GOVERONMENT OF PUNJAB
ENVIRONMENTAL PROTECTION AGENCY

Environmental Assessment Checklists and Guidelines

Small and Medium Size Road Construction and Expansion in Urban Areas

Contents

1. Introduction

Road infrastructure plays a vital role in the socio-economic development of Punjab by facilitating the efficient movement of people, goods, and services. The construction and expansion of small and medium-sized roads in urban areas improve connectivity, reduce travel time, enhance access to residential, commercial, educational, healthcare, and industrial facilities, and contribute to economic growth and urban development. Road widening and rehabilitation projects also help alleviate traffic congestion and improve road safety.

Road construction and expansion activities typically include site clearance, excavation, earthworks, utility relocation, construction of embankments, drainage structures, pavements, footpaths, medians, and associated infrastructure such as street lighting, traffic signs, and road markings. These activities require the use of construction machinery, construction materials, transportation of materials, and temporary traffic management measures.

Although these projects provide significant social and economic benefits, they may also result in temporary and, in some cases, permanent adverse environmental impacts if not properly planned and managed. Potential impacts include dust emissions, noise and vibration, traffic congestion, soil erosion, disposal of excavated materials, loss of roadside vegetation, disruption of drainage systems and public utilities, wastewater generation, occupational and community health and safety risks, and temporary disturbance to nearby residents, businesses, schools, hospitals, and other sensitive receptors.

Appropriate environmental planning, engineering design, and implementation of effective mitigation measures can substantially reduce these impacts while ensuring compliance with applicable environmental legislation and standards. Environmental considerations should therefore be integrated into all stages of road planning, design, construction, operation, and maintenance

1.2 Purpose of the Guidelines

These Environmental Assessment Guidelines have been prepared to assist project proponents, consultants, contractors, and regulatory authorities in identifying, assessing, and mitigating the potential environmental impacts associated with the construction and expansion of small and medium-sized roads in urban areas. The guidelines promote environmentally sound engineering practices, efficient resource utilization, pollution prevention, public safety, and sustainable urban infrastructure development in Punjab.

1.3 Scope of the Guidelines

These guidelines apply to future developments of small and medium size road construction and expansion in urban areas of the Province of the Punjab undertaken by the Local Government, City District Government, or Development Authorities. The guidelines are also applicable to the construction of federal or provincial highways passing through urban areas.

1.4 How to Use These Guidelines

The project proponent (the **Local Government**, **Municipal Corporation/Committee**, **City District Government**, or the **Cantonment Board**) is obliged to use these guidelines. The project proponent must fill in an environmental assessment form.

The following steps are to be taken in this regard:

Step 1: Provide information on the project (use **Section I**).

Step 2: Determine Applicability (*Are you sure that IEE or EIA is not required?*) [use **Section II**]

Step 3: Describe the physical, biological, and social environment (use **Section III**).

Step 4: Assess potential impacts and applicable mitigation measures (use Section IV).

Step 5: Provide an undertaking to the Punjab Environmental Protection Agency (Punjab EPA) on mitigation measures and compliance (use **Section V**).

The completed form is to be submitted to the **Punjab EPA** for evaluation. The **Punjab EPA** may request additional information or decide to undertake a visit to the proposed project site to assess the environmental impact of the proposed project.

1.3 Glossary

Act: Means the **Punjab Environmental Protection Act, 2017** (as amended).

Environment: Means (a) air, water, and land; (b) all layers of the atmosphere; (c) all organic and inorganic matter and living organisms; (d) the ecosystem and ecological relationships; (e) buildings, structures, roads, facilities, and works; (f) all social and economic conditions affecting community life; and (g) the inter-relationships between any of these factors.

Environmental Assessment: A technique and process by which information about the environmental effects of a project is collected and taken into account by the planning authority in forming judgments on whether the development should proceed.

Environmental Management: To carry out developmental activities in a sustainable manner.

Erosion: Physical removal of soil, either by wind or by running water.

Impact on Environment: Means any effect on land, water, air, or any other component of the environment, including social, cultural, and heritage resources.

Mitigation Measure: A measure for the control, reduction, or elimination of an adverse impact, including restorative measures.

Project Proponent: A person, company, NGO, or agency that sponsors and promotes a project.

Regulations: Means the **Punjab Environmental Protection Agency Review of IEE and EIA Regulations**, 2022

Siltation: Accumulation of silt in a water body.

Urbanization: Changing from a rural to an urban state.

2. Project Profile

2.1 Project Description

Activities which likely be carried out during various phases of the projects related to construction of small and medium size roads and expansion of existing roads in urban areas are summarized below:

i. Pre-Construction Activities

- Topographic and engineering surveys.
- Land acquisition and utility identification, where required.
- Site clearance, including removal of vegetation, debris, and obstructions.
- Traffic management planning.
- Mobilization of construction equipment and workforce.

ii. Road Construction Activities

- Earthworks, excavation, filling, grading, and compaction.
- Construction of embankments and subgrade.
- Placement of granular sub-base and base course.
- Asphalt paving or other approved pavement construction.
- Construction of culverts, drains, and stormwater management structures.
- Construction of kerbs, medians, footpaths, and road shoulders.
- Installation of traffic signs, road markings, street lighting, and safety barriers.

iii. Road Expansion and Rehabilitation Activities

- Removal of existing pavement where required.
- Widening of the carriageway.
- Relocation of utilities.
- Reconstruction of drainage structures.
- Milling and resurfacing of existing pavement.
- Demolition and removal of damaged structures and debris.
- Temporary traffic diversions during construction.

iv. Transportation and Material Handling

- Transportation of construction materials.

- Storage of aggregates, sand, bitumen, and other materials.
- Loading and unloading activities.
- Operation of construction vehicles and machinery.

v. Site Restoration and Completion

- Removal of temporary facilities and construction waste.
- Restoration of disturbed areas.
- Landscaping and tree plantation where applicable.
- Cleaning of drainage channels.
- Final inspection and commissioning.

The proponent after deep consultation must describe the project and all related allied activities which may include but not limited to followings:

i. General Information
ii. Site Description
iii. Forest Resource Characteristics
iv. Harvesting Methodology
v. Machinery and Equipment
vi. Transportation and Access Roads
vii. Workforce and Support Facilities
viii. Construction and Operational Activities
ix. Environmental Protection Measures
x. Environmental monitoring

3. Environmental Impacts

3.1 Pre-Construction Phase

The pre-construction phase involves land acquisition (where required), surveys, utility identification, site clearance, mobilization of machinery, and establishment of temporary construction facilities. Although environmental impacts during this phase are generally limited, poor planning can result in significant environmental and social issues.

3.1.1 Potential Environmental Impacts

- Removal of roadside trees and vegetation.
- Loss of green spaces and urban landscape.
- Disturbance to wildlife inhabiting roadside vegetation.
- Land acquisition and displacement of roadside vendors or informal businesses.

- Relocation of public utilities such as water supply, sewerage, electricity, gas, and telecommunication lines.
- Temporary disruption of public services.
- Generation of demolition waste from removal of existing structures.
- Public inconvenience due to road closures and traffic diversions.
- Dust and noise during site clearance.
- Community concerns due to inadequate stakeholder consultation.

3.2 Road Construction Phase

The construction phase includes excavation, earthworks, filling, grading, compaction, construction of drainage structures, pavement construction, and installation of roadside infrastructure. This phase generally has the greatest potential for environmental impacts.

3.2.1 Potential Environmental Impacts

- Dust emissions from excavation, earthworks, stockpiles, and construction traffic.
- Exhaust emissions from construction machinery and vehicles.
- Noise and vibration from heavy equipment.
- Soil erosion and sediment transport during excavation.
- Temporary alteration of natural drainage patterns.
- Generation of excavated material and construction waste.
- Improper disposal of surplus earth and debris.
- Fuel, lubricant, and chemical spills leading to soil contamination.
- Contamination of nearby drains or water bodies due to sediment-laden runoff.
- Increased traffic congestion and delays.
- Restricted pedestrian movement.
- Occupational health and safety risks to workers.
- Community health and safety risks associated with construction activities.

3.3 Road Expansion and Rehabilitation Phase

Road widening and rehabilitation involve removal of existing pavement, widening of carriageways, relocation of utilities, reconstruction of drainage systems, and resurfacing of existing roads.

3.3.1 Potential Environmental Impacts

- Removal of mature roadside trees.
- Demolition waste from existing pavement and roadside structures.
- Increased dust during pavement milling and demolition.

- Noise and vibration from demolition equipment.
- Temporary interruption of utility services.
- Traffic congestion caused by lane closures.
- Restricted access to residences, shops, schools, hospitals, and businesses.
- Increased accident risk due to temporary traffic diversions.
- Visual impacts associated with construction activities.
- Additional occupational hazards during demolition and resurfacing.

3.4 Transportation and Material Handling Phase

Construction materials, equipment, and waste materials are transported throughout the project. Improper transportation and storage practices can adversely affect the surrounding environment.

3.4.1 Potential Environmental Impacts

- Dust generated from transportation of construction materials.
- Vehicle exhaust emissions.
- Spillage of construction materials onto public roads.
- Traffic congestion due to movement of heavy vehicles.
- Damage to existing roads by overloaded trucks.
- Noise from transport vehicles.
- Fuel leakage from vehicles and machinery.
- Improper storage of construction materials causing runoff and drainage blockage.
- Public safety risks associated with increased construction traffic.

3.5 Site Restoration and Completion Phase

Following completion of construction, temporary facilities are removed, disturbed areas are restored, landscaping is undertaken, and the road is commissioned.

3.5.1 Potential Environmental Impacts

- Generation of demolition and cleanup waste.
- Improper disposal of temporary construction materials.
- Failure to restore disturbed areas.
- Soil erosion if exposed areas are left untreated.
- Inadequate restoration of drainage channels.
- Poor survival of newly planted trees and landscaping.
- Residual dust and debris affecting nearby communities.
- Temporary inconvenience during final finishing works.

Table-1 Summary of Environmental Impacts by Project Phase

Project Phase	Major Environmental Impacts
Pre-Construction	Tree removal, vegetation loss, demolition waste, utility relocation, traffic disruption, community concerns
Road Construction	Dust, air pollution, noise, vibration, soil erosion, waste generation, water pollution, occupational and community safety risks
Road Expansion & Rehabilitation	Pavement demolition, dust, noise, utility disruption, traffic congestion, access restrictions, demolition waste
Transportation & Material Handling	Dust, vehicle emissions, traffic congestion, material spillage, road damage, fuel leakage, public safety risks
Site Restoration & Completion	Construction waste, landscape restoration, erosion, drainage restoration, plantation survival, residual environmental impacts

4. Environmental Mitigation Measures

4.1 Pre-Construction Phase

4.1.1 Site Selection and Planning

- Avoid environmentally sensitive areas, including wetlands, forests, parks, protected areas, and critical wildlife habitats, wherever feasible.
- Minimize acquisition of productive agricultural land and avoid unnecessary displacement of people and businesses.
- Select road alignments that minimize tree cutting and disturbance to existing infrastructure.
- Preserve roadside trees and green spaces to the maximum extent practicable.

4.1.2 Stakeholder Consultation

- Conduct consultations with affected communities, local authorities, utility agencies, and other stakeholders before commencement of construction.
- Establish a grievance redress mechanism for receiving and addressing public complaints.

4.1.3 Utility Planning

- Identify all underground and overhead utilities before construction.
- Coordinate relocation of utilities with relevant service providers to minimize service interruptions.

4.1.4 Tree Protection

- Minimize removal of roadside trees.
- Obtain approvals before tree cutting.
- Undertake compensatory plantation using native tree species in accordance with applicable regulations.

4.1.5 Construction Planning

- Prepare and implement:
  i. Environmental Management Plan (EMP)
  ii. Traffic Management Plan
  iii. Occupational Health and Safety Plan
  iv. Waste Management Plan
  v. Emergency Response Plan

4.2 Road Construction Phase

4.2.1 Air Quality Management

- Sprinkle water on exposed surfaces, haul roads, and stockpiles.
- Cover trucks transporting soil, sand, aggregates, and excavated materials.
- Minimize stockpile heights and cover fine materials.
- Maintain construction equipment to minimize exhaust emissions.
- Prohibit open burning of waste.

4.2.2 Noise and Vibration Control

- Restrict construction activities to daytime hours where practicable.
- Regularly maintain construction machinery.
- Install temporary noise barriers where construction occurs near schools, hospitals, or residential areas.
- Provide hearing protection to workers exposed to excessive noise.

4.2.3 Soil Conservation

- Minimize excavation and land disturbance.
- Stabilize exposed slopes using vegetation, stone pitching, or retaining structures.
- Stockpile topsoil separately for reuse.
- Restore disturbed areas immediately after completion.

4.2.4 Water Resource Protection

- Construct temporary drainage channels.
- Install silt fences, sediment traps, or settling ponds.
- Prevent wastewater and construction debris from entering drains, canals, and streams.
- Store fuel and chemicals away from watercourses.

4.2.5 Waste Management

- Segregate construction waste.
- Reuse excavated materials wherever feasible.
- Dispose of surplus materials only at approved disposal sites.
- Maintain good housekeeping throughout the project.

4.2.6 Occupational Health and Safety

- Provide appropriate PPE to all workers.
- Install warning signs around hazardous areas.
- Provide first-aid facilities.
- Conduct regular safety training.
- Ensure safe operation of machinery and equipment.

4.2.7 Community Health and Safety

- Fence construction sites where necessary.
- Maintain safe pedestrian access.
- Install reflective barriers and warning signs.
- Control dust and noise near residential areas.
- Maintain emergency vehicle access at all times.

4.3 Road Expansion and Rehabilitation Phase

4.3.1 Demolition Management

- Wet demolition areas before pavement breaking.
- Recycle asphalt pavement wherever feasible.
- Segregate demolition waste.
- Dispose of waste at approved locations.

4.3.2 Traffic Management

- Prepare and implement a Traffic Management Plan.
- Provide clearly marked diversion routes.
- Maintain access to residences, businesses, hospitals, and schools.
- Schedule major works during off-peak traffic hours where feasible.

4.3.3 Utility Protection

- Coordinate utility relocation with service providers.
- Minimize interruption of utility services.
- Notify affected communities before planned service interruptions.

4.3.4 Tree and Landscape Protection

- Protect retained trees during construction.

- Replace damaged vegetation through compensatory plantation.
- Restore landscaping after construction.

4.4 Transportation and Material Handling

4.4.1 Dust Control

- Cover all trucks transporting construction materials.
- Sprinkle water on haul roads.
- Clean public roads affected by construction traffic.

4.4.2 Traffic Safety

- Enforce speed limits for construction vehicles.
- Use trained flagmen where necessary.
- Install traffic warning signs.
- Avoid transporting materials during peak traffic periods where practicable.

4.4.3 Material Storage

- Store construction materials in designated areas.
- Cover cement and fine aggregates.
- Protect stockpiles from erosion.
- Maintain proper drainage around storage areas.

4.4.4 Fuel and Chemical Management

- Store fuels and lubricants on impermeable surfaces.
- Provide spill containment.
- Keep spill response kits readily available.
- Train workers in spill response procedures.

4.5 Site Restoration and Completion

4.5.1 Site Cleanup

- Remove temporary construction facilities.
- Remove construction debris.
- Restore disturbed land immediately after completion.

4.5.2 Landscape Restoration

- Replant disturbed areas using native vegetation.
- Replace removed roadside trees through compensatory plantation.
- Restore parks, green belts, and landscaped areas affected by construction.

4.5.3 Drainage Restoration

- Clean all drainage channels.
- Remove sediment from culverts.

- Ensure proper functioning of stormwater drainage systems.

4.5.4 Waste Disposal

- Remove all remaining waste materials.
- Dispose of waste through approved facilities.
- Recycle reusable construction materials where feasible.

4.5.5 Environmental Monitoring

- Inspect restored areas regularly.
- Monitor survival of planted trees.
- Repair erosion damage promptly.
- Verify implementation of all EMP commitments.

4.6 Environmentally Sustainable Practices

- Use recycled construction materials where technically feasible.
- Use energy-efficient construction equipment.
- Conserve water during construction.
- Protect existing trees and green infrastructure.
- Maximize reuse of excavated materials.
- Promote recycling of asphalt and concrete.
- Minimize greenhouse gas emissions by reducing unnecessary vehicle idling.
- Incorporate climate-resilient drainage and pavement design where appropriate.
- Provide accessible pedestrian facilities and encourage non-motorized transport.
- Develop green belts and roadside plantation to improve urban air quality and aesthetics.

ENVIRONMENTAL ASSESSMENT CHECKLISTS

Section I: Project Description

File No:

Date:

General Information

1. **Project Name or Title:**
2. **Project Proponent:** (Department, organization, or owner)
3. **Address:**
4. **Telephone:**
5. **Fax:**
6. **E-mail:**
7. **Representative of the Proponent:**
8. **Designation:**
9. **Name of person who conducted this assessment:**
10. **Designation:**
11. **Qualification:**

Project Information

12. **Project Location:**

13. **Cost of the Project:**

14. **Period of construction of proposed activity:** (start and end dates)

15. **Length of road on which work will be undertaken:**

16. **Brief Project Description:** *(Please attach a map of the proposed project area)*

17. **Number and type of major construction equipment to be used:**

18. **Total construction material to be utilized:**

19. **Will any new land be acquired?** If yes,

- Specify total area: _____
- Present ownership and use of land: _____
- Acquisition method: (**Punjab Land Acquisition Act, 1894** or Direct Purchase) * Timeline for compensation:

20. **In case of state land, are there squatter settlements?** * If yes, number of settlements and compensation details:

21. **Is night construction work planned?**

22. **Number of trees to be removed:**

23. **Will existing asphalt be removed?** (If yes, specify quantity)

Section II: Screening

Is the proposed road or part of the proposed road:

- A federal highway? (☐ Yes ☐ No)
- A provincial highway? (☐ Yes ☐ No)
- In an ecologically sensitive area? (☐ Yes ☐ No)

Note: If the answer to any of the above is **Yes**, the project requires an Initial Environmental Examination (IEE) or Environmental Impact Assessment (EIA). Refer to the **Punjab Environmental Protection (Review of IEE and EIA) Regulations, 2022** for appropriate categorization or consult **Punjab EPA**.

Section III: Environmental Profile

1. **Terrain of project area:**

   - ☐ Flat or Level (Slope < 3%)
   - ☐ Level to moderately steep (Slope 3%-30%)
   - ☐ Moderately steep to mountainous (Slope > 30%)

2. **Maximum elevation of proposed road:**
   - ☐ < 400 masl | ☐ 400-800 masl | ☐ > 800 masl
3. **Natural stream or canal crossings:** (Provide Name, Dimensions, Flow rate, and Status/Uses)
4. **Trees/Vegetation on road sides:** (☐ Yes ☐ No)
5. **Sites of Cultural Importance:** (Graveyard, shrine, mosque, archeological site)
6. **Sensitive Receptors:** (Schools, colleges, hospitals, clinics)
7. **Land Use Mapping:** Describe present land use for every 250m section on both sides (Residential, Commercial, Open Land, Sensitive Receptors).
8. **Existing Traffic Level:** (For rehabilitation projects)

Section IV: Impact Assessment and Mitigation Measures

Potential Negative Impacts	Mitigation Measures	Monitoring Plan
Removal of roadside trees and vegetation	Minimize tree cutting through appropriate alignment and design; obtain necessary approvals before tree removal; undertake compensatory plantation using native species.	Verify tree-cutting permits, plantation records, and survival rate of planted trees.
Loss of urban green spaces and landscape	Preserve existing green areas wherever feasible; restore disturbed areas and implement landscaping after construction.	Site inspections and post-construction landscape assessment.
Disturbance to wildlife and urban biodiversity	Avoid disturbing nesting sites; minimize vegetation clearance; restrict construction in ecologically sensitive areas.	Field inspections and ecological monitoring.
Dust emissions from excavation, earthworks, and construction traffic	Sprinkle water on exposed surfaces and haul roads; cover construction materials and trucks; minimize stockpile heights.	Visual inspections and ambient air quality monitoring (PM_{10} and $PM_{2.5}$).
Exhaust emissions from construction machinery	Maintain machinery regularly; use well-maintained equipment and low-emission engines; avoid unnecessary idling.	Equipment maintenance records and site inspections.
Noise and vibration from construction equipment	Restrict noisy activities to daytime hours; maintain equipment; install temporary noise barriers near sensitive receptors where required.	Noise monitoring and community feedback.
Soil erosion and sedimentation	Minimize exposed soil areas; stabilize slopes; install silt fences, sediment traps, and temporary drainage.	Inspection after rainfall and during construction.
Disruption of natural drainage	Maintain existing drainage paths; construct temporary drainage channels; clean blocked drains regularly.	Routine inspection, especially during rainfall events.
Contamination of surface water	Prevent disposal of construction waste and wastewater into drains or water bodies; implement erosion and sediment control measures.	Water quality monitoring and site inspections.
Fuel, oil, and chemical spills	Store fuels and chemicals in designated bunded areas; provide spill kits; train workers in spill response.	Inspection of storage areas and spill response records.
Generation of excavated material and construction waste	Segregate waste; reuse excavated materials where feasible; dispose of waste at approved disposal sites.	Waste disposal records and site inspections.
Demolition waste during road widening	Recycle asphalt, concrete, and construction materials wherever practicable; dispose of non-recyclable waste through approved facilities.	Waste recycling and disposal records.
Traffic congestion and delays	Prepare and implement a Traffic Management Plan; provide diversions, warning signs, and flagmen where necessary.	Traffic monitoring and inspection of traffic control measures.

Potential Negative Impacts	Mitigation Measures	Monitoring Plan
Restricted access to residences, businesses, schools, and hospitals	Maintain safe pedestrian and vehicular access throughout construction; notify affected communities in advance.	Site inspections and public complaint records.
Damage to underground and overhead utilities	Identify utilities before excavation; coordinate relocation with utility agencies; implement safe excavation practices.	Utility coordination records and field inspections.
Occupational health and safety risks	Provide PPE; conduct safety training; install warning signs; maintain first-aid facilities; implement an Occupational Health and Safety Plan.	OHS inspections, accident records, and training records.
Community health and safety risks	Fence hazardous work areas; install warning signs and barricades; maintain emergency access; control dust and noise.	Routine inspections and grievance records.
Material spillage during transportation	Cover trucks; avoid overloading; clean spilled materials immediately.	Transport inspections and housekeeping records.
Road damage caused by heavy vehicles	Enforce axle load limits; repair damaged roads promptly; designate haul routes where feasible.	Road condition surveys and transport records.
Visual impacts during construction	Maintain orderly construction sites; remove debris regularly; restore disturbed areas immediately after construction.	Visual inspections and site audits.
Poor restoration of disturbed areas	Restore topsoil; undertake landscaping; plant native vegetation; rehabilitate temporary construction sites.	Post-construction inspection and plantation monitoring.
Inadequate drainage after project completion	Inspect and clean culverts, side drains, and stormwater channels before project handover.	Final inspection and drainage performance monitoring during rainfall.
Climate change impacts due to fuel consumption	Use fuel-efficient machinery; minimize idling; optimize transportation routes; undertake roadside plantation.	Fuel consumption records and plantation monitoring.
Public complaints and social disturbance	Maintain stakeholder communication; establish and operate a grievance redress mechanism; respond promptly to complaints.	Grievance register and consultation records.
Cultural Sites	Maintain safe distance; mark and fence sites during construction.	

Section V: Undertaking

I, _____ (full name and address), as proponent for _____ (project name/location), do hereby solemnly affirm and declare:

1. Information provided in Forms I, II, and III is correct to the best of my knowledge.
2. I fully understand and accept the conditions in these Guidelines.
3. I undertake to design, construct, and operate the project strictly in accordance with Form I.
4. I undertake to implement all mitigation and monitoring measures stated in Form IV.

Signature: _____ Date: _____ Witnesses: 1. _____ 2. _____