

Environmental Assessment Checklists and SOPS for Slaughter Houses / Abattoirs
(Municipal Slaughter Houses, Commercial Slaughter Houses, Industrial Abattoirs, Meat Processing & By-product Handling Facilities)

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1. INTRODUCTION

Slaughter houses constitute an essential component of the livestock and meat supply chain in Punjab. These facilities facilitate the processing of livestock into meat products for human consumption and support associated commercial activities including meat processing, cold storage, transport, and by-product utilization. However, slaughter house operations involve multiple environmentally sensitive activities that generate significant quantities of wastewater, blood, offal, condemned meat, paunch contents, fats, oils, grease, odorous emissions, and other organic wastes.

If not properly planned, designed, operated, and monitored, slaughter house facilities may cause serious environmental degradation and public health concerns including surface water contamination, groundwater pollution, offensive odours, vector infestation, disease transmission, and occupational hazards. Improper management of wastewater and slaughter waste can significantly increase organic pollution load, resulting in elevated BOD, COD, suspended solids, and pathogen contamination.

Accordingly, these SOPS have been developed by EPA Punjab to provide a structured framework for environmental assessment, regulatory review, pollution prevention, environmental management, monitoring, and compliance enforcement for slaughter house facilities across Punjab.

1.1 Scope of SOPS

These SOPS apply to all categories of slaughter house and abattoir facilities operating within Punjab, including municipal slaughter houses, commercial slaughter houses, industrial abattoirs, meat processing facilities, by-product processing facilities, rendering facilities, and associated cold storage facilities.

The scope covers facilities engaged in slaughtering, processing, storage, handling, transportation, and disposal of livestock and slaughter-related materials including meat, blood, offal, hides, bones, fats, condemned meat, and other by-products. These SOPS are applicable irrespective of ownership status, including public sector, private sector, municipal authorities, and public-private partnership arrangements.

Municipal slaughter houses generally serve public slaughtering requirements under local government administration and are commonly located within or near urban areas. Commercial slaughter houses are privately operated facilities serving wholesale meat markets, retailers, and commercial supply chains. Industrial abattoirs refer to large-scale mechanized slaughtering and meat processing units with high slaughter capacities and advanced processing infrastructure.

The SOPS also extend to meat processing facilities involved in cutting, deboning, packaging, chilling, freezing, storage, and distribution of meat products. Similarly, by-product processing and rendering facilities associated with slaughter house operations, including facilities handling blood, fats, bones, hides, offal, and other animal waste

streams, fall under the scope of these SOPS due to their significant environmental implications.

In addition, ancillary and supporting infrastructure associated with slaughter house operations shall also be covered under these SOPS. Such infrastructure includes lairage areas, animal receiving zones, veterinary inspection facilities, slaughter halls, wastewater conveyance systems, effluent treatment plants (ETPs), solid waste storage areas, waste disposal systems, cold storage units, refrigeration systems, and transport loading/unloading areas.

These SOPS shall apply to all project stages, including site selection, planning, design, construction, operation, expansion, modernization, rehabilitation, and closure/decommissioning of slaughter house facilities. All new projects, as well as expansions or modifications of existing facilities, shall ensure compliance with these SOPS and all applicable environmental laws, standards, and regulatory requirements of Punjab.

1.2 Objectives

The primary objective of these SOPs is to provide a comprehensive framework for the environmentally sound planning, design, construction, operation, monitoring, and management of slaughter house facilities in Punjab. The SOPs are intended to safeguard environmental quality, public health, animal welfare, and occupational safety, while ensuring compliance with applicable environmental laws and regulatory standards.

The specific objectives of these SOPS are as follows:

1. **Regulatory Alignment and Guidance:** To ensure the environmentally sound development, expansion, and operation of slaughter houses in accordance with applicable laws, and to guide project proponents and consultants in preparing IEE/EIA reports for such projects
2. **EPA Punjab Oversight:** To assist EPA Punjab in the environmental screening, review, evaluation, and regulatory oversight of slaughter house and abattoir projects.
3. **Impact Assessment and Mitigation:** To identify, assess, and mitigate potential environmental impacts associated with slaughter house activities, including wastewater discharge, blood and solid waste generation, odour emissions, and disease transmission risks.
4. **Pollution Prevention and Waste Management:** To minimize environmental pollution through cleaner production, efficient resource use, and the safe collection, handling, treatment, and disposal of all waste streams including blood, offal, hides, bones, fats, condemned meat, and effluent.
5. **Water and Soil Protection:** To prevent contamination of surface water, groundwater, and soil by ensuring effective wastewater collection, treatment, and disposal in compliance with Punjab Environmental Quality Standards (PEQS).
6. **Public Health, Sanitation, and Occupational Safety:** To improve public health and hygiene through responsible slaughtering practices, and to protect worker safety by promoting safe work procedures, emergency preparedness, use of PPE, and risk management systems.
7. **Sustainable Operations and Compliance:** To support sustainable slaughter house operations through regular environmental monitoring, reporting, compliance verification, and continuous performance improvement.

1.3 Environmental Approval Requirements

All slaughter house, abattoir, meat processing, rendering, and associated facilities falling within the scope of the Punjab Environmental Protection (Review of Initial Environmental Examination and Environmental Impact Assessment) Regulations, 2022 shall obtain environmental approval from the Environmental Protection Agency, Punjab (EPA Punjab) prior to commencement of construction, installation, expansion, modernization, or operation.

No project proponent shall initiate site preparation, civil works, construction activities, installation of machinery, expansion of existing facilities, or operational activities without obtaining the requisite environmental approval from EPA Punjab, wherever applicable under the prevailing regulatory framework.

The requirement for environmental approval shall be determined based on the nature, scale, location, and environmental sensitivity of the proposed project, including but not limited to:

- Slaughtering capacity (number of animals processed per day)
- Total project area and land use characteristics
- Type and scale of slaughter house operations
- Wastewater generation and discharge volumes
- Quantity and characteristics of solid waste and by-products
- Requirement of wastewater treatment facilities
- Proximity to environmentally sensitive receptors
- Potential environmental and public health risks

The environmental assessment report submitted to EPA Punjab shall comprehensively address project description, baseline environmental conditions, potential environmental impacts, mitigation measures, environmental management and monitoring plans, emergency response measures, and compliance commitments.

1.4 Legal and Regulatory Framework

- Punjab Environmental Protection Act, 1997
- Punjab Environmental Quality Standards (PEQS)
- Punjab IEE/EIA Regulations, 2022
- Local Government Regulations
- Livestock and Veterinary Regulations

2. PROJECT PROFILE / SECTOR OVERVIEW

Slaughter houses are specialized, regulated facilities for slaughtering livestock and processing meat under controlled, hygienic conditions to protect food safety, public health, and the environment. They are a core part of Punjab's livestock supply chain, converting live animals into meat for consumption and supporting related activities such as processing, cold storage, transportation, and distribution. The sector in Punjab ranges from small municipal facilities serving local areas to large industrial abattoirs supplying regional and national markets. Facilities may vary in scale, ownership, and mechanization, and larger operations often include ancillary units like cold storage, rendering plants, by-product units, and wastewater treatment systems. Operationally, slaughter houses involve a sequence of activities — animal reception and holding, veterinary inspection, slaughtering, bleeding, skinning, evisceration, carcass washing, cutting, packaging, cold storage,

dispatch, and waste handling. Each stage carries environmental, public health, and occupational risks that must be managed through proper design, controls, and monitoring. Environmentally, slaughter houses are sensitive facilities because they generate large volumes of wastewater, blood, offal, fats, grease, organic waste, and odorous emissions. If not managed correctly, these waste streams can contaminate surface and groundwater, degrade soil, pollute air, cause offensive odors, and create vector and disease risks. The extent of these impacts depends on facility capacity, design, waste management infrastructure, operational efficiency, and regulatory compliance. Therefore, sound environmental planning, engineering, and operational controls are essential for sustainable development of the sector in Punjab. These SOPs establish a framework to assess slaughter house projects from environmental, operational, and regulatory perspectives, and set minimum requirements for pollution prevention, waste management, monitoring, and performance improvement.

3. HOW TO PREPARE IEE/EIA REPORTS

The project proponent shall prepare and submit the Initial Environmental Examination (IEE) or Environmental Impact Assessment (EIA), as applicable, in accordance with the Punjab Environmental Protection (Review of Initial Environmental Examination and Environmental Impact Assessment) Regulations, 2022 and all other applicable environmental laws, regulations, standards, and sector-specific requirements issued by EPA Punjab.

The purpose of the IEE/EIA is to systematically identify, predict, evaluate, and mitigate potential environmental and social impacts associated with slaughter house projects during planning, construction, operation, expansion, and closure phases. The environmental assessment shall provide sufficient technical, environmental, and operational information to enable EPA Punjab to evaluate the project and determine whether the proposed development is environmentally acceptable.

The IEE/EIA report shall be prepared by qualified environmental professionals and shall include comprehensive information regarding project design, operational processes, environmental baseline conditions, anticipated impacts, mitigation measures, environmental management arrangements, and compliance commitments.

The environmental assessment process shall generally include:

- Project screening
- Scoping and terms of reference
- Baseline environmental studies
- Stakeholder consultation
- Impact identification and assessment
- Analysis of alternatives
- Mitigation planning
- Environmental management and monitoring planning
- Institutional arrangements and compliance framework

The IEE/EIA report shall include, but not be limited to, the following components:

3.1 Policy, Legal and Administrative Framework

The IEE/EIA report shall identify and evaluate all applicable policy, legal, regulatory, and administrative requirements relevant to the proposed slaughter house project.

This section shall include review of all applicable laws, standards, regulations, SOPs, and administrative requirements at provincial and local levels, including but not limited to:

- Punjab Environmental Protection Act, 1997
- Punjab IEE/EIA Regulations, 2022
- Punjab Environmental Quality Standards (PEQS)
- Municipal and local government regulations
- Livestock and veterinary regulations
- Public health and sanitation requirements
- Occupational health and safety requirements
- Solid waste management regulations
- Building and land-use regulations

The proponent shall demonstrate how the project design, operational planning, and environmental management systems comply with these requirements.

3.2 Project Description and Scope

The IEE/EIA report shall provide a comprehensive description of the proposed project, including its physical characteristics, operational processes, infrastructure requirements, and expected outputs.

The project description shall include, at minimum:

- Project location and site coordinates
- Total land area and layout plan
- Type and category of slaughter house
- Slaughtering capacity (animals/day)
- Utility requirements
- Water demand and source
- Energy and fuel requirements
- Wastewater generation volumes
- Solid waste quantities and characteristics
- Waste management systems
- Supporting infrastructure and facilities

The report shall also describe all operational stages including animal transportation, receiving, lairage, slaughtering, bleeding, skinning, evisceration, carcass handling, meat processing, storage, dispatch, and waste management.

A clear process flow diagram should be included to illustrate all operational activities and associated waste streams.

3.3 Environmental and Social Baseline Mapping

The IEE/EIA report shall provide a comprehensive description of the existing environmental and social conditions of the project area and surrounding zones of influence. Baseline data shall be collected to establish reference conditions against which project-related impacts can be assessed. Baseline studies shall cover physical, biological, and socio-economic environments.

Baseline assessment shall include, at minimum:

Physical Environment

- Ambient air quality
- Noise levels
- Groundwater quality

- Surface water quality
- Drainage patterns
- Soil characteristics
- Land use and land cover
- Climate and meteorological conditions

Biological Environment

- Flora and fauna
- Sensitive habitats
- Ecologically important areas
- Biodiversity considerations

Socio-Economic Environment

- Nearby settlements
- Population characteristics
- Sensitive receptors (schools, hospitals, mosques)
- Community infrastructure
- Public utilities
- Traffic conditions

The baseline study shall identify environmentally sensitive receptors within the project influence area and assess the vulnerability of nearby populations and environmental resources.

3.4 Stakeholder Consultation

The proponent shall conduct meaningful consultations with relevant stakeholders to identify concerns, collect local information, and improve environmental decision-making. Stakeholders may include:

- Local communities
- Municipal authorities
- Livestock departments
- Veterinary departments
- Nearby residents
- Relevant government departments

Stakeholder consultations shall identify potential concerns regarding odour, wastewater discharge, waste disposal, public nuisance, traffic congestion, disease risks, and other environmental and social issues.

The IEE/EIA report shall document consultation findings and describe how stakeholder concerns have been addressed in project planning and design.

3.5 Hazard Identification and Risk Assessment

The IEE/EIA report shall identify and assess potential hazards, accident scenarios, operational failures, and emergency situations associated with slaughter house operations. Risk assessment shall consider both likelihood and consequence of identified hazards.

Major hazards to be assessed include:

- Disease outbreaks
- Fire incidents
- Blood spills
- Chemical spills
- ETP failure

- Wastewater overflow
- Equipment failure
- Occupational accidents
- Solid waste accumulation
- Odour nuisance events

The report shall evaluate potential impacts of such events on workers, nearby communities, and environmental resources.

Appropriate preventive, corrective, and emergency response measures shall be identified.

3.6 Impact Assessment and Analysis of Alternatives

The IEE/EIA shall assess all potential direct, indirect, cumulative, short-term, and long-term impacts associated with the proposed slaughter house project.

Impact assessment shall evaluate impacts during:

- Site preparation
- Construction
- Operation
- Expansion
- Closure

The report shall also evaluate feasible alternatives including:

- Alternative sites
- Alternative layouts
- Alternative wastewater treatment systems
- Alternative waste disposal methods
- Alternative operational practices (Best Available Technologies)

The preferred option shall be justified based on environmental, technical, and economic considerations.

3.7 Environmental Management and Monitoring Plan (EMMP)

The IEE/EIA report shall include a comprehensive Environmental Management and Monitoring Plan (EMMP) describing mitigation measures, monitoring requirements, implementation responsibilities, and reporting arrangements.

The EMMP shall include:

- Impact mitigation measures
- Monitoring parameters
- Monitoring frequency
- Responsible persons/entities
- Reporting mechanisms
- Emergency response procedures
- Compliance verification framework

The monitoring framework shall include parameters such as wastewater quality, odour levels, waste management performance, occupational safety indicators, and compliance with PEQS.

The EMMP shall clearly define institutional responsibilities for implementation, supervision, and reporting throughout the project lifecycle.

4. COMPLETE SLAUGHTER HOUSE PROCESS FLOW

Slaughter house operations involve a sequence of interconnected activities beginning from animal transportation and ending with waste disposal and dispatch of meat products. Each stage of the slaughtering process generates specific environmental, health, safety, and operational risks that require proper planning, infrastructure, process controls, and monitoring.

The entire slaughter house process shall be designed and operated to ensure:

- Hygienic slaughtering conditions
- Environmental protection
- Animal welfare
- Public health protection
- Occupational safety
- Efficient waste management

The complete process flow generally includes:

Animal Transportation → Animal Receiving → Lairage → Ante-Mortem Inspection → Slaughtering → Bleeding → Skinning → Evisceration → Post-Mortem Inspection → Carcass Washing → Meat Cutting → Chilling & Cold Storage → Packaging & Dispatch → Waste Handling

4.1 Animal Transportation

Animal transportation represents the first stage in slaughter house operations and involves movement of livestock from farms, markets, or holding areas to the slaughter house facility.

Improper transportation practices may cause animal stress, injury, waste generation, traffic congestion, and public nuisance. Animal waste generated during transportation may contribute to localized pollution and sanitation issues if not properly managed.

Transportation vehicles shall be properly designed, regularly cleaned, and maintained to ensure hygienic handling of livestock. Overcrowding, prolonged transport duration, and inhumane transport conditions shall be avoided.

Environmental concerns at this stage include:

- Animal stress and welfare issues
- Waste discharge during transport
- Traffic congestion
- Public nuisance
- Disease transmission risks

Appropriate traffic management, vehicle sanitation, and animal welfare measures shall be implemented.

4.2 Animal Receiving

Animal receiving includes unloading, registration, verification, and movement of animals into designated holding areas within the slaughter house.

This stage requires careful management to prevent overcrowding, stress, injury, and sanitation issues. Receiving areas shall be properly designed to ensure smooth movement and safe handling of animals.

Environmental concerns at this stage include:

- Animal waste generation
- Odour generation
- Noise

- Surface contamination
- Hygiene issues

Receiving areas shall be cleaned regularly and provided with adequate drainage and wash facilities.

4.3 Lairage

Lairage refers to the designated holding area where animals are temporarily kept before slaughter.

Lairage areas shall provide adequate space, ventilation, drinking water, and resting conditions for animals. Proper cleaning and sanitation are essential to minimize contamination and odour generation.

Major environmental concerns include:

- Animal waste accumulation
- Odour generation
- Wastewater generation
- Vector attraction
- Disease transmission

Lairage areas shall have proper drainage systems and routine cleaning schedules.

4.4 Ante-Mortem Inspection

Ante-mortem inspection involves veterinary examination of animals prior to slaughter, to assess their health condition and suitability for slaughter.

This stage is essential for preventing diseased or unfit animals from entering the food chain and reducing public health risks.

The inspection shall identify:

- Diseased animals
- Injured animals
- Weak animals
- Abnormal behavior
- Signs of infection

Animals found unfit for slaughter shall be isolated and managed in accordance with veterinary regulations.

4.5 Slaughtering

Slaughtering involves humane killing of animals in designated slaughter areas using approved procedures and equipment.

This stage requires strict hygiene controls, proper drainage, worker safety, and sanitation protocols.

Environmental concerns include:

- Blood generation
- Wastewater generation
- Solid waste generation
- Occupational hazards
- Hygiene risks

The slaughter area shall be cleaned frequently and maintained in sanitary condition.

4.6 Bleeding

Bleeding is one of the most critical stages of slaughter house operations from an environmental perspective due to the high organic pollution load of blood.

Blood contains extremely high concentrations of biodegradable organic matter and contributes significantly to BOD and COD if discharged untreated into drainage systems.

All bleeding operations shall be carried out in designated bleeding areas equipped with proper drainage and blood collection systems. Blood shall be collected separately using dedicated channels, containers, or collection pits to minimize contamination of general wastewater streams.

The discharge of untreated blood into drains, sewers, stormwater channels, or water bodies is strictly prohibited.

Collected blood shall be processed for rendering, by-product recovery, or disposed of through approved methods.

4.7 Skinning

Skinning involves removal of hide or skin from the carcass.

This process generates hides, skin residues, and wastewater. Improper handling may contaminate carcasses and create hygiene concerns.

Environmental concerns include:

- Solid waste generation
- Wastewater generation
- Odour
- Hygiene issues

Hides and skins shall be collected separately and stored in designated areas.

4.8 Evisceration

Evisceration involves removal of internal organs and digestive tract contents.

This is a highly sensitive stage because improper handling can cause contamination of meat and working areas.

Environmental concerns include:

- Offal generation
- Paunch content disposal
- Wastewater generation
- Odour
- Pathogen contamination

Proper segregation and safe handling of organs and offal are mandatory.

4.9 Post-Mortem Inspection

Post-mortem inspection involves examination of carcasses and organs after slaughter.

The purpose is to identify disease, abnormalities, contamination, and meat unfit for human consumption.

Inspection shall assess:

- Carcass quality
- Organ condition
- Contamination
- Disease indicators

Condemned meat shall be segregated immediately for safe disposal.

4.10 Carcass Washing

Carcass washing is carried out to remove visible contaminants and improve hygiene. This process generates considerable wastewater and requires efficient water management practices.

Environmental concerns include:

- High water consumption
- Wastewater generation
- Surface contamination

Water-efficient washing systems should be encouraged.

4.11 Meat Cutting

Meat cutting includes carcass breakdown, deboning, trimming, and portioning. Strict hygiene and sanitation measures are required to prevent contamination.

Environmental concerns include:

- Solid waste generation
- Organic waste
- Wastewater generation
- Hygiene risks

4.12 Chilling and Cold Storage

Chilling and cold storage preserve meat quality and reduce spoilage.

These systems require energy, refrigeration, and temperature control.

Environmental concerns include:

- Energy consumption
- Refrigerant management
- Wastewater generation
- Equipment failure risks

Cold storage systems shall be properly maintained and monitored.

4.13 Packaging and Dispatch

Packaging and dispatch involve preparation of meat products for transportation and distribution.

Environmental concerns include:

- Packaging waste
- Vehicle emissions
- Cold chain management

Proper handling and sanitation protocols shall be maintained.

4.14 Waste Handling

Waste handling includes collection, segregation, storage, treatment, transport, and disposal of all slaughter house waste streams.

Major waste streams include:

- Blood
- Offal
- Bones
- Hides
- Fat

- Condemned meat
- Paunch contents
- Wastewater sludge

Improper waste handling may cause severe environmental pollution, odour, vector infestation, and public health risks.

All waste streams shall be managed through approved waste handling, treatment, recovery, and disposal systems.

Engineering Design Requirements

All slaughter house facilities shall incorporate the following minimum engineering and infrastructure requirements to ensure safe, hygienic, and environmentally sound operations:

- Dedicated slaughter hall
- Lairage area with proper drainage
- Animal receiving area
- Ante-mortem inspection area
- Post-mortem inspection area
- Blood collection system
- Covered waste storage area
- Cold storage facility
- Drainage network with screening chamber
- Effluent Treatment Plant (ETP)
- Emergency wash and sanitation systems
- Ventilation systems
- Water supply systems
- Fire safety systems

Facility design shall ensure operational efficiency, hygiene control, environmental protection, and compliance with regulatory requirements.

5. ENVIRONMENTAL IMPACTS & MITIGATION MEASURES

Slaughter house operations have the potential to generate significant environmental, public health, and occupational impacts if not properly planned, designed, operated, and monitored. Major environmental concerns arise from wastewater generation, blood discharge, organic waste accumulation, odour emissions, pathogen spread, improper waste disposal, and resource consumption.

The type and severity of environmental impacts depend upon several factors including slaughter capacity, facility layout, waste generation rates, wastewater characteristics, treatment infrastructure, operational practices, and overall compliance with environmental standards.

This section identifies key environmental impacts associated with slaughter house projects during various project phases and establishes mandatory mitigation measures and pollution control requirements to minimize adverse impacts and ensure compliance with regulatory standards.

The mitigation hierarchy shall prioritize:

- Impact avoidance
- Impact minimization
- Waste recovery and reuse
- Treatment and control
- Safe disposal

5.1 Site Selection Criteria

Site selection is one of the most important factors in minimizing long-term environmental and public health risks associated with slaughter house operations.

Improper site selection may lead to odour nuisance, water contamination, public complaints, traffic congestion, and health risks for nearby communities.

The following minimum site selection criteria shall be considered:

- Slaughter houses should preferably maintain **buffer distances of at least 500 m from residential receptors and 200 m from major water bodies**, unless otherwise determined by EPA Punjab during environmental review.
- Outside environmentally sensitive areas
- Outside flood-prone areas
- Adequate road access
- Adequate drainage availability
- Availability of water supply
- Sufficient land for future expansion and waste treatment infrastructure

Preference shall be given to sites that minimize environmental and social conflicts.

5.2 Construction Phase Impacts

Construction activities associated with slaughter house development may cause temporary environmental disturbances.

Potential impacts include:

- Dust emissions
- Noise generation
- Construction waste generation
- Soil disturbance
- Traffic congestion
- Surface runoff contamination

Mitigation measures shall include:

- Dust suppression as per EPA's SOPs for under construction sites
- Proper construction waste management
- Controlled material storage
- Traffic management measures
- Noise control practices
- Safe disposal of construction debris

Construction activities shall comply with applicable environmental and occupational safety requirements.

5.3 Operational Phase Impacts

The operational phase presents the most significant environmental risks.

Major operational impacts include:

- Wastewater pollution
- Blood discharge
- Solid waste generation
- Odour emissions
- Air pollution
- Surface water contamination
- Groundwater contamination
- Disease transmission
- Vector infestation
- Occupational hazards

Operational controls and pollution prevention systems must be maintained continuously to ensure environmental compliance.

5.4 Wastewater Management

5.4.1 Wastewater Characteristics

Slaughter houses generate significant volumes of wastewater from animal washing, floor washing, carcass washing, equipment cleaning, sanitation, and process activities.

This wastewater typically contains blood, fats, oils, grease [FOG], paunch contents, suspended solids, high BOD/COD, nutrients, and Pathogenic microorganisms. Untreated discharge causes severe surface/groundwater contamination, sewer choking, and public health risk.

5.4.2 Segregation at Source – Mandatory

- Blood: 100% collection in sealed, sloped blood tanks. No blood shall enter ETP or drain. Blood to be sold to registered renderer within 24 hours.
- FOG: Fat/oil/grease traps or DAF unit at source for all washing halls. FOG to be sold to renderer or biodiesel unit.
- Solids: Screens 6mm + paunch press to separate solids before ETP. Paunch to composting/biogas only.
- Storm vs Process: Separate stormwater and process drains. Stormwater to bypass ETP after oil interceptor.

5.4.3 Treatment Requirements

All facilities shall install an ETP designed to achieve PEQS discharge limits. The treatment system shall be designed according to wastewater quantity and pollutant load to match scale.

Capacity	Minimum ETP Train	Design basis
<100 small animals/day	Screening →Equalization →Anaerobic Baffled Reactor →Constructed Wetland	<5 m ³ /day
100-500 animals/day	Screening →FOG Trap → DAF →UASB* →Aerated Lagoon →Sand Filter	5-50 m ³ /day
>500 animals/day	Screening →DAF →UASB →Activated Sludge	>50 m ³ /day

	→Tertiary →Disinfection	Filtration
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* UASB = Upflow Anaerobic Sludge Blanket reactor

No untreated wastewater shall be discharged into drains, canals, rivers, sewerage systems, or natural water bodies.

5.4.4 Water Conservation

Target <300L water per large animal. Recycle treated effluent for floor/vehicle washing only, not carcass contact. Water meters mandatory at inlet + ETP outlet.

5.4.6 Monitoring & Records

Regular monitoring of effluent quality shall be mandatory.

Daily: pH, flow.

Monthly: BOD, COD, TSS FOG + faecal coliform by EPA-Punjab certified lab.

ETP logbook and lab reports shall be available for inspection.

ETP failure >48 hours = stop slaughtering

5.5 Blood Management SOP

Blood is among the most environmentally critical waste streams generated during slaughter operations due to its extremely high organic pollution load.

Improper disposal of blood significantly increases BOD and COD levels and may severely impact wastewater treatment performance.

The following measures shall be mandatory:

- Separate blood collection system
- Dedicated blood channels or pits
- No mixing with general wastewater where avoidable
- Covered storage containers
- Safe transport and handling
- Rendering or approved disposal

The discharge of blood into drains, sewers, or water bodies is strictly prohibited.

5.6 Offal and Condemned Meat Handling

Offal and condemned meat require careful handling to prevent contamination, odour, and disease transmission.

Improper handling can create serious environmental and public health risks.

Mandatory requirements include:

- Separate collection and segregation
- Clearly marked storage containers
- Covered storage areas
- Safe transportation
- Timely disposal
- Approved disposal methods

Condemned meat shall never enter the food chain and shall be destroyed according to approved veterinary and regulatory procedures.

5.7 Solid Waste Management

Slaughter houses generate substantial quantities of solid waste and by-products.

Major waste streams include:

- Bones
- Hides
- Horns
- Hooves
- Paunch contents
- Fat residues
- Packaging waste
- ETP sludge

Improper waste handling may cause odour nuisance, vector infestation, and environmental pollution.

Waste management shall prioritize:

- Segregation
- Recovery
- Reuse
- Recycling
- Safe disposal

All waste storage areas shall be covered, properly designed, and regularly sanitized.

5.8 Odour Control

Odour generation is one of the most common environmental complaints associated with slaughter house operations.

Major odour sources include:

- Blood
- Offal
- Paunch contents
- Wastewater
- Solid waste storage
- Rendering operations

Effective odour management measures shall include:

- Covered waste bins
- Frequent cleaning
- Timely waste disposal
- Proper ventilation
- Good housekeeping
- Rapid removal of organic waste
- Odour control systems where necessary

Operators shall ensure odour emissions remain within acceptable limits and do not create nuisance in surrounding communities.

5.9 Occupational Health and Safety

Slaughter house operations involve significant occupational health and safety risks due to machinery, sharp tools, biological exposure, slippery surfaces, and heavy workloads.

Key occupational risks include:

- Physical injuries
- Slips and falls
- Cuts and wounds
- Biological exposure
- Disease transmission
- Chemical exposure
- Fire hazards

Mandatory safety measures include:

- Personal Protective Equipment (PPE)
- Safety training
- First aid facilities
- Emergency response procedures
- Fire safety systems
- Hygiene and sanitation protocols

Workers shall receive regular training on occupational health, safety, hygiene, and emergency procedures.

PEQS-Linked Wastewater Standards

All treated effluent discharged from slaughter house facilities shall comply with applicable Punjab Environmental Quality Standards (PEQS) or any other standards prescribed by EPA Punjab.

Parameter	Standard
pH	6–10
BOD	≤ 80 mg/L
COD	≤ 150 mg/L
TSS	≤ 200 mg/L
Oil & Grease	≤ 10 mg/L
Temperature	< 40°C

EPA Punjab may require additional monitoring parameters depending on project-specific risks, discharge routes, and environmental sensitivity of the receiving environment.

This section is now much closer to the standard required for a formal EPA Punjab slaughterhouse SOP.

6. MUNICIPAL SLAUGHTER HOUSE REQUIREMENTS

Municipal slaughter houses operate under unique environmental, operational, and public health constraints due to their proximity to urban settlements, wholesale markets, commercial areas, and dense population centers. Compared to private or industrial slaughter facilities, municipal slaughter houses often face higher risks of public nuisance, odour complaints, traffic congestion, sanitation issues, and wastewater management challenges.

Therefore, municipal slaughter houses require stricter operational controls, higher sanitation standards, and more rigorous environmental management measures to ensure compliance with environmental and public health requirements.

Municipal slaughter houses shall comply with the following minimum requirements:

6.1 Cleaning and Sanitation Requirements

High-frequency cleaning and sanitation shall be mandatory throughout operational hours and after completion of daily slaughtering activities.

Cleaning shall cover:

- Slaughter halls
- Animal receiving areas
- Lairage areas
- Waste storage areas
- Drainage channels
- Equipment and tools
- Loading/unloading areas

Cleaning schedules shall be documented and strictly implemented to minimize contamination, odour, and disease risks.

6.2 Integrated Drainage Systems

Municipal slaughter houses shall maintain properly designed and integrated drainage systems to ensure efficient collection and conveyance of wastewater to treatment or disposal systems.

Drainage systems shall:

- Prevent stagnant wastewater accumulation
- Prevent blockages and overflow
- Separate stormwater and process wastewater where feasible
- Minimize leakages and contamination

Open drainage systems should be avoided wherever possible.

6.3 Parking and Traffic Management

Municipal slaughter houses located in urban areas shall ensure adequate parking and traffic management to minimize congestion and public inconvenience.

Traffic management measures shall include:

- Designated parking areas
- Separate entry and exit routes
- Controlled vehicle movement
- Scheduled loading/unloading operations

Traffic congestion around slaughter house premises shall be minimized.

6.4 Public Hygiene and Sanitation Measures

Municipal slaughter houses shall maintain high public hygiene standards to prevent nuisance and public health concerns.

Public hygiene measures shall include:

- Routine washing and disinfection
- Fly and pest control
- Odour management
- Proper waste storage
- Daily waste disposal

Poor sanitation shall be treated as a serious compliance issue.

6.5 Veterinary Supervision

Veterinary supervision by qualified veterinary officer / authorized livestock department representative shall be mandatory.

Veterinary personnel shall ensure:

- Ante-mortem inspection
- Post-mortem inspection
- Detection of diseased animals
- Safe disposal of condemned meat
- Disease surveillance

No slaughtering activity shall occur without veterinary oversight.

6.6 Waste Disposal Requirements

In Punjab, municipal slaughter houses often operate in dense urban settings with limited drainage infrastructure and mixed sewerage systems. Special controls shall therefore be implemented to manage wastewater discharge, waste disposal, and public nuisance.

All municipal slaughter houses shall ensure daily removal and safe disposal of waste.

Waste disposal systems shall cover:

- Blood
- Offal
- Bones
- Condemned meat
- Paunch contents
- Wastewater sludge

Waste accumulation beyond operational hours shall be avoided to avoid following issues in Punjab municipal slaughter houses:

- Eid-ul-Adha surge
- informal slaughtering
- disposal in open drains
- encroachments
- mixed sewerage systems

6.7 Urban Constraints and Public Nuisance Control

Municipal slaughter houses operating within urban areas shall implement additional controls to manage public nuisance and environmental impacts.

Special attention shall be given to:

- Odour emissions
- Traffic congestion
- Noise
- Waste spillage
- Visual nuisance
- Community complaints

Operators shall maintain complaint registers and promptly address public concerns.

6.8 Market Interface Management

Municipal slaughter houses connected with meat markets shall ensure proper management of slaughter-to-market interfaces.

This includes:

- Hygienic transfer of meat
- Clean loading areas
- Proper cold chain where required
- Prevention of waste spillage
- Clean transport vehicles

Improper handling between slaughter and market distribution shall be avoided.

7. EMERGENCY RESPONSE & DISEASE OUTBREAK MANAGEMENT

Slaughter house operations involve multiple operational, environmental, and biological risks that may result in emergencies requiring immediate response.

Each slaughter house shall develop and implement a comprehensive emergency response plan covering accident prevention, emergency preparedness, response procedures, and corrective actions.

Emergency response plans shall include:

- Emergency reporting procedures
- Emergency contact information
- Roles and responsibilities
- Response protocols
- Worker training
- Emergency drills

7.1 Fire Emergency Response

Fire incidents may arise from electrical faults, fuel storage, equipment malfunction, or operational negligence.

Facilities shall maintain:

- Fire extinguishers
- Fire alarms
- Emergency exits
- Fire response procedures

Workers shall receive fire safety training.

7.2 Blood Spill Response

Blood spills can cause hygiene, safety, and environmental hazards.

Blood spill control procedures shall include:

- Immediate containment
- Restricted access
- Safe cleaning
- Disinfection
- Safe disposal of contaminated materials

Spills shall be handled immediately.

7.3 Disease Outbreak Management

Disease outbreaks among animals or within slaughter facilities present major public health and environmental risks.

Response measures shall include:

- Immediate isolation
- Suspension of slaughter activities if necessary
- Veterinary investigation
- Reporting to relevant authorities
- Safe disposal of infected animals or meat
- Disinfection and sanitation

Rapid containment is essential.

7.4 ETP Failure Response

Failure of wastewater treatment systems may cause severe pollution incidents.

Response procedures shall include:

- Immediate shutdown of discharge
- Temporary containment
- Repair and restoration
- Emergency wastewater management

Untreated discharge during ETP failure shall be strictly prohibited.

7.5 Wastewater Overflow Control

Overflow of untreated wastewater may contaminate surrounding areas and drainage systems.

Facilities shall maintain:

- Overflow prevention systems
- Backup pumps
- Emergency storage capacity
- Rapid response protocols

Immediate corrective action shall be mandatory.

8. MONITORING & REPORTING FRAMEWORK

Environmental monitoring and reporting are essential to ensure compliance with environmental approval conditions, PEQS, and EPA Punjab requirements.

All slaughter house facilities shall establish structured monitoring and reporting systems to assess environmental performance and verify regulatory compliance.

Monitoring objectives include:

- Compliance verification
- Pollution prevention
- Performance improvement
- Early problem detection
- Regulatory reporting

8.1 Environmental Monitoring Requirements

Monitoring shall include, at minimum:

- Wastewater quality monitoring
- Noise monitoring
- Odour monitoring
- Waste management monitoring
- Occupational safety monitoring
- ETP performance monitoring

8.2 Record Keeping

Operators shall maintain proper records of:

- Slaughter records
- Veterinary records
- Waste disposal logs
- ETP logs
- Monitoring reports
- Complaint registers
- Incident records

All records shall be available for EPA Punjab inspections.

8.3 Monitoring Schedule

Parameter	Frequency	Responsible
Wastewater Quality	Monthly	Operator
Noise Levels	Quarterly	Operator
Odour Monitoring	Weekly	Operator
Waste Records	Daily	Operator
ETP Performance	Daily	Operator
Complaint Register Review	Weekly	Operator

EPA Punjab may require additional monitoring parameters or increased monitoring frequency depending on project-specific environmental risks and compliance status.

9. REFERENCES

The following laws, regulations, standards, SOPs, and technical reference documents were considered in preparation of these Standard Operating Procedures (SOPs) for Slaughter Houses in Punjab.

- Punjab Environmental Protection Act, 1997
(Link: <https://punjablaws.gov.pk/laws/2192a.html>)
- Punjab Environmental Protection (Review of IEE/EIA) Regulations, 2022
(Link: <https://epd.punjab.gov.pk/node/228>)
- Punjab Environmental Quality Standards (PEQS) for Wastewater, Air Emissions and Noise
(Link: <https://epd.punjab.gov.pk/resource-center>)
- Policy and Procedures for Filing, Review and Approval of Environmental Assessments
(Link: <https://epd.punjab.gov.pk/resource-center>)
- EPA Punjab SOPs for Environmentally Sensitive and Critical Areas
(Link: <https://epd.punjab.gov.pk/resource-center>)
- Punjab Local Government / Municipal Regulations related to slaughter houses, sanitation, drainage and waste management
(Link: <https://lgcd.punjab.gov.pk>)
- Punjab Livestock & Dairy Development Department Rules and Veterinary Health Protocols
(Link: <https://livestock.punjab.gov.pk>)
- Punjab Food Authority / Public Health Requirements for Meat Safety and Hygiene
(Link: <https://pfa.gop.pk>)
- Occupational Health and Safety / Labour Safety Requirements
(Link: <https://labour.punjab.gov.pk>)
- FAO SOPs on Slaughterhouse Design and Operations
(Link: <https://www.fao.org>)
- WHO SOPs on Food Safety, Hygiene and Public Health
(Link: <https://www.who.int>)
- International Best Available Practices for Slaughter House Design, Waste Management and Wastewater Treatment
- WOAHP (World Organization for Animal Health) SOPs on Animal Health and Slaughter Practices
(Link: <https://www.woah.org>)

APPENDIX I – DETAILED COMPLIANCE CHECKLIST

Sr.	Compliance Item	Yes	No	Remarks
1.	Environmental approval obtained from EPA Punjab	☐	☐	
2.	Site outside environmentally sensitive area	☐	☐	
3.	Site outside flood zone	☐	☐	Evidence NOC irrigation dept.
4.	Minimum 500 m from residential area	☐	☐	Evidence required as GPS map + satellite image with scale
5.	Minimum 200 m from canal/drain/water body	☐	☐	
6.	Proper road access available	☐	☐	
7.	Site has proper drainage system	☐	☐	
8.	Veterinary approval obtained	☐	☐	
9.	Municipal approvals obtained	☐	☐	
10.	Dedicated slaughter hall available	☐	☐	
11.	Lairage area available	☐	☐	
12.	Ante-mortem inspection area available	☐	☐	
13.	Post-mortem inspection area available	☐	☐	
14.	Blood collection tank/system installed + no blood to drain	☐	☐	Photo + renderer MoU
15.	Covered waste storage area available	☐	☐	
16.	Cold storage available	☐	☐	
17.	Drainage network installed	☐	☐	
18.	Screening chamber installed	☐	☐	
19.	FOG trap/DAF(Dissolved air flotation) installed	☐	☐	Photo + design drawing
20.	Animals transported hygienically	☐	☐	
21.	Animal receiving area maintained	☐	☐	
22.	Animals inspected before slaughter	☐	☐	
23.	Veterinary officer available onsite	☐	☐	
24.	Sick animals isolated	☐	☐	
25.	Humane slaughter practices followed	☐	☐	
26.	Slaughter area regularly sanitized	☐	☐	
27.	Water meters + <300L/animal target	☐	☐	Meter readings log
28.	Land area sufficient for ETP + future expansion	☐	☐	Site plan with area calculation required

29.	ETP installed	☐	☐	ETP design + contractor invoice
30.	ETP operational	☐	☐	
31.	No untreated wastewater discharge	☐	☐	
32.	Wastewater routed to ETP	☐	☐	
33.	PEQS compliance maintained	☐	☐	Lab. reports
34.	Wastewater testing conducted	☐	☐	
35.	ETP logs maintained	☐	☐	
36.	Separate blood collection system operational	☐	☐	
37.	Blood discharge into drains prohibited	☐	☐	
38.	Blood safely disposed/rendered	☐	☐	
39.	Separate storm & process drainage	☐	☐	Drainage plan signed by engineer
40.	Offal properly segregated	☐	☐	
41.	Hides stored properly	☐	☐	
42.	Bones stored properly	☐	☐	
43.	Condemned meat segregated	☐	☐	
44.	Condemned meat safely destroyed	☐	☐	
45.	Covered waste bins available	☐	☐	
46.	Waste segregation practiced	☐	☐	
47.	Daily waste removal conducted	☐	☐	
48.	Waste disposal contractor available	☐	☐	
49.	Odour control measures implemented: covered halls / biofilter	☐	☐	
50.	Ventilation adequate	☐	☐	
51.	No excessive odour nuisance	☐	☐	
52.	Vector control: fly-proof bins, weekly fogging			
53.	PPE provided to workers	☐	☐	PPE issue register
54.	First aid available	☐	☐	first aid box photo
55.	Hepatitis B vaccination + zoonotic training	☐	☐	Medical + training attendance sheets
56.	Fire safety equipment available	☐	☐	Civil defense NOC
57.	Workers trained in safety procedures	☐	☐	

58.	Emergency response plan available	☐	☐	mock drill record
59.	Slaughter records maintained	☐	☐	
60.	Veterinary records maintained	☐	☐	
61.	Solid Waste disposal records maintained	☐	☐	Evidence required
62.	Wastewater monitoring reports available	☐	☐	
63.	Odour complaints register maintained	☐	☐	
64.	Incident register maintained	☐	☐	
65.	EPA inspection records available	☐	☐	
66.	Overall compliance satisfactory	☐	☐	

APPENDIX II – PROPONENT UNDERTAKING

SECTION I: PROJECT DESCRIPTION

1. Name of Project: _____
 2. Proponent / Owner: _____
 3. CNIC / NTN: _____
 4. Address: _____
 5. Contact Person: _____
 6. Contact No.: _____
 7. Location (District/Tehsil): _____
 8. GPS Coordinates: _____
 9. Total Project Cost (PKR): _____
 10. Project Type (tick):
☐ New Installation ☐ Expansion ☐ Modernization ☐ Relocation
 11. Facility Type (tick):
☐ Municipal Slaughter House
☐ Commercial Slaughter House
☐ Industrial Abattoir
☐ Meat Processing Facility
☐ Rendering Facility
☐ Cold Storage Facility
 12. Total Site Area (acres): _____
 13. Slaughter Capacity:
Large Animals/day: _____
Small Animals/day: _____
Poultry/day: _____
 14. Total Employees: _____
 15. Working Shifts:
☐ 1 ☐ 2 ☐ 3
 16. Water Requirement (m³/day): _____
 17. Wastewater Generation (m³/day): _____
 18. Source of Water:
☐ Municipal Supply ☐ Groundwater ☐ Other _____
-

SECTION II: SCREENING

1. Does the project fall under Punjab IEE/EIA Regulations, 2022?
☐ Yes ☐ No
2. Category:
☐ IEE Category ☐ EIA Category
3. Is project located in environmentally sensitive area?
☐ Yes ☐ No
4. Is project within 500 m of residential area?
☐ Yes ☐ No
5. Is project within 200 m of canal/drain/river?
☐ Yes ☐ No

6. Is ETP required?

☐ Yes ☐ No

SECTION III: SCOPING

Has the following been identified for detailed assessment?

- | | |
|--------------------------------------|--|
| 1. Wastewater pollution risk | ☐ Yes ☐ No |
| 2. Blood discharge risk | ☐ Yes ☐ No |
| 3. Solid waste generation | ☐ Yes ☐ No |
| 4. Odour nuisance | ☐ Yes ☐ No |
| 5. Disease transmission risk | ☐ Yes ☐ No |
| 6. Groundwater contamination risk | ☐ Yes ☐ No |
| 7. Public health risk | ☐ Yes ☐ No |
| 8. Occupational health & safety risk | ☐ Yes ☐ No |

SECTION IV: ENVIRONMENTAL PROFILE

1. Existing land use:
☐ Industrial ☐ Agricultural ☐ Residential ☐ commercial ☐ Mixed
2. Nearest settlement distance: _____ meters
3. Nearest canal/drain distance: _____ meters
4. Groundwater depth: _____ ft
5. Nearby sensitive receptors:
☐ Schools ☐ Hospitals ☐ Water bodies ☐ Agricultural lands ☐ Other _____

SECTION V: CONSTRUCTION PHASE CHECKLIST

- | | |
|--|--|
| 1. Dust control measures implemented? | ☐ Yes ☐ No |
| 2. Construction waste disposed properly? | ☐ Yes ☐ No |
| 3. Site drainage available? | ☐ Yes ☐ No |
| 4. Workers PPE provided? | ☐ Yes ☐ No |
| 5. Fire extinguishers available? | ☐ Yes ☐ No |
| 6. Safe chemical storage ensured? | ☐ Yes ☐ No |

SECTION VI: OPERATIONAL CHECKLIST

- | | |
|---|--|
| 1. Animal receiving area available? | ☐ Yes ☐ No |
| 2. Lairage available? | ☐ Yes ☐ No |
| 3. Ante-mortem inspection system available? | ☐ Yes ☐ No |
| 4. Post-mortem inspection system available? | ☐ Yes ☐ No |
| 5. Blood collection system available? | ☐ Yes ☐ No |
| 6. Covered waste storage available? | ☐ Yes ☐ No |
| 7. ETP installed? | ☐ Yes ☐ No |
| 8. ETP operational? | ☐ Yes ☐ No |
| 9. Cold storage available? | ☐ Yes ☐ No |
| 10. Daily cleaning conducted? | ☐ Yes ☐ No |

SECTION VII: WASTE MANAGEMENT CHECKLIST

- | | |
|---|--|
| 1. Blood safely collected? | ☐ Yes ☐ No |
| 2. Offal properly segregated? | ☐ Yes ☐ No |
| 3. Condemned meat safely disposed? | ☐ Yes ☐ No |
| 4. Bones properly stored? | ☐ Yes ☐ No |
| 5. Hides properly stored? | ☐ Yes ☐ No |
| 6. Wastewater treated before discharge? | ☐ Yes ☐ No |
| 7. Sludge properly disposed? | ☐ Yes ☐ No |
-

SECTION VIII: EMERGENCY RESPONSE CHECKLIST

- | | |
|--|--|
| 1. Fire emergency plan available? | ☐ Yes ☐ No |
| 2. Blood spill response system available? | ☐ Yes ☐ No |
| 3. Disease outbreak response plan available? | ☐ Yes ☐ No |
| 4. ETP failure response plan available? | ☐ Yes ☐ No |
| 5. Wastewater overflow response available? | ☐ Yes ☐ No |
-

SECTION IX: IMPACT ASSESSMENT & MITIGATION

Potential Impact	Applicable	Mitigation Measure	Proposed
Wastewater pollution	☐	ETP installation	☐
Blood discharge	☐	Blood collection system	☐
Odour nuisance	☐	Ventilation & waste removal	☐
Disease spread	☐	Sanitation & veterinary inspection	☐
Solid waste accumulation	☐	Waste segregation	☐

SECTION X: MONITORING CHECKLIST

- | | |
|---------------------------------------|--|
| 1. Wastewater monitoring conducted? | ☐ Yes ☐ No |
| 2. Noise monitoring conducted? | ☐ Yes ☐ No |
| 3. Odour monitoring conducted? | ☐ Yes ☐ No |
| 4. Waste disposal records maintained? | ☐ Yes ☐ No |
| 5. Complaint register maintained? | ☐ Yes ☐ No |
-

SECTION XI: MANDATORY REQUIREMENTS (EPA PUNJAB)

1. ETP is mandatory for applicable facilities
 2. No untreated wastewater discharge allowed
 3. No blood discharge into drains allowed
 4. Veterinary supervision mandatory
 5. Daily waste disposal mandatory
 6. PEQS compliance mandatory
-

SECTION XII: UNDERTAKING

I, _____ S/O, D/O _____,
as owner/proponent/authorized representative of the project titled:
“ _____ ”

located at _____, Punjab, solemnly
affirm and undertake that:

1. All information provided is true and correct.
2. The project shall comply with PEPA 1997 and Punjab IEE/EIA Regulations 2022.
3. All mitigation measures shall be implemented.
4. No untreated wastewater or blood shall be discharged.
5. EPA Punjab may inspect the project at any stage.
6. Non-compliance may lead to legal action.

Signature: _____

Name: _____

CNIC: _____

Date: _____

Stamp: _____