to ensure safety at the site, following measures should be implemented.

- ✓ Train personnel on health and labor protection issues.
- ✓ Provide staff with personal protective equipment.

- ✓ Fencing work areas dangerous for health.
- ✓ Ensure proper working of machinery.
- ✓ Control getting and moving of strangers at the workplace without special permit or without special protective equipment.
- ✓ Onsite risk assessment to identify certain hazards and appropriate handling of them for the security of working personnel.
- ✓ Keep register for accidents and incidents.
- ✓ Fuel and chemical storage should be labeled.
- ✓ Necessary health and safety rules shall be enforced by the management.
- ✓ First Aid kits should always be available at the site and staff members trained in first aid administration.
- ✓ Clear signage should be posted alerting of possible danger situations.
- ✓ FFF has a detailed EMS system in place which is provided as Annexure-Z.

xii. Impacts on Ecology and Biodiversity

The probability and consequences of significant ecological impacts occurring as a result of the operation are almost negligible as there is no engendered fauna and flora exists at the site, also the proposed expansion does not require removal of plants or trees from site. FFFL actively plant trees in the factory and other parts of the Country on annual basis. There is a yearly tree plantation campaign in the factory with special

invitation to DO Environment, Pakpattan. Plants provide habitat for many birds and insects and thus restoring and promoting biodiversity of the area.

xiii. Socio-economic Impacts

The positive impact of the proposed project is that there will be job opportunities for the local people during operational phase that will bring prosperity in the area.

Environmental Enhancement measures

- ✓ Complaints from the people shall be recorded and solved on immediate basis.
- ✓ The employer and site manager should try to resolve any grievance in the first instance.
- ✓ A booklet outlining grievance contact points should be maintained.

Table 5.2 presents a Checklist of Potential Impacts of Proposed Operation Phase.

Table 8.2: Checklist of Potential Impacts of Proposed Operation Phase

Environmental Aspects (Operation Phase)		Impact Categorization								
		Mild			Moderate			Severe		
		*	**	***	*	**	***	*	**	***
1.	Water and Sewage Overflows	✔								
2.	Noise and Vibration				✔					
3.	Air Quality	✔								
4.	Odor	✔								
5.	Soil and Water Pollution	✔								
6.	Traffic	✔								
7.	Solid Waste				✔					

8.	Public and Workers Health and Safety				✔					

Key: * Avoidable through design (Preventive) **Mitigation through contractor's obligation ***Non-reversible permanent change.

CHAPTER 9

ENVIRONMENTAL MANAGEMENT AND MONITORING PLAN(EMMP)

Chapter Nine

ENVIRONMENTAL MANAGEMENT & MONITORING PLAN

9.1 Introduction to EMMP

This section presents the environmental management and monitoring plan (EMMP) for the proposed project. The EMMP is the synthesis of all proposed mitigation and monitoring actions, set to a time frame with specific responsibility assigned and follow-up actions defined. It is a plan of actions for avoidance, mitigation, and management of the negative impacts of the project. A detailed set of mitigation measures have been compiled in view of the likely impacts associated with the proposed expansion project.

EMMP has been prepared addressing the issues like:

- Preventive, mitigation, compensatory & enhancement measures for minimization and abatement of the undesirable impacts caused during design, construction, and operation stage.
- Environmental Monitoring Program during construction phase including parameters, locations and frequency of monitoring and cost involved, and their implementation program.

- Institutional setup identified/recommended for implementation of the EMP including institutional strengthening and training.

9.2 Institutional Capacity

The Proponent will utilize the following arrangements in the implementation of the EMMP during planning and design, construction, and operation phase. The Proponent is accountable for ensuring that resources are made available to effectively implement the EMMP and necessary environmental management measures arising from the project. **Table 9.1** provides details on the functions of each staff member.

Table 9.1: Role of Staff in the Implementation of EMMP

Position	Responsibility
Project Manager	• Supervising construction works. • Schedule preparation and resource forecasting for engineering and other technical activities relating to the project. • Effective implementation of the EMMP • Regular performance reviews • Corrective and/or remedial action where this may be required.
Contractor	• Undertake development of facility in accordance with contract signed with the Proponent. • Adhere to Proponent HSE policies, procedures and other requirements while undertaking the Project. • Implement aspects of EMMP assigned to them.

HSE Executive	• Preparation of environmental monitoring, reporting and any permit applications (if any) • Overseeing of construction process and ensuring the implementation of avoidance and mitigation measures • Conducting monitoring and review of EMMP implementation by contractor • Inspect the constructed facility after completion. • Develop policies and procedures on the environmental, social, health and safety issues. • Oversee implementation of the EMMP. • Review and analysis of monitoring results and preparation of brief reports to Project Manager • Planning of training programs for personnel in accordance with relevant laws • Oversee inspection of the constructed facility after completion of construction works

9.2.1 Management of Contractor

The Contractor will be responsible for implementation of some of the EMMP commitments. However, the Proponent fully recognizes that it is not absolved from those management responsibilities. Ultimate responsibility for meeting all commitments lies with the Proponent.

The Proponent will commit contractor to meeting the relevant responsibilities by means of specific conditions in the contracts of appointment. Where there is concern over the capacity of contractor to undertake specific activities according to the system stated

here, the Proponent will provide additional training to improve the capacity of the contractor. Activities of contractor will be overseen by the Project Manager and staff as appropriate. The Proponent will put in place the following construction phase contractor arrangements to support EMMP implementation:

- Contractor will have certain key environmental line functions included in their job descriptions and performance criteria. Critical among these is the Construction Manager.
- The Construction Manager will be accountable for environmental (including social) management during the construction phase. Specific responsibilities for the Construction Manager will include Regular performance reviews and undertake corrective and/or remedial action where this may be required.
- Regular (at least monthly) liaison between the Construction Manager and the HSE Executive and his/her team must be carried out. At the commencement of the construction phase, weekly meetings should occur. Meetings should review implementation of EMMP requirements, highlight issues of concern, identify required interventions, and prescribe corrective actions and schedule, and allocate budget and appoint responsible parties.
- A code of practice for construction teams will be prepared and implemented. This code will guide the management and behavior of construction teams. The code will include items relating to health safety and community relations.

- Information on the implications of construction will be disseminated before construction starts.
- Contracts will be key tools in managing many potential negative impacts such as transport related incidents. They will specify required environmental and social practices.

9.2.2 Environmental Training

Environmental training will help to ensure that the requirements of the EIA and EMMP are clearly understood and followed by all project personnel during the project. The contractor and HSE executive have the responsibility for providing training to all project personnel. An indicative environmental training program is provided in **Table 9.2**. The duration of this training program will be 1-2 weeks.

Table 9.2: Training Program

Target Audience	Trainer	Contents	Schedule
All Site Personnel	Contractor HSE Executive	• Key Findings of EIA • Environmental Enhancement Measures • Environmental Management Plans such as: ➧ Health and Safety Measures ➧ Natural Resource Conservation	Prior to the Start of Project Activities

		➔ Safe Raw Material Storage ➔ Material Loading and Unloading ➔ Fire Control ➔ Emergency preparedness and Evacuation ➔ Housekeeping ➔ Wildlife Protection ➔ Grievance Redressal	
Drivers	Contractor	• Vehicle Movement Plan • Oil spill Control • Loading and Unloading • Emergency Handling Plan	Before and during Field Operations

9.2.3 Training, Awareness and Capacity Building

The Proponent will ensure that all contractors' staff is inducted on health and safety, environmental and emergency response procedures. The Proponent will use written (newsletter/posters/toolbox talks) and verbal (as part of routine briefings) communication methods to raise awareness on a range of health, safety, and environmental issues. This will be done in both Urdu and English languages (as appropriate) to ensure that all members of the workforce are made aware.

9.2.4 Monitoring and Compliance Assessment

During the construction phase, the Proponent will monitor and inspect contractor's written records to demonstrate compliance with the EMMP. This compliance monitoring will verify that the responsible parties are implementing the specifications contained in the EMMP. Compliance will mean that the contractor is fulfilling contractual obligations.

To determine the effectiveness of the EMMP, the Proponent will use a series of internal and external inspections and audits:

- Internal environmental, health and safety inspections will be carried out once every week by HSE person.
- Minor non-conformances will be discussed during the inspection and recorded as a finding in the inspection report. Major non-conformances will be formally reported as an incident and will be subject to the Proponent's existing incident reporting and handling procedures.
- HSE Executive will arrange for initial and subsequent environmental audits and will provide relevant information required by relevant authorities including EPA Punjab. The audit will be carried out in accordance with Punjab Environmental Protection Act 1997 (Amended 2012) and its subsidiary legislation, IEE/EIA Regulations, 2000. Any negative findings arising from the audits will be addressed accordingly.

9.2.5 Incident Handling and Reporting

An incident can arise from the following:

- Significant non-conformance with the EMMP identified during an internal inspection.
- Any non-conformance identified by either the authorities or an external audit.
- Accidents or spills resulting in potential or actual environmental harm.
- Significant complaints received from any source.

All incidents will be formally recorded and noted in the General/Complaint Register.

9.2.6 Checking and Corrective Action

Checking and if necessary, implementing corrective action, to ensure that required EMMP management activities are being implemented and desired outcomes are achieved. As such this component includes four key activities namely:

- Monitoring selected environmental quality variables as defined in the objectives and targets.
- Ongoing inspections of the operational controls and general state of the operations.
- Internal audits to assess the robustness of the EMMP or to focus on a performance issue.
- External audits to provide independent verification of the efficacy of the EMMP.

9.2.7 Reporting

The findings of all the above will be structured into instructive reporting that provides information to all required parties on EHS performance, together with clearly defined corrective action where this is seen to be required. Both the monitoring and inspections are to be reported continuously.

9.2.8 Management Review

The Proponent will organize for formal management review at defined intervals both during the construction and operational phase. The purpose of the management review is for senior project management to review the environmental management performance during the preceding period and to propose measures for improving that performance in the spirit of continuous improvement.

9.2.9 Liaison

Throughout the project cycle, the Proponent will liaise with authorities especially EPA Punjab to ensure on going feedback on the environment performance of the project.

9.3 Impacts Mitigation & Management Measures

Table 9.3 presents the EMP for the proposed project. It covers on the proposed management and mitigation measures for the identified impacts. In addition, it also provides a schedule for the implementation of management/mitigation activities, sub-divided by project phase.

Table 9.3 Environmental Management Plan

Sr. No.	Activity/Aspect	Objectives	Project Enhancement Measures	Time of Implementation	Responsibility	
					Implementation	Supervision
Planning and Design Phase						
1.	Site Selection	To ensure that the site is feasible for the proposed installation	• Proponent shall carry out engineering surveys including environmental surveys depending on the level of complexity	Planning and Design Phase	Proponent	Proponent
		To protect sensitive receptors, present near the site (if any)	• No residential area is present near the site	Planning and Design Phase	Proponent	Proponent
2.	Layout Plan and Engineering Design	To ensure the facility is being constructed according to the regulatory requirements, also protect the aesthetic beauty of the project site	• The design shall be carried out in accordance with current national specifications, procedures, and standards. • The design process shall be carried out in recognition of identified hazards and risks assessment. • According to the process configuration, partial structure of	Planning and Design Phase	Proponent	Proponent

			the main plant will adopt steel structure to accelerate the construction progress			
3.	Cultural Properties	To avoid any impact on cultural sites	• There is no cultural property present near the project site	Planning and Design Phase	Proponent	Proponent
4.	Public Utilities	To avoid impact on public utilities near project site	• The construction and installation activities will take place within the premises of FFFL, so damage to public utilities is not a creditable scenario. • If any damage occurs to utility services, then it should be reported to the relevant department and the contractor on immediate basis.	Planning and Design Phase	Proponent	Proponent
5.	Public Participation	To gain public views, concerns, and values To build trust amongst the various stakeholders	• Proper sensitization of the community at the initial stages of the project with aim to educate them on advantages of the project.	Planning and Design Phase	Proponent	Proponent

			• Involving the community on its implementation especially as casuals.			
Construction Phase						
6.	Review of EMMP	To ensure EMMP is enough to control impacts and compliance with legal requirements of EPA	• Make sure that EMMP covers all the impacts associated with this project	Pre-Construction Phase	Contractor/Proponent	Contractor/Proponent
7.	Orientation for Contractor and Workers	To ensure that the contractor, subcontractors, and workers understand the key environmental impacts and their relevant mitigation measures.	• Conducting special briefing and / or onsite training for the contractors and workers on the environmental requirement of the project. • Periodic progress review sessions to be conducted every six months	Pre-Construction Phase	Contractor/Proponent	Contractor/Proponent
8.	Landscape and Visual Impact	To protect the aesthetic value of the site.	• Plant trees and grass in surrounding of production unit for greenery, better vision, and beauty	During Construction Phase	Contractor	Contractor/Proponent

			of site			
9.	Water Resources	To minimize any negative impacts on water resources during construction activities	• Best effort/measures should be adopted against accidental discharge. • Proper construction management including, training of operators and other workers should be ensured to avoid pollution of water bodies by the operation of construction machinery and equipment. • Temporary construction facilities including structures and material stockpiles shall be located at least 50 m away from water bodies. • Avoid disposal of wash water, solid waste as discarded packing etc., waste from concrete agitator cleaning operations and excavated material on water bodies adjacent to or in the vicinity of the sites.	During Construction Phase	Contractor	Contractor/Proponent

			• Water quality monitoring should be carried out on quarterly basis by 3rd party.			
10.	Wastewater	To reduce the impact of wastewater on surface and ground water resources	• Proper drainage and sanitation facilities should be provided at construction site. • Wastewater to be generated during construction phase should be treated in already installed WWTP of FFFL. • The construction activities should be limited to possible smallest area. • Recycling & reuse of the construction wastewater will reduce the volume of the whole wastewater. • Wastewater sampling should be conducted on monthly basis by 3rd party lab.	During Construction Phase	Contractor	Contractor/Proponent
11.	Air Quality and Dust Emission	To minimize air pollution effectively	• All personnel working on the	During Construction	Contractor	Contractor/Proponent

		and avoid complaints due to the airborne particulate matter released to the atmosphere	project should be trained prior to construction on methods of minimizing air quality impacts. • Training should be focused on minimizing dust and exhaust gas emissions from heavy construction vehicles. • Construction vehicles' drivers should be under strict instructions to minimize unnecessary trips, refill petrol fuel tanks in the afternoon, and minimize idling of engines. • Dust emissions should be controlled by watering all active construction areas when necessary.	Phase		
12.	Soil Erosion and Contamination	To avoid or minimize soil disturbance / contamination and	• All spoils should be disposed of properly and the site should be restored back to its original conditions.	During Construction Phase	Contractor	Contractor/Proponent

		erosion	• Excavations should be kept confined to the specified foundation spots as per the approved engineering drawings. Unnecessary excavations should be avoided. • All machineries and materials should be stored at the designated areas and compounds. • All the unspent and leftover materials should be completely removed offsite upon completion of construction and the site should be restored to original or near to original condition; and contractor will be asked to clean the site. • Wastes (debris) from construction activities should be used for refilling, leveling and restoration purposes.			

13.	Solid Waste	To minimize any negative impacts associated with waste generation	• Excavation and construction waste should be recycled or reused to ensure that materials that would otherwise be disposed of as waste are diverted for productive uses. • In this regard, the proponent should commit to ensure that construction materials left over at the end of construction will be used in other projects rather than being disposed-off. • The wastes which are reusable/recyclable (iron bars, aluminum) should be sold to waste vendors and those which cannot be sold out (brick pieces) should be used as a filling material for leveling the depressions, subject to technical feasibility.	During Construction Phase	Contractor	Contractor/Proponent

			• Construction workers and supervisory staff should be encouraged and educated to practice waste minimization, reuse, and recycling to reduce quantity of the waste for disposal. • Open burning of solid waste should be prohibited.			
14.	Noise	To minimize the potential for noise to adversely affect sensitive receptors	• Limit pickup trucks and other small equipment to an idling time of one minute, observe a commonsense approach to vehicle use, and encourage workers to shut off vehicle engines whenever possible. • Earmark parking place for construction equipment and vehicles when idling; no parking shall be allowed on the roads, that may disturb the traffic movement.	During Construction Phase	Contractor	Contractor/Proponent

			• The traffic should be properly managed during loading and unloading of construction material. • Provide personal protection equipment like ear plugs to the workers at the noisy working site. • Generator to be used at the site should be enclosed in a sound dampening enclosure. • All the construction equipment and vehicles used should be in good working condition, properly lubricated and maintained to keep noise within the permissible limits. • Engines should be tuned off when not in use to reduce noise. • Noise monitoring should be done on quarterly basis by 3rd party.			
15.	Health and Safety	To ensure safety of workers at the construction site	• Enough infrastructure facilities and safe conditions for the workers will be ensured on the site during	During Construction Phase	Contractor/Proponent	Contractor/Proponent

			construction activities. • Construction material should be trucked to the site during peak working hours. • Ensure the provision of Personnel Protective Equipment's (PPE's) such as helmet, shoes, gloves, glasses and earmuffs to workers to avoid worksite accidents. • Continuous provision of drinks, smoking area and sheltered/shaded areas for workers, especially during the summer months to avoid heat stress. • Training and awareness of workers regarding safety issues will be ensured once a week on once in a month. • Protective fencing will be used around the construction sites,			

			excavated areas, and voids.			
16.	Biological Environment (Flora & Fauna)	To conserve biological resources	• Although the project will take place within the boundary of an already built facility, yet all the necessary precautions should be taken to ensure the minimum disturbance to the local flora and fauna. • Strict instructions should be given to all personnel working in project area to refrain from killing, capturing, or disturbing any species of bird, reptile or mammal encountered during project activities, except in self-defense. • Landscaping and gardening will be done to restore aesthetic value as well as greening of the site.	During Construction Phase	Contractor/Proponent	Contractor/Proponent
17.	Social Impact	To engage local workforce and community in the	• Local labor should be preferred for manual work.	During Construction Phase	Contractor/Proponent	Contractor/Proponent

		proposed project. To ensure minimum impacts to people living close to the project site	• Local educated people for office or technical work should be hired where possible. • Claims/complaints of the people on construction nuisance/damages close to the proposed project site should be considered and responded promptly by the Contractor and monitored by proponent			
Operation Phase						
18.	Air Emissions	To protect the air quality from the pollutants and exhaust from operation activities	• **Tall Vent Stacks** will be installed. To minimize the CO & NO_x emission, external analysis will be done to check the emission level. Gas will be washed-off in **wet scrubber** to eliminate carbon particles from entering atmosphere. Washing water will circulate in close cycle. The instruments and equipment should be kept well	During Operation Phase	Proponent	Proponent

			maintained. Try to reduce unnecessary use of machinery whenever possible. The less fuel is consumed, the more environmentally friendly operation is. Monitoring of Ambient air parameters (PM_{10}, SO_2, and No_x) emissions shall be carried out on quarterly basis to ensure compliance with the PEQS. • Installation of gaseous emissions treatment system like wet scrubber will be carried out. • Wet suppression will be carried out to control dust generated from cleaning operations of boiler. • Regular monitoring and preventive maintenance and regular tuning and servicing of boiler will be carried out. • Boiler start-up SOP is provided as Annexure-T. • Awareness & commitment should			

			be created among workers for environmental protection . • PPE will be provided to workers. There will be proper water showering arrangements. It should be ensured that MSDS of all chemicals are in place. There should be enough emergency response training/procedures in place to minimize environmental damage. • List of chemicals is provided as Annexure-U. • MSDS of chemicals are provided as Annexure-V. • Chemical handling, storage and waste management is provided as Annexure-W. • Emergency plan/guidelines should be in place to avoid NH_3 release. Periodic testing of emergency plan			

			(Dry Run) should be conducted. Annual emergency response training should be provided to workers. • For reduction in air contaminants, service vehicle regularly, use low air polluting vehicles and conduct external analysis to check the smoke level. Ensure that industry owned vehicles will be tuned and maintained time to time. Also, carry out regular oil lubrication monitoring. • Maximum tree plantation will be ensured within the premises of the industry to keep the environment clean and peaceful. • Equipment should be in good working condition and will be tuned on a regular basis and trucks engines will be turned off			

			when not in use. • Ambient Air Monitoring will be scheduled on quarterly basis by 3rd party.			
19.	Odor Nuisance	Ensure to reduce the odor nuisance from the surrounding environment	• Ensure the odor removal systems at the main sources of odor (inlet channel, inlet pumping station, coarse and fine screen channels and conveyors, containers for screenings and grit, sludge dewatering). • Plant trees in landscaping areas to prevent odor dispersion.	During Operation Phase	Proponent	Proponent
20.	Noise Pollution	To minimize the noise pollution within the facility	• Ensure Use of PPEs and Signages in noisy areas. • All equipment with potential of noise generation will be well maintained. • Noise at WWTP site can be reduced by following measures:	During Operation Phase	Proponent	Proponent

			○ Installation of high-quality pumping stations on WWTP site ○ Using noise-insulation materials during installation of pumping station ○ Arrangement of pumps on vibro-isolating platform, for that thick rubber sheets can be used. ○ Place pumps in closed containers, special shells. ○ Frequent shift of workers, working with noisy devices. • Regular noise mapping should be carried out by HSE. • Noise monitoring should be done on quarterly basis by 3rd party.			
21.	Wastewater	To reduce the pollution load on local drain/nullah	• A water management strategy will be developed to ensure minimal water use during washing process;	During Operation Phase	Proponent	Proponent

			hence volume of discharge will be minimum. • Follow good housekeeping practices with potato line machinery that may potentially discharge wastewater. • Blowdown wastewater from boiler will be recycled in cooling system. • The blowdown will be treated before disposal. • Procure clean raw potatoes, thus reducing the concentration of dirt and organics (including pesticides) in the effluent. • Effluent will be treated in proposed WWTP prior to its release into the environment. • Choking, blockage and overflow of the sewerage system will be prevented by preventing entry of the solid wastes into the sewer lines. screens will be installed at			

			appropriate points in the waste line for removing the solid from the wastewater stream. • Minimize disposal of polluted effluents & compliance to PEQS must be ensured. • Wastewater analysis will regularly be carried out by WWTP laboratory. • Wastewater sampling and analysis will be scheduled on quarterly basis by 3rd party. • Liquid and solid waste management system of FFFL is provided as Annexure-X.			
22.	Solid Waste	To safe environment from solid waste	• Take measures to ensure paperless environment. There should be maximum utilization of electronic media. • There should be a control over Issuance of paper to restrict its	During Operation Phase	Proponent	Proponent

			excessive use. • Separate waste bins will be placed for different type of wastes - plastic, paper, and metal etc. • Non-hazardous non-recyclable wastes will be disposed-off properly. • No waste will be dumped at any location outside the plant boundary. • Records of all waste generated will be maintained. Quantities of waste disposed, recycled, or reused will be logged on a Waste Tracking Register. • Training will be provided to personnel for identification, segregation, and management of waste. • Potato peel and other waste from French fries' line will be sold as			

			cattle feed. • The boiler ash will be disposed-off properly through EPA approved vendor. • A detailed strategy will be developed on management and disposal of the sludge. • Licensed third party vendors will be contracted on long term arrangements to manage the disposal of the sludge in an environmentally beneficial manner in accordance with international good practices. • Liquid and solid waste management system of FFFL is provided as Annexure-X.			
23.	Disease vector generation & transmission	Ensure the safety of workers from different diseases which may spread during operation	• Minimize the sludge inventory present at the WWTP as far as possible to prevent breeding of disease vectors.	During Operation Phase	Proponent	Proponent

		activities (e.g., sludge from WWTP)	• Cover the sludge piles present at the WWTP as far as possible. • Maintain good housekeeping. • Provide and require use of suitable personal protective clothing and equipment to prevent contact with wastewater (e.g., rubber gloves, aprons, boots, etc.). Especially provide prompt medical attention and cover any skin trauma such as cuts and abrasions to prevent infection and use protective clothing and goggles to prevent contact with sludge. • Encourage workers at WWTP to wash hands frequently.			
24.	Oil Leakage and spill control	To avoid negative impacts on soil and water resources, risk of fire and explosions during	• FFFL must maintain and up-to-date Spill Prevention Control and Counter measures (SPCC) Plan. • An inventory must be kept of oil storage tank.	During Operation Phase	Proponent	Proponent

		vegetable oil transport, storage, and handling	• The cooking oil storage tank must have sized secondary containment. • The department responsible for oil storage need to be equipped and able to respond to a small spill. • At a minimum, spill kits must be available during product transfer. • Monthly inspections of systems and equipment must be conducted. • All employees that maintain oil tank and/or handle oil, must be trained yearly regarding SPCC requirements. • All inspections and trainings must be documented, and records retained for three years.			
25.	Soil Pollution	To minimize the soil disturbance	• In case of fuel/oil spill, cleaning of the territory and withdrawal of the contaminated soil and ground for further remediation. • Improve wastewater quality with reference to COD & Oil by carrying out regular analysis.	During Operation Phase	Proponent	Proponent

			Ensure regular Inspection / cleaning of drains and pits. • There should be controlled waste management			
26.	Power Demand	To ensure the conservation of electricity during operation activities	• All electrical appliances will be switched off when not in use. • Energy conservation should be practiced that involves proper use of electrical appliances, lighting systems and other electrical instruments used for different purposes.	During Operation Phase	Proponent	Proponent
27.	Fire and Explosion Hazard	To avoid fire hazard at the site	• The proposed expansion will be carried out according to international standards for the prevention and control of fire and explosion hazards, including provisions for segregation of process, storage, utility, and safe areas.	During Operation Phase	Proponent	Proponent

			• Fire extinguishers, fire hydrants and fire alarms should be provided at convenient locations within the facility. These should be regularly inspected and maintained by a reputable fire security company. • Fire drills should be conducted at least biannually to ensure that workers are conversant with the action to take in the event of fire or explosions. • Fire awareness materials should be placed in strategic locations within the facility to educate the workers and customers on what to do in the event of fire. • An elaborate emergency response plan has been developed by FFFL to address the risks associated with the facility 's			

			operations.			
28.	Medical Emergencies	To provide First Aid to the injured workers	• In case of medical emergencies, there is a dispensary within factory. If the injuries are serious, the dispenser can assess and send the worker to nearby hospital.	During Operation Phase	Proponent	Proponent
29.	Natural Emergencies	To minimize the impact of natural hazard at site	• In case of fire, medical or natural emergencies, the FFFL has prepared and practiced a detailed ERP attached as Annexure-Y.	During Operation Phase	Proponent	Proponent
30.	Occupational hazards and accidents	To ensure workers safety at the site To provide workers with the safe and healthy working environment	• Train personnel on health and labor protection issues. • Provide staff with personal protective equipment. • Fencing work areas dangerous for health. • Ensure proper working of machinery. • Control getting and moving of	During Operation Phase	Proponent	Proponent

			strangers at the workplace without special permit or without special protective equipment. • Onsite risk assessment to identify certain hazards and appropriate handling of them for the security of working personnel. • Keep register for accidents and incidents. • Fuel and chemical storage should be labeled. • Necessary health and safety rules shall be enforced by the management. • First Aid kits should always be available at the site and staff members trained in first aid administration. • Clear signage should be posted alerting of possible danger situations.			

			• FFFL has a detailed EMS system in place which is provided as Annexure-Z.			
31.	Ecology and Biodiversity	To protect the existing flora and fauna of the project site.	• The probability and consequences of significant ecological impacts occurring because of the operation are almost negligible as there is no engendered fauna and flora exists at the site, also the proposed expansion does not require removal of plants or trees from site. • FFFL actively plant trees in the factory and other parts of the Country on annual basis. There is a yearly tree plantation campaign in the factory with special invitation to DO Environment, Pakpattan. Plants provide habitat for many birds and insects and thus restoring and promoting	During Operation Phase	Proponent	Proponent

			biodiversity of the area.			
32.	Socio-Economic Impact	To increase social benefits of the project	• Complaints from the people shall be recorded and solved on immediate basis. • The employer and site manager should try to resolve any grievance in the first instance. • A booklet outlining grievance contact points should be maintained. • Employment opportunities will be generated for local skilled and unskilled people, this will bring economic prosperity in the area.	During Operation Phase	Proponent	Proponent

9.4 Environmental Monitoring

This section provides a Monitoring Plan that identifies the roles and responsibilities of project staff involved in environmental monitoring and lists the parameters that will be tested in the monitoring process. Tables 9.4 and 9.5 present the Monitoring Plan for performance indicators during construction and operation phases.

Table 6.4 Environmental Monitoring Plan for Construction Phase

Env Quality	Parameters	Details of Location	Method	Stnd/Glines	Frequency	Responsibility
Air (emission of dust and exhaust)	Air Quality (PM_{10}) All relevant stack emissions (CO, NO_X, SO_X)	Construction Sites	• Visual control • technical inspection of machinery • Instrumental measuring	PEQS	Quarterly	Proponent
Water Quality	Groundwater Quality (Total Coliform, Fecal E.Coli, pH, TDS, Total hardness, Alkalinity Nitrates, Chloride, sodium, iron)	Construction Sites	• Laboratory Control	PEQS	Quarterly	Proponent
Wastewater Quality	Wastewater quality (pH, TDS, TSS, BOD_5, COD, Chloride, Iron, Nitrate)	Construction camps At Construction Sites	• WWM control • Laboratory control.	PEQS	Quarterly	Proponent
Noise Level	Noise level on dB (A) Scale	Construction Site	• Instrumental Monitoring	PEQS	Annually	Proponent
Soil Quality	Calcium, Magnesium, Iron Fluoride, Sulphide, Sulphate, Zinc, Barium, pH, Sodium, Potassium	Construction camps, Construction sites, Material, and waste storage areas	• Lab control		Regular inspection Inspection after completion of works. Laboratory analysis-in case of any spill	Proponent

Table 6.5 Environmental Monitoring Plan Operation Phase

Environmental Quality	Parameters	Details of Location	Method	Standards/ Guidelines	Frequency	Responsibility
Ambient Air	SO2, NOx, CO, PM10, PM2.5, HC	• Minimum 2-3 point of FFFL, Plant • Near Sensitive Receptor	• Instrumental monitoring, technical inspection of machinery, visual control	PEQS	Quarterly	Proponent
Water Quality	Groundwater Quality (Total Coliform, Fecal E.Coli, pH, TDS, Total hardness, Alkalinity Nitrates, Chloride, sodium, iron)	• End user points at randomly chosen end user points	Laboratory Control	PEQS	Quarterly	Proponent
Wastewater Quality	pH, TDS, TSS, BOD, COD, chloride, iron, nitrates	• WWTP inlet and outlet • Sukh Bias Drain	• Wastewater management control • Laboratory control.	PEQS	Quarterly	Proponent
Noise Level	Noise level on dB (A) Scale	• Near Noisy Machinery • Near Sensitive Receptor	• Instrumental Monitoring	PEQS	Annually	Proponent
Solid Waste	Record of waste generated and waste disposal practice	Potato Storage area and FF line	• Visual/ site inspection	-	Quarterly	Proponent
Gaseous Emission	SO2, NOx, CO, PM	Boiler Stack	• Instrumental	PEQS	Quarterly	Proponent

			monitoring and technical inspection			
Emergency	Frequency of accidents, No. of injuries and care provided	All Components	• Visual/ site inspection	Health and Safety	Regularly	Proponent

9.5 Environmental Budget allocated for proposed expansion project.

Table 9.6 presents an estimated cost reserved for environmental management during the proposed project.

Table 9.6: Cost Estimates for Environmental Management

Sr. #	Item	Rs.
1	Water Sampling & Testing	250,000.00
2	Wastewater Sampling & Testing	280,000.00
3	Vehicular Emission Testing	80,000.000
4	Air Quality Monitoring	200,000.00
5	*Purchase of PPEs	350,000.00
6	Maintenance of Equipment	200,000.00
7	Waste Disposal	100,000.00
8	EHS Training	75,000.00
9	Landscaping and tree plantation	400,000.00
	Sub total	1,385,000

*PPE's cost will reduce subsequently each year as capital investment is made in first year.

CHAPTER 10

STAKEHOLDER CONSULTATION

Chapter Ten

STAKEHOLDER CONSULTATION

10.1 Involvement of Stakeholders/ Public Consultation

Public participation basically involves encouragement of the public to express their views. This exercise tries to ensure that due consideration will be given to public values, concerns and preferences when decisions are made. Information and notification, strictly speaking, are the preconditions of meaningful public involvement. On its own, information disclosure is not an enough provision in public involvement for an audit of a major project. Consultation denotes an exchange of information designed to canvass the views of stakeholders on a project and its impacts. Participation is a more interactive process of engaging the public in addressing the issues, establishing areas of agreement and disagreement and trying to reach common positions. As previous experience shows that certain potentially contentious issues never get to the public domain if the correct consultation process is not maintained from the conceptual stage of any development. For this project, proponent and the consultant have maintained a steady consultation process with all relevant parties, to ensure that all issues of concern are rationalized and sorted out prior to implementation of proposed project.

10.2 Objectives of Stakeholder Engagement & Consultation

The objectives of embarking on the consultations process for the project are:

- Inform and educate to avoid misunderstandings about the proposed project/development
- Identify problems, concerns and needs.
- Obtain feedback.
- Learn through local knowledge and understanding, particularly for environmental.
- Social baseline feedback
- Dissemination of information on the project
- Promote ownership and enhance social acceptability.
- Build trust amongst the various stakeholders.
- Evaluate alternatives and seek solutions.

This section involves communication of possible impacts and concerns with;

- Proponents Environmental Management Team
- The responsible authority
- Other departments and agencies
- Environmental Practitioners and experts
- Affected and wider community

10.3 Proponents Environmental Management Team

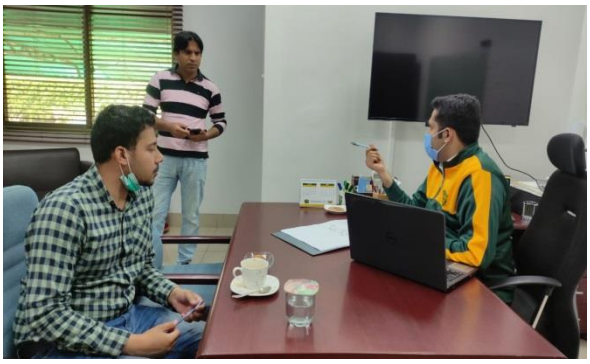
Findings of the consultations with proponent's environment management team are summarized in below table.

Table 10.1 List of Interviewed Personnel from FFFL

Names	Designation	Organization
Mr. Raza Waseem	AM - Utilities	Fauji Fresh n Freeze pvt Ltd
Mr. Muhammad Akhtar Javaid	JM - HSE	Fauji Fresh n Freeze pvt Ltd
Mr. Muhammad Tariq	JM	Fauji Fresh n Freeze pvt Ltd

Mr. Raza Waseem said that the expansion of French Fries Line will provide healthy and hygienic food to the consumers. The Installation of Wastewater Treatment Plant (WWTP) will ensure proper treatment of wastewater before discharge. Mr. M. Akhtar Javaid added that Fauji Fresh n Freeze believes on clean and green Pakistan. So, with expansion of plant it also going to install a new wastewater treatment plant to ensure sustainability. Mr. Muhammad Tariq said that the main advantage of this expansion will be to grow the business as well as provide healthy food products to the community. In addition, it will also provide the jobs to the locals during construction and operation phases of the project. Feedback form of consultation with the proponent is provided as Annexure-R.

PICTORIAL PROFILE OF CONSULTATION WITH PROPONENT



Mr. Raza Waseem (AM - Utilities, FFFL Pvt Ltd.)

Mr. Muhammad Tariq (JM , FFFL Pvt Ltd.)

Mr. Muhammad Akhtar Javaid (JM - HSE, FFFL Pvt Ltd.)

10.4 The Responsible Authority

Findings of the consultations with Responsible Authority/EPA's team are summarized in below table.

Table 10.2 Views of Responsible Authority

Sr. No.	Name	Designation Department	View / Concerns
1.	Mr. Safdar Ali	Assistant Director (Field) EPA District Office Pakpattan. Phone: 0457-383913 Cell: 0302-6948139	He responded in a positive manner towards the proposed project. Moreover he suggested that to consider all guidelines of Punjab EPA during preparation of Environmental Impact Assessment. He also emphasized to develop detailed Environmental and monitoring Plan

10.5 Other Departments and Agencies

There are many important reasons to establish and maintain good working relationships with governmental authorities at different levels, and to keep them informed about project's activities and anticipated impacts. Government support can be critical to the success of a project and routine engagement with various regulatory and public service authorities is often required as part of doing business. On a practical level, local government authorities may have long-established relationships with project-affected communities and other local and national stakeholder groups, and as such can play a role in convening and facilitating discussions between the project and stakeholder representative.

a. Objectives

The objectives behind the consultation with government officials were,

- To provide information about the proposed project
- To resolve and avoid conflicts.
- To establish areas of co-operation and development
- To provide an opportunity to influence project design in a positive manner.
- To tap information on key environmental and social baseline of the project area
- To manage expectations and misconceptions regarding the project
- To provide opportunities to discuss their opinions and concerns.

b. Methodology

The consultant telephonically communicated with various government officials due to COVID-19 and lockdown situation in the country. The telephonic conversation took place on 6th and 7th May 2021. Below table 10.3 shows details of consulted government officials on the proposed project.

Table 10.3 List of Government Officials Contacted

Sr. No.	Name	Designation	Department
1.	Mr. Khaliq Dad Wattoo	Deputy Director Agriculture (OFWM)	Department of Agriculture, Pakpattan Phone: 0457-383569 Cell: 0300-8962585 Email: doofwm.ppn22@yahoo.com Address: Baba Farid Chowk (Jamal

			Chowk), Arifwala Road Pakpattan
2.	Mr. Hafiz Imran Anjum Saleemi	Asstt. Dir. Agri.(OFWM), Arifwala	Department of Agriculture, Pakpattan Phone: (0457)834446 Cell: 0300-6892398 Email: iImran1007@hotmail.com Address:59/EB Road, Near Khushila Bank Arifwala
3.	Mr. Malik Waseem	District Forest Office (DFO)	Sub Divisional Forest Office DFO office, Pakpattan Phone: (040)9200177-8 Email: dfosahiwal1@gmail.com

Following points were recorded from contacted district officers of various departments.

- DD (Agriculture) briefed that Pakpattan district is known for the fertility of its soil and most of the population of Pakpattan district makes a living on agriculture. The main crops are wheat, rice, cotton, maize (corn), sugar cane, etc. The primary fruits and vegetables that are harvested are mango, guava, carrots, potatoes, oranges and okra. Climate change has been a serious issue which is adversely affecting major crops in Pakpattan and may lead to food insecurity. However, he responded in a positive manner towards the proposed project if the environmental issues that may arise with the execution of proposed project are being properly addressed.

- Division Forest Officer shared useful data on forests. He forests said that trees are the major source of oxygen. There is a need to increase the area under tree cover not only to meet the material needs of the growing population but also to enhance the environmental and ecological services being provided by the forests.
- Mr. Hafiz Imran Anjum Saleemi explained that the Industries located in Pakpattan and Sahiwal are bound to comply with environmental regulations/standards. He further told us that industries are encouraged to install wastewater treatment plants in order to avoid water pollution problems as wastewater is one of the main environmental concerns.

In short, all officials contacted responded in a positive manner and gave useful feedback on possible environmental impacts and control measures of proposed projects. However, the proponent should encourage projects like tree plantation, free medical camps, and education programs for the local community in future.

10.6 Consultation with Environmental Experts and Practitioners

Environmental experts from different universities and other sectors were briefed about the project and interviewed to get their expert opinion. Summary of consultation with environmental experts is given in Table 10.4.

Table 10.4 Feedback of Environmental Practitioners & Expert

Name	Summary of discussion	Input/Recommendation
Dr. Kausar Jamal Cheema Environmental Specialist and Ex- HOD Environmental Science Department, LCWU Lahore.	• Dr. Cheema, shared information and strategies regarding Environmental and Social Impact Assessment of the proposed project. • She discussed and gave expert opinion for Site Suitability and Site Alternatives, Environmental Monitoring Parameter, monitoring frequency, Expert Opinion in Social Economic Surveys, Safety Parameters and Protocols, Biodiversity of the Area and Advance treatment technologies.	• Dr. Cheema was much concerned about detailed impact assessment of the project, covering each aspect. • She emphasized on selection of best suitable site, having minimum environmental and social impacts. She was of the view that biodiversity of the area should not be damaged and proper management should be done. • She proposed that environmental monitoring (air, water, soil etc.) should be done on regular basis. • She said that SOP's for each practice should be designed and implemented throughout the project phase. And said that proper environmental and safety audits should be conducted. • She said that latest technologies with better result

		should be used in the project, environmental and safety trainings should be arranged for the workers to avoid any mishap.
Muhammad Waqar Lecturer at College of Earth and Environmental Sciences, University of The Punjab, Lahore	Mr. Waqar Ahmad, shared information regarding depleting water level of Pakpattan and its adjacent areas.	He strongly endorsed that compliance of FFFL with environmental standards will lower air, water and soil pollution.

Consultation with Environmental Experts

10.7 Consultation with Affected and Wider Community

a. Methodology

The project team comprising of environmentalists and sociologists consulted the people residing around the project area. The responses from different stakeholders were captured via interviews and questionnaires. All the obtained feedbacks were recorded in the field notebook.

b. Project Response

The majority people of the nearby communities are strongly in favor of the proposed project because they think earning at any level is more important than any other thing. They have the perspective of healthy future which will bring prosperity to their young ones. They also gave comments that such projects will pave the path of unemployment. As these projects will commence; it will open the door of employment opportunities not only during construction phase but also afterwards. On the other hand, 4% of people seemed not satisfied with the project. As they said that such projects will bring disturbance to them. They were afraid of usage of heavy machinery that will lead to public nuisance i.e., water pollution and air pollution. They said, if mitigation measures would be taken and regular monitoring will be carried out, then they would have no objection.

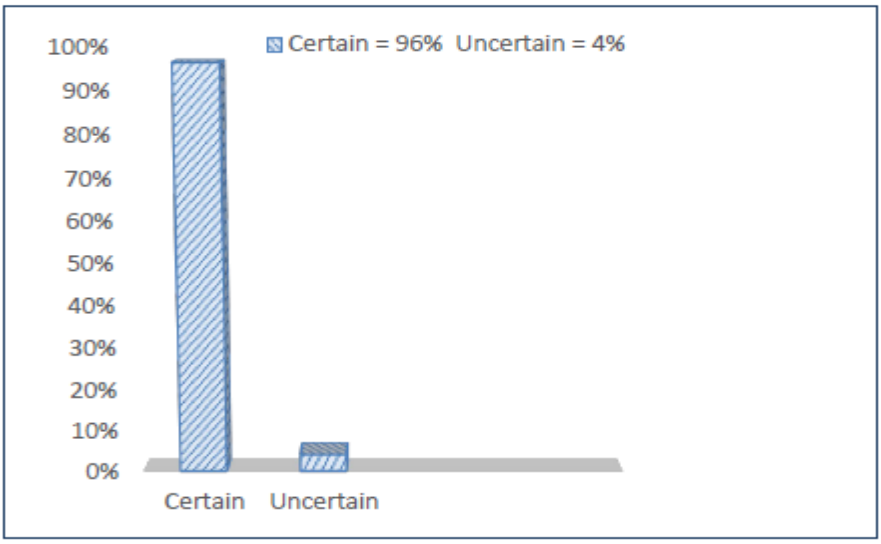


Figure 10.1 People's certainty about the project

So, we can conclude from the feedback of stakeholders that if the proposed project is not harming the natural and green environment, then this project is environment friendly and without any hesitation and deterioration under risk we can commence the project. This will enhance the development of the country and people will get desirable result. Feedback forms of consultation with local community are provided as Annexure-Q.

PICTORIAL PROFILE OF CONSULTATION WITH AFFECTED AND WIDER COMMUNITY


FILA

CHAPTER 11

CONCLUSION

Chapter Eleven

CONCLUSION OF THE REPORT

The EIA of the proposed expansion of FFFL Sahiwal plant has achieved the following goals:

- Identification of national environmental regulatory requirements that apply to the proposed development activities.
- Identification of the environmental features of the project area and the likely impacts of the project on the environment.
- Recommendation of appropriate mitigation measures that the proponent will incorporate into the project design to eliminate or mitigate all adverse environmental impacts.

Baseline environmental and socioeconomic information was collected from a variety of sources including published literature and field surveys. The information collected was used to compose profiles of the natural and socioeconomic environments likely to be affected by the project. Information for the section describing the project came mainly from the proponent. An assessment was then made of the potential impacts of the described project on the area's natural and socioeconomic environment. The impacts of the planned activities in the project area will be insignificant. In areas where these activities may have a significant impact, additional mitigation measures are given to reduce impacts to as low as reasonably possible.

All construction & operation activities will be confined within the boundary wall of the project site. Therefore, no disturbance will be caused to the surrounding. Implementation of the proposed mitigation measures and regular monitoring is not likely to leave any significant impact on the environment from the proposed project. After assessing the proposed project activities and investigating the project area, the consultant, Environmental Consultancies and Options (ECO) have concluded that:

"If the activities are undertaken as proposed and described in this report, and the recommended mitigation and environmental management measures are implemented/adopted, the project will not result in any long-term or significant impacts on the local community or the environment."