Draft Initial Environmental Examination

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IND: Infrastructure Development Investment Program for Tourism (Tranche 3) State of Punjab – Eco-tourism development at Ropar and Harike Wetlands (Package No. PB/IDIPT/T3/04/03)

Prepared by the Government of Punjab for the Asian Development Bank

CURRENCY EQUIVALENTS

(as of 7 October 2014)

Currency unit	–	Indian rupee/s (Re/Rs)
Re1.00	=	$0.0163
$1.00	=	Rs61.326

ABBREVIATIONS

ADB	–	Asian Development Bank
BOD	–	Biological Oxygen Demand
BoQ	–	Bill of Quantities
CO	–	Carbon Monoxide
CPCB	–	Central Pollution Control Board
CR	–	Community Reserve
DSC	–	Design and Supervision Consultant
EA	–	Executing Agency
EAC	–	Expert Appraisal Committee
EARF	–	Environment Assessment and Review Framework
EIA	–	Environmental Impact Assessment
EMP	–	Environment Management Plan
ES	–	Environmental Specialist
GC	–	General Conditions
Go	–	Government of India
GoP	–	Government of Punjab
IDIPT	–	Infrastructure Development Investment Program for Tourism
IEE	–	Initial Environmental Examination
INR	–	Indian Rupee
IPIU	–	Investment Program Implementation Unit
IPMU	–	Investment Program Management Unit
PUC	–	Pollution Under Control Certificate
MCA	–	Municipal Corporation of Amritsar
MLD	–	Million Liters per day
MoEF	–	Ministry of Environment and Forests
MFF	–	Multi- Trench Financing Facility
NGO	–	Non-Governmental Organization
NOx	–	Nitrogen oxide
PD	–	Project Director
PIU	–	Project Implementation Unit
PM	–	Particulate Matters
PMU	–	Project Management Unit

RP	–	Resettlement Plan
RPM	–	Respirable Particulate Matter
SAUW	–	South Asia Urban Development and Water Division
SC	–	Scheduled Castes
SEAC	–	State Expert Appraisal Committee
SO_2	–	Sulfur dioxide
SPM	–	Suspended Particulate Matter
SPS	–	Safeguards Policy Statement
STP	–	Sewage Treatment Plant

NOTES

In this report, "$" refers to US dollars.

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CONTENT

EXECUTIVE SUMMARY			I
I.	INTRODUCTION		1
	A.	Background	1
II.	DESCRIPTION OF PROJECT COMPONENTS		2
	A.	Project Overview	2
	B.	Need for Project	2
	C.	Proposed Project	2
	D.	Implementation Schedule	3
III.	POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK		6
	A.	ADB Policy	6
	B.	National and State Laws	7
IV.	DESCRIPTION OF ENVIRONMENT		9
	A.	Rupnagar District	9
	B.	Tarn Taran District	15
V.	ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES		20
	A.	Assessment of Environmental Impacts	21
	B.	Pre-construction Impacts and Mitigation Measures	22
	C.	Anticipated Construction Impacts and Mitigation Measures	26
	D.	Post-Construction Impacts and Mitigation Measures	34
	E.	Anticipated Operations and Maintenance (O&M) Impacts and Mitigation Measures	34
	F.	Cumulative Impact Assessment	35
VI.	PUBLIC CONSULTATION AND INFORMATION DISCLOSURE		37
	A.	ADB Disclosure Policy	37
	B.	Process for Consultation Followed	37
	C.	Plan for Continued Public Participation	38
VII.	GRIEVANCE REDRESS MECHANISM		39
	A.	Composition and functions of GRC	39
VIII.	ENVIRONMENTAL MANAGEMENT PLAN		40
	A.	Responsibilities for EMP Implementation	41
	B.	EMP Tables	43
	C.	Summary of Site- and Activity-Specific Plans as per EMP	71
	D.	Environmental Monitoring Program	71
	E.	Capacity Building	82
	F.	EMP Implementation Cost	82
IX.	FINDINGS & RECOMMENDATIONS		83
X.	CONCLUSIONS		84

List of Annexures

1.	REA Checklists	74
2.	NOC from Line Departments	79
3.	Sample Outline of Spoil Management Plan	93
4.	Sample Traffic Management Plan	95
5.	Public Consultation	99
6.	Sample Grievance Redress Form	100
7.	Sample Semi-Annual Environmental Monitoring Report Template	101
8.	Sample Environmental Site Inspection Report Plan	105

EXECUTIVE SUMMARY

1. **Background**. Infrastructure Development Investment Program for Tourism (IDIPT) will develop and improve basic urban infrastructure and services in the four participating states of Himachal Pradesh, Punjab, Uttarakhand and Tamil Nadu to support the tourism sector as a key driver for economic growth. It will focus on: (i) strengthening connectivity to and among key tourist destinations; (ii) improving basic urban infrastructure and services, such as water supply, road and public transport, solid waste management and environmental improvement, at existing and emerging tourist destinations to ensure urban amenities and safety for the visitors, and protect nature and culture-based attractions. Physical infrastructure investments will be accompanied by: (iii) capacity building programs for concerned sector agencies and local communities for better management of the tourist destinations and for more active participation in the tourism-related economic activities, respectively.

2. Government of Punjab proposed 13 subpojects under Tranche 3. The subproject Package No. PB/IDIPT/T3/04/03 is one of the subprojects to support conservation of natural attractions to professionally accepted standards in tourist clusters inclusive of management-plan based investments (Output 1) and improve connectivity to tourist destinations (Output 4).

3. **Executing and implementing agencies.** The executing agency is the Department of Tourism, Government of Punjab and the executing agency is the Punjab Heritage and Tourism Promotion Board (PHTPB). Project Management Unit (PMU) is set up at Chandigarh to coordinate the overall execution. Project Management Consultant (PMC) at Chandigarh provides assistance to PMU for the execution of the project. Project Implementation Unit (PIUs) are set up in Amritsar and Rupnagar, which are supported by respective Design Supervision Consultant (DSC) teams. The Punjab Department of Forest and Wildlife is the asset owner of this subproject.

4. **Subproject Components**. The two wetlands are protected under Government of India Wetland Rules, 2010 and declared as Ramsar Wetlands. The subproject Package No. PB/IDIPT/T3/04/03 components are in accordance with government-approved wetland management plans and include development of bird watchtowers, up gradation of tourist interpretation center, boating facilities, sign boards, parking facilities, development of landscaping in the tourist areas, public utilities and other allied facilities. All subproject sites are outside the protected core areas.

5. **Categorization.** Based on the proposed interventions, the subproject has been classified as Environmental Category B as per the SPS as no significant impacts are envisioned. Accordingly this Initial Environmental Examination (IEE) has been prepared and the environmental impacts are assessed in order to provide mitigation and monitoring measures to ensure no significant impacts arises as a result of the subproject.

6. **Description of the Environment**. Subproject components are located in two districts namely Rupnagar and Tarn Taran. The Beas and Sutlej rivers are the key surface water bodies' traversing through the subproject area. The topography remains flat for most of the subproject area, however undulating terrain are also observed. The climate in the subproject area may be divided into distinct seasons. The cold season starts from mid - November to the early March, which is followed by the hot season which lasts till the end of June. July, August and the first half of September constitute the south-west monsoon season. The period from mid-September to the middle of November may be termed as the post-monsoon or transitional period. The average annual rainfall in the subproject area is 695.6mm. The major soil types found in the

subproject area are the arid brown soils and tropical arid brown soils. The arid brown soils are found mostly in southern parts of the subproject area and tropical arid brown soils are found in the Northern part subproject area. The geology of the subproject area is occupied by Indo-Gangetic alluvial plain of Quaternary age. The principal kharif crops are paddy, cotton, maize and sugarcane; subsidiary crops are kharif vegetables, such as ladyfinger, cauliflower, tomato, brinjal, cucurbits, kharif pulses and fruits.

7. **Environmental Management**. An Environmental Management Plan (EMP) is included as part of this IEE, which includes (i) mitigation measures for environmental impacts during implementation; (ii) an environmental monitoring program, and the responsible entities for mitigating, monitoring, and reporting; (iii) public consultation and information disclosure; and (iv) grievance redress mechanism. A number of impacts and their significance have already been reduced by amending the designs. The EMP will be included in civil work bidding and contract documents.

8. **Locations and siting,** of the proposed infrastructures were considered in order to reduce the impacts further. The concepts considered in design of the subproject are (i) design, material and scale will be compatible to the local architectural, physical, cultural and landscaping elements; (ii) preference will be given to the use of local material and labour as best as possible; (iii) for conservation, local construction material available in the nearby region as best as possible suiting to those in existence; (iv) all painting (interior and exterior) will be with environment-friendly low volatile organic compound paints (v) earth backfill, if any will be done from the site excavated material; and (vi) ensuring all planning and design interventions and decisions are made in consultation with local communities and reflecting inputs from public consultation and disclosure for site selection.

9. **During the construction phase**, impacts mainly arise from the need to dispose of moderate quantities of construction debris. These are common impacts of construction related projects and there are well developed methods for their mitigation. Measures such as conducting work in lean season and minimizing inconvenience by best construction methods will be employed in the wetland areas. In the operational phase, all facilities and infrastructure will operate with routine maintenance, which should not affect the environment. Facilities will need to be repaired from time to time, but environmental impacts will be much less than those of the construction period as the work will be infrequent, affecting small areas only.

10. **Mitigation measures** have been developed to reduce all negative impacts to acceptable levels. Mitigation will be assured by a program of environmental monitoring that would be conducted during construction. The environmental monitoring program will ensure that all measures are implemented, and will determine whether the environment is protected as intended. It will include observations on- and off-site, document checks, and interviews with workers and beneficiaries. Any requirements for corrective action will be reported to the ADB.

11. The stakeholders were involved in developing the IEE through on-site discussions and public consultation, after which views expressed were incorporated into the IEE and in the planning and development of the subproject. The IEE will be made available at public locations and will be disclosed to a wider audience via the ADB and PHTPB websites. The consultation process will be continued and expanded during project implementation to ensure that stakeholders are fully engaged in the project and have the opportunity to participate in its development and implementation.

12. The tourists and the local community in the subproject area will be the major beneficiaries of the project. The most noticeable net environmental benefits to the tourists and local community will be positive and large as the proposed subproject will improve access to reliable and adequate tourism facilities and propagate the local traditions and cultural heritage of the state. This subproject will also provide a common platform for local traditions and values; provide and improve business opportunities for local communities, linked to the cultural and natural heritage tourism.

13. **Consultation, Disclosure and Grievance Redress**. Public consultations will be done in the preparation of the detailed design and final IEE. On-going consultations will occur throughout the project implementation period. A grievance redressal mechanism has been described within the IEE to ensure that any public grievances are addressed quickly.

14. **Monitoring and Reporting**. The PMU, PIU, PMC and DSC will be responsible for environmental monitoring. The PIU with support from the DSC will submit monthly, quarterly and Semi-annual monitoring reports to the PMU. The PMU will consolidate the Semi-annual reports with the assistance of PMC and will send it to ADB. ADB will post the environmental monitoring reports on its website.

15. **Conclusions and Recommendations**. The proposed subproject is unlikely to cause significant adverse impacts. The potential impacts that are associated with design, construction and operation can be mitigated to standard levels without difficulty through proper engineering design and the incorporation or application of recommended mitigation measures and procedures. Based on the findings of the IEE, there are no significant impacts and the classification of the subproject as Category “B” is confirmed. No further special study or detailed environmental impact assessment (EIA) needs to be undertaken to comply with ADB SPS, 2009 or Government of India EIA Notification, 2006.

I. INTRODUCTION

A. Background

1. Infrastructure Development Investment Program for Tourism (IDIPT) will develop and improve basic urban infrastructure and services in the four participating states of Himachal Pradesh, Punjab, Uttarakhand and Tamil Nadu to support the tourism sector as a key driver for economic growth. It will focus on: (i) strengthening connectivity to and among key tourist destinations; (ii) improving basic urban infrastructure and services, such as water supply, road and public transport, solid waste management and environmental improvement, at existing and emerging tourist destinations to ensure urban amenities and safety for the visitors, and protect nature and culture-based attractions. Physical infrastructure investments will be accompanied by: (iii) capacity building programs for concerned sector agencies and local communities for better management of the tourist destinations and for more active participation in the tourism-related economic activities, respectively.

2. Government of Punjab proposed 13 subprojects under Tranche 3. The subproject Package No. PB/IDIPT/T3/04/03 is one of the subprojects to support conservation of natural attractions to professionally accepted standards in tourist clusters inclusive of management-plan based investments (Output 1) and improve connectivity to tourist destinations (Output 4).

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4. **Subproject Components**. The two wetlands are protected under Government of India Wetland Rules, 2010 and declared as Ramsar Wetlands. The subproject Package No. PB/IDIPT/T3/04/03 components are in accordance with government-approved wetland management plans and include development of bird watchtowers, up gradation of tourist interpretation center, boating facilities, sign boards, parking facilities, development of landscaping in the tourist areas, public utilities and other allied facilities. All subproject sites are outside the protected core areas.

5. **Categorization.** Based on the proposed interventions, the subproject has been classified as Environmental Category B as per the SPS as no significant impacts are envisioned. Accordingly this Initial Environmental Examination (IEE) has been prepared and the environmental impacts are assessed in order to provide mitigation and monitoring measures to ensure no significant impacts arises as a result of the subproject.

6. **Purpose of the IEE.** This report gives an account of the initial environmental examination (IEE) of subproject Package No. PB/IDIPT/T3/04/03 as per SAR and preliminary design. It has been prepared in accordance with ADB SPS's requirements for environment Category B projects and provides measures to (i) ensure the environmental sustainability of subproject Package No. PB/IDIPT/T3/04/03; (ii) integrate environmental considerations into the project preparation process; and (iii) provide for environmental management during project implementation.

II. DESCRIPTION OF PROJECT COMPONENTS

A. Project Overview

7. Wetlands as known tourist destinations in Punjab as they are known to provide habitat to diverse flora and fauna including bird speciesand attract thousands of migratory birds from various parts of the world during winter season (October to February). The state has 12 natural and 9 man-made wetlands (covering more than 15,500 ha area). The state has three wetlands of international importance (Ramsar sites). Stated as follows:

- Harike wetland – At the point of confluence of Satluj and Beas lies the internationally renowned Harike wetland in 28.5 sq km area was formed due to construction of Harike barrage in 1952. It is famous for its migratory birds.
- Kanjli wetland – located in Kapurthala, was created due to barraging of Kali Bein rivulet which deviates from Budha Barkat regulator near Muradpur village - this wetland is spaced over 100 ha area.
- Ropar wetland – located in Rupnagar, was found in 1952 due to construction of barrage on river Satluj at Ropar and is spread over 1365 ha area.

8. The Government of Punjab, declared Harike wetland as bird sanctuary in 1982. A number of conservation measures have been initiated to conserve Harike wetland after the declaration of Harike as Ramsar site on 23 March 1990. The Ropar and Kanji wetlands were also declared the Ramsar site on 22 January 2002.

9. Ministry of Forest and Environment and Government of Punjab designated Punjab State Council for Science and Technology to develop the wetland management plans. The activities covered in the management plans are survey and mapping, afforestation, fencing and wildlife development, water quality monitoring, soil conservation, weed/hyacinth control, and public awareness. The management plans emphasize the importance of public awareness as a tool to involve the public in the conservation programs.

B. Need for Project

10. Data from State Department of Forest and Wildlife shows status of wetlands in Punjab has been declining rapidly due to rapid urbanization and acquisition of land to meet the infrastructure demand. The present funding support from Government is inadequate and resulted poor implementation of the target schemes and activities in the wetland management plans.

C. Proposed Project

11. The subproject Package No. PB/IDIPT/T3/04/03 will support the efforts of Government of Punjab through State Department of Forest and Wildlife in Harike and Ropar wetlands. The subproject Package No. PB/IDIPT/T3/04/03 components aim to promote eco-tourism and generate public awareness about the importance, values, ecological functions etc. of wetlands by way of: (i) upgrading existing interpretation centers; (ii) provision of bird towers and bird hides; (iii) rehabilitation/upgrade of existing pathways; and (iv) publication of posters, pamphlets, brochures, videos and other materials in English as well as Punjabi. The subproject Package No. PB/IDIPT/T3/04/03 will also improve the connectivity for adjacent rural villages to Ropar wetland.

12. The details of the proposed interventions in Harike Wetland as per preliminary design are:

- Provision of nature trail of about 6.5 km surrounding the wetland (outside core protected area).
- Provision of a short trail (outside core protected area) of about 600 m ending at notch point for visitors who want to use existing boats to visit the confluence of Beas and Sutlej rivers.
- Provision for vehicle parking and reception complex including visitor facilities, reception counter, drawing room, refreshment canteen, souvenir shop and other facilities (outside core protected area).
- Provision of public amenities including toilets, dustbins, drinking water facilities, garden benches, etc. (outside core protected area)
- Provision of internal sign/information boards of uniform design (strategic locations outside core protected area)
- Upgrading the old building at Churian check post to an interpretation center.
- Provision of boating facilities (in addition to existing).
- Landscaping outside core protected area (approximate area of 500sq.m)

13. The details of the proposed interventions in Ropar Wetland as per preliminary design are:

- Provision of bird watch towers and bird hides (outside core protected area)
- Provision of nature trail of about 800 m (outside core protected area)
- Provision of public utilities, rain shelter, ticket cum reception counter, public toilets, sitting benches, vehicle parking and dustbins (outside core protected area)
- Upgrade of existing interpretation center
- Provision of sign/ information boards of uniform design (strategic locations outside core protected area)
- Provision of parking facilities (outside core protected area)

14. The details of the proposed improvement in connectivity to Ropar Wetland as per preliminary design are:

- Develop a stretch of existing 16.245 km of road.
- Strengthening is proposed at 0/00 km to 0/945 km (0.945 km) and 6/115 km to 16/245 (10.13 km).
- Widening and strengthening is proposed at 0/945km to 6/115 km (5.17km).

15. The subproject Package No. PB/IDIPT/T3/04/03 shall have a direct benefit for the local people by way of increase in business/ employment opportunities due to the inflow of the tourists and in-turn uplifts their level of living standards/ social status and the indirect benefits which will promote the revenue generation for the state government as a result from the tourism activities

D. Implementation Schedule

16. Preliminary design of the subproject has been done by the Design and Supervision Consultant (DSC) team and will be finalized during detailed design stage. It is estimated that construction period will cover 24 months.

17. The final detailed implementation schedule will be provided in the updated IEE once the detailed design phase is completed.

Figure 1: Interpretation Centre and Bird Watch Towers at Rupnagar Wetland

Ropar Wetland - Bird watch Tower

Ropar Wetland - Boating Area

View of the Wetland

Presence of Water Hyacinth

Figure 2: Sub Project Location – Harike Wetland

Interpretation Center at LMB Harike Wetland

III. POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

A. ADB Policy

18. ADB requires the consideration of environmental issues in all aspects of ADB's operations, and the requirements for environmental assessment are described in ADB SPS, 2009. This states that ADB requires environmental assessment of all project loans, program loans, sector loans, sector development program loans, and loans involving financial intermediaries and private sector loans.

19. **Screening and Categorization.** The nature of the environmental assessment required for a project depends on the significance of its environmental impacts, which are related to the type and location of the project, the sensitivity, scale, nature and magnitude of its potential impacts and the availability of cost-effective mitigation measures. Projects are screened for their expected environmental impacts and are assigned to one of the following four categories:

- **Category A**. Projects could have significant adverse environmental impacts. An EIA is required to address significant impacts.
- **Category B**. Projects could have some adverse environmental impacts, but of lesser degree or significance than those in category A. An IEE is required to determine whether significant environmental impacts warranting an EIA are likely. If an EIA is not needed, the IEE is regarded as the final environmental assessment report.
- **Category C**. Projects are unlikely to have adverse environmental impacts. No EIA or IEE is required, although environmental implications are reviewed.
- **Category FI**. Projects involve a credit line through a financial intermediary or an equity investment in a financial intermediary. The financial intermediary must apply an environmental management system, unless all Projects will result in insignificant impacts.

20. **Environmental Management Plan.** An EMP which addresses the potential impacts and risks identified by the environmental assessment shall be prepared. The level of detail and complexity of the EMP and the priority of the identified measures and actions will be commensurate with the Project's impact and risks.

21. **Public Disclosure.** The IEE will be put in an accessible place (e.g., local government offices, libraries, community centers, etc.), and a summary translated into Hindi/Punjabi for the project affected people and other stakeholders shall also be disclosed. The following safeguard documents will be put up in ADB,s website so that the affected people, other stakeholders, and the general public can provide meaningful inputs into the project design and implementation:

- For environmental category A projects, a draft EIA report at least 120 days before Board consideration;
- Final or updated EIA and/or IEE upon receipt; and
- Environmental monitoring reports submitted by the Project Management Unit (PMU) during project implementation upon receipt.

B. National and State Laws

22. Implementation of the subproject will be governed by the national and State of Punjab environmental acts, rules, regulations, and standards. These regulations impose restrictions on activities to minimize/mitigate likely impacts on the environment. It is the responsibility of the project executing and implementing agencies to ensure subprojects are consistent with the legal framework, whether national, state or municipal/local. Compliance is required in all stages of the subproject including design, construction, and operation and maintenance.

23. The environmental rules and regulations applicable for the subprojects are listed in the **Table 1**. The Environmental Impact Assessment (EIA) notification, 2006 by the Ministry of Environment and Forests (MoEF, GoI) specifies the mandatory requirements for obtaining environmental clearance. Accordingly, all projects and activities are broadly categorized into two categories[1] - Category A and Category B, based on the spatial extent of potential impacts and potential impacts on human health and natural and man-made resources. Given that the sub-project is not covered in the ambit of the EIA notification, Environment clearance requirements from the GoI are not triggered.

Table 1: Environmental Regulatory Compliance

Sub-Project	Applicability of Acts/Guidelines	Compliance Criteria
1. Interpretation Centre and Bird Watch Tower at Forest Wildlife Nursery, Ropar (using existing building) 2. Eco tourism development at Harike Wildlife Sanctuary – Infrastructure development and interpretation centre.	The EIA notification, 2006 (and its subsequent amendments in 2009) provides the details for categorization of projects into category A and B, based on extent of impacts.	These subprojects are not covered in the ambit of the EIA notification as they are not either covered under Category A or Category B of the notification. As a result of the above categorization, the subsequent environmental assessment and clearance requirements are not triggered
	Safeguard Policy Statement, 2009. The Environment Policy and Operations Manual (OM) 20: Environmental Considerations in ADB Operation	Categorization of sub-project components into A, B or C and developing the required level of environmental assessment for each component. Based on the construction activities involved in this subproject, it shall be categorized as B
	Water (Prevention and control of pollution) Act, 1974 and Air (prevention and control of pollution) Act, 1981	Consent to Establishment (CTE) and Consent to Operation (CTO) from the Punjab Pollution Control Board is mandatory for all subprojects those

[1]All projects or activities included as Category 'A' in the Schedule, including expansion and modernization of existing projects or activities and change in product mix, will require prior environmental clearance from the CentralGovernment in the Ministry of Environment and Forests (MoEF) on the recommendations of an Expert Appraisal Committee (EAC) to be constituted by the Central Government for the purposes of this notification;

All projects or activities included as Category 'B' in the Schedule, including expansion and modernization of existing projects or activities as specified in sub paragraph (ii) of paragraph 2, or change in product mix as specified in sub paragraph (iii) of paragraph 2, but excluding those which fulfil the General Conditions (GC) stipulated in the Schedule, *will* require prior environmental clearance from the State/Union territory Environment Impact Assessment Authority (SEIAA). The SEIAA shall base its decision on the recommendations of a State or Union territory level Expert Appraisal Committee (SEAC) as to be constituted for in this notification.

In addition, General Condition (GC) of the notification specifies that any project or activity specified in Category 'B' will be treated as Category A, if located in whole or in part within 10 km from the boundary of: (i) Protected Areas notified under the Wild Life Protection) Act, 1972, (ii) Critically Polluted areas as notified by the Central Pollution Control Board from time to time, (iii) Notified Eco-sensitive areas, (iv) inter-State boundaries and international boundaries.

Sub-Project	Applicability of Acts/Guidelines	Compliance Criteria
		requiring, setting up of hot mix plants, wet mix plants, stone crushers and diesel generators. The consent shall be obtained by the Contractor.
	The Noise Pollution (regulation and Control) Rules, 2000	The subproject shall put measures for abatement of noise including noise emanating from vehicular movements, blowing of horns, bursting of sound emitting firecrackers, use of loud speakers or public address system and sound producing instruments and ensure that the existing noise levels do not exceed the ambient air quality standards specified under these rules.
	The Wildlife Conservation Act, 1972, amended in 2003 and 2006, provides for protection and management of Protected Areas.	As per section 28 (Grant of permit) of Wildlife Protection Act 1972, permission/ NoC from the Chief Wildlife warden is mandatory for this subproject which has been already obtained and attached at Appendix 3.
	The Forest Conservation Act, 1980 and its subsequent amendments necessitate obtaining clearance from the MoEF for diversion of forest land for non-forest purposes.	Project site is not located within forest area (Reserved or Protected Forest). Felling of trees is not envisaged
	Wetland Rules, 2010	The listed subprojects mandate prior approval from the state government as per the section 4(2) Restrictions on activities within Wetland. This is due to the location of these subprojects, which are located within the wetland influence/ buffer area (10km radius). Hence the same has been obtained from the Forest and Wildlife Department of Punjab and Chief Wildlife Warden of Punjab. As per the rules the activities identified under the project can be implemented only after permission from the State Government and only for the management of these wetlands. As required under the Rules, the project activities are as per the Comprehensive Management Action Plan (2013-18) For Conservation Of Ropar Wetland and Harike Wetland respectively. The proposals were reviewed by representatives of Chief Wildlife Warden and Chief Conservator of Soils, Punjab on 2-08-12. Proposals were also discussed with Scientific Officer, MEF, GOI, New Delhi on 3.08.12. The proposals were also approved by the steering committee on wetlands headed by Chief Secretary Punjab during 16th

Sub-Project	Applicability of Acts/Guidelines	Compliance Criteria
		meeting held on 16-01-2013.
	The Ancient Monuments and Archaeological Sites and Remains Act, 1958, and the rules, 1959 provide guidance for carrying out activities, including conservation, construction and reuse in and around the protected monuments.	Not applicable as these sites and monuments are not under the ambit of this Act.

Source: MoEF, CPCB and ADB

24. The **Table 1** indicates that the proposed subproject does not need to go through a full-scale environmental assessment process; as the scale of impacts and categorization of the sub-project components will not require clearances from Competent Authorities. Therefore, any further approvals or environmental clearances from the GoI or GoP are not envisaged.

25. The ADB guidelines, stipulate addressing the environmental concerns, if any, of a proposed activity in the initial stages of Project preparation. For this, the ADB Guidelines categorizes the proposed components into categories (A, B or C) to determine the level of environmental assessment that is required to address the potential impacts. The Rapid Environmental Assessment (REA) checklist method was followed as per ADB requirement to assess the potential impacts of the project in planning phase. The REA checklist is attached as **Appendix 1** with this report. The subproject has been categorized as B. Accordingly this IEE is prepared to address the potential impacts, in line with the recommended IEE content and structure for Category B projects. The IEE was based mainly on secondary sources of information and field reconnaissance surveys. Stakeholder consultation was an integral part of the IEE. An Environmental management plan (EMP) outlining the specific environmental measures that are to be adhered to during implementation of the subproject has been prepared.

IV. DESCRIPTION OF ENVIRONMENT

26. The identified subprojects sites are located in the Rupnagar and Tarn Taran districts. The environmental and social profile for the subproject area has been prepared district-wise.

Sl.no	Subproject	Project Location
1.	Interpretation Centre and Bird Watch Tower at Forest Wildlife Nursery, Ropar (using existing building).	Rupnagar District
2.	Eco tourism development at Harike Wildlife Sanctuary – Infrastructure development and interpretation centre.	Tarn Taran District

A. Rupnagar District

27. **Physiography.** Rupnagar is located between the Outer Himalayas and the Punjab plains. On the basis of relief, slope, drainage and overlain material, the district is divided into following five physiographic units.

- **Anandpur Dun**: An elongated valley enclosed by the Shiwalik Hills on the south-west and the outer Himalayas on the north-east. The elevation ranges between 278m and 358m above mean sea level (MSL). Sutlej Sutlej River enters this valley near Nangal and flows along its longer axis and finally it exits near Rupnagar.
- **Hilly Tracts**: This physiographic unit has three characteristic divisions :
  a. The Eastern slopes of Katar Dhar: spread over a distance of 36 kilometers and ranging from 300m and 520m above sea level. Hard savanna grasses, Thorny bushes and scattered trees are the characteristic vegetation of these hills.
  b. The Western slopes of Kolhai range: spread over a distance of 35 kilometers, the elevation of this elongated hilly tract ranges between 300m and 570m above sea level. The general slope of the land here is from east to west. Thus, the small streams and gullies flowing down these slopes drain out onto the foothill plain.
  c. The Western peripheral fringe of Naina Devi range: runs along the eastern and south-eastern boundary of Anandpur Sahib Tahsil and has an elevation ranging between 400m and 500m above sea level. It is characterized by thicker vegetation cover.
- **Foothill Dissected Palin**: runs along the Shiwalik Hills over a length of about 30km and breadth of 7km to 10km, the elevation ranges between 300m and 380m. A high degree of dissection by large number of closely spaced seasonal streams, called chos, is the distinguishing feature of this tract. The proportion of the gravel is higher nearer the hills. Coarse, light and exposed soils of this transitional plain are less productive than those of the neighboring upland plain.
- **Upland Plain**: located in the south-west of the foothill plain covering both Rupnagar and Kharar tahsils. The elevation ranges from 275m to 320m above sea level. It is a flat featureless plain. Alluvial in origin, it is well drained and easily workable and suitable for crop cultivation.
- **Floodplain of the Sutlej:** runs at a distance of about 20km along the Sutlej River from Rupnagar in the east to the western boundary of the district. Flooding is a special feature of this terrain unit. The flood leaves behind a layer of alluvium, which is rich in minerals and suitable for cultivation.

28. **Climate and Rainfall.** The climate of Rupnagar District is characterized by its general dryness (except in the south-west monsoon season), a hot summer and a bracing cold winter. The year may be divided into four seasons. The period from about middle of November to February is the cold season. This is followed by the summer season from March to about the end of June. The south-west monsoon season commences late in June and continues up to about middle of September. The period from mid-September to the middle of November constitute the post-monsoon or transition season. The temperature ranges from a minimum of 4°C in winter to 45°C in summer. May and June are generally hottest months and December and January are the coldest months. Relative humidity is high, averaging about 70 percent during monsoon. The average annual rainfall in the district is about 775.6 mm. About 78 percent of the annual rainfall is received during the period from June to September.

29. **Soils.** The soils of the district vary in texture generally from loam to silty clay loam except along the Sutlej River and chos where some sandy patches were found. In general, there are two type of soils found in the district:

- Reddish chestnut soils which is seen in the northeastern part of the district, particularly in the Rupnagar and Anandpur Sahib blocks. These soils are loam to clay-loam in nature and decalcified and
- Tropical Arid Brown soils (Weakly Solonized) are mainly found in rest of the area which is mainly calcareous sandy loam.

30. **Geology.** The rock formations in the district include river terraces, gravel beds, alluvial fans and calc tufa beds of recent origin and conglomerates, sandstones and claystones of Upper Shiwalik. The Upper Shiwalik mostly comprises boulder conglomerate beds with poorly to moderately sorted sandstone beds. The conglomerate bands are usually poorly cemented and include cobbles and pebbles with some boulders of quartzite, sandstone and siltstone with stray fragments of coarse and fine grained granites, banded quartzite, limestone, trap rock, claystone, carbonaeous phyllite, schist and purple shale. Sub-recent to recent deposits include mainly gravel beds, alluvial fans, river terraces and *calc* tufa beds.

31. **Surface Water Quality.** River Sutlej is the main river traversing through the Rupnagar District andit is supported by many tributaries. The irrigation system in the district is fed by two canals namely Sirhind and Bhakra main canal. The water quality information obtained from Central Pollution Control Board (CPCB), New Delhi has been taken to describe the pollution status/ surface water quality of the Sutlej River. The furnished information in the **Table 2** is based on a study under MINARS (Monitoring of Indian Aquatic Resources Series) conducted across India to monitor the pollution levels of all the perennial river systems.

Table 2: River Sutlej Surface Water Quality

Parameters	**1km downstream to Rupnagar (Station Code : 1293)**	**Upstream Headwork's Rupnagar (Station Code : 1019)**	**1km downstream Rupnagar (Station Code : 1380)**	**CPCB Norms for Surface Waters**
Temperature (°C)	18.7	18.5	18.8	40
Dissolved Oxygen (D.O.) (mg/l)	7.6	7.8	8.4	> 4
pH	7.7	7.5	7.9	6.5-8.5
Conductivity (µmhos/cm)	431	290	284	-
Biochemical oxygen demand (B.O.D.) (mg/l)	1.6	0.9	0.6	< 3 mg/l
Nitrate- N (mg/l)	2.8	2.2	2.3	-
Nitrite-N (mg/l)	1.33	1.15	1.2	-
Fecal Coliform (MPN/100ml)	305	83	50	< 2500
Total Coliform (MPN/100ml)	1533	483	403	< 5000

Source: MINARS, CPCB Delhi

32. From the given information, the water quality of River Sutlej at all sampling locations is observed to be good in comparison with CPCB surface water norms. However, when compared among them, it is observed that the station code 1293 has relatively high concentration of pollutants particularly those comprising of Fecal Coliforms and Total Coliforms, which clearly indicates that the river water in that location has been polluted by due to the influx of sewage.

33. **Groundwater Quality.** The status of groundwater in the Rupnagar District has been discussed based on the information obtained from the Central Groundwater Board (CGWB), Ministry of Water Resources, GoI. Groundwater sampling and analysis has been conducted at

various locations across the Rupnagar District to understand the groundwater quality status. From the analysis outcome, it is concluded that the ground water quality in the district is alkaline in nature with medium to high salinity. The chemical quality data from the shallow and deep aquifers indicate that all major cations (Ca, Mg, Na, K) and anions (CO_3, HCO_3, Cl, SO_4) are within the permissible limits set by BIS, 1991. The physical parameter such as electrical conductivity shows a wide variation from 470µs/cm in southern and northern part and it is about 1225µs/cm in the central part of the district particularly in Rupnagar block. Nitrate and fluoride concentration is below the prescribed permissible limit in entire district 66.7% of the groundwater samples collected from the district show Ca-Mg-HCO_3 type of water, which imparts temporary hardness. Rest 33.3% shows a mixed type of chemical character. Since all the physical and chemical parameters are below the permissible limit prescribed by BIS, the groundwater in the Rupnagar District is suitable for drinking and irrigation purposes.

34. **Ambient Air Quality.** Under the NAMP program (National Ambient Air Quality Monitoring Program) conducted by the Central Pollution Control Board (CPCB), New Delhi all the state pollution control boards are requested to conduct the ambient air quality monitoring for the selected industrial and residential areas. In Punjab, the Punjab Pollution Control Board has taken the initiative to conduct NAAQM program. The monitored results are shared by preparing the overall air quality status report. For this assignment, the air quality information for the Rupnagar area has been taken from the status report for discussion. The monitoring has been conducted for industrial and residential areas and the outcome of the analysis is shown in the **Table 3**.

Table 3: National Ambient Air Quality Monitoring Programme (NAMP)

Location: Rupnagar		Industrial area	Residential area	CPCB,AAQ standards
Sulphur Dioxide SO_2 µg/m^3 (Annual)	Max	8	12	50
	Min	6	6	
	Avg	7	9	
Oxides of Nitrogen NO_2 µg/m^3 (Annual)	Max	22	45	40
	Min	11	25	
	Avg	7	31	
RSPM µg/m^3 (Annual)	Max	123	268	40
	Min	40	168	
	Avg	94	225	

Source: NAMP Report, CPCB, Delhi

35. It is observed from the analysis, that the key noxious air pollutants like sulphur di-oxide and oxides of nitrogen are well within the permissible limits set by the CPCB. However, the concentration of RSPM is relatively high in comparison with the standard. This may be due to the moving traffic and other anthropogenic activities.

36. **Ambient Noise Quality.** The information on the noise quality for the district was very limited. The secondary information on ambient noise quality has been taken from the Environmental Assessment report carried out for Punjab State Road Sector Projects (PSRSP) in Rupnagar for discussion. The noise quality information is depicted in the **Table 4**.

Table 4: Ambient Noise Quality

Location		Commercial area	Sensitive area	CPCB Noise Standards
Rupnagar	Day time	68.14	62.73	65
	Night time	58.24	52.22	55

Source: Environmental Assessment, PSRSP

37. From the analysis it is observed that the day time and night time noise levels for commercial areas exceeds the standards stipulated by CPCB. The increase may be likely due to the movement of traffic and commercial activities. However, for sensitive locations the noise quality was observed to be within the limits.

38. **Economy.** Agriculture is the main source of economy. The land utilisation pattern shows that net area sown is 780sq.km while area under forest cover and land put to nonagricultural uses are 370 and 140sq.km respectively. Total cropped area of the district is 1400sq.km. Rice and maize constitute the main Kharif crops whereas wheat is the main Rabi crop.

39. **Flora**: The floral diversity consists of scattered Khair (*Acacia catechu*), Chhal (*Anogeisus latifolia*), Jhingan (*Lanea grandis*), Kikar (*Acacia nilotica*) Phalahi (*Acacia modesta*), Ber (*Zizyphus mauritiana*), shisham (*Dalbergia sisoos*), neem (*Azadirachta Indica*), mango(*Mangifera indica*), dhak (*Butea monosperma*) etc., Shrubs such as garna (*Carissa spinarum*), mehnder (*Dodona viscasa*), mallah (*Zizyphus nummularia*) gandhala (*Marraya koenigil*), basuti (*Adathoda vasica*), jhav(*Artemesia spp*), hins (*Capparis decidua*), panwar (*Cassia tara*), phul buti (*Lantana camara*), etc. and grasses such as (*Saccharum bengalenese*).

40. The forest strips have mostly artificially raised plantations like shisham (Dalbergia sissoo), eucalyptus (*Edcalyptus spp*), siris (*Albizzia lebbek*), mango (*Mangifera indica*) jaman (*Syzygium communi*) tun (*Cedrela toona*) neem (*Azadiachta indica*). Some of the mixed plantations are amaltas (*Cassia fistula*) jacranda (*Jacranda ovalifolia*), kachnar (*Bauhinca variegata*), bottle brush (*Callistemon vimnalis*) gulmohar (*Delomix rigia*) amla (*Emblica officivalis*) etc.

41. **Fauna**: The main animals found in these areas are Blue Bull (*Boselaphus tragocamelus*), Wild boar (*Sus scrofa*), Sambhar (*Cervas unicolor*), Jackal (*Canis aureus*), Common Mongoose (*Herpestes spp.*), Indian Porcupine (*Hystrix indica*) and Rhesus Monkey (*Macaca mulatta*) etc.

42. The common birds found in the district are :*Phalacrocorax niger* (vieillot), *Butorides striatus chloriceps* (Bonaparte), *Ardeola grayii* (sykes), *Bubulcus ibis coromandus* (Boddaert), *Egretta alba modesta* (Gray), *E. garzetta* (Linnaeus), *Anastomus oscitans* (Boddaert), *C. ciconia* (Linnaeus), *C. migra* (Linnacus), *Tadorna ferruginea* (pallas), *T tadorna*(Linnaeus), *Nettapus coromandelianus* (Gmelin), *Haliaeetus leucoryphus* (Pallas), *Coturnix coromandelica* (Gmelin), *T. stagnatili* (Bechastein), *S. pagodrum*(Gmelin), *Chrysomma sinense* (Gmelin).

43. **Protected area.** Ropar Wetland (manmade wetland) is situated (31°01' N, 76°30' E) near Ropar City, Punjab. This Ropar wetland has been formed due to the construction of Ropar head regulator in 1952. The reservoir level is maintained at Reduced Level (RL) 873.50 feet above Mean Sea Level (MSL). Depth of water varies from half meter to 6 meters in the Reservoir area. Shallow water features exist along both sides of the river which is located within the wetland area. State Government has prepared an Action Plan, and thru Punjab State Council for Science and Technology, developed the Ropar Wetland Management Plan for the conservation of the lake, which includes removal of water hyacinth and its utilization for generation of biogas, afforestation, water quality monitoring and protective measures. The funds to implement the Action Plan and Ropar Wetland Management Plan is being provided by the Central Government.

Figure 3: Location of Ropar Wetland / Ropar Lake

44. The wetland has variety of biodiversity; tree species includes Acacia *catechu, F. religiosa, A. modesta, Mangifera indica, A. nilotica, Melia azadirachta, Albizzia lebbek, Moringa oleifera, Azadirachta indica, Prosopis juliflora, Dalbergia sissoo, Eucalyptus tereticornis and Ficus Bengalensis.* The local bird species includes *Accipiter badius* (Shikra)*, A. nisus* (Sparrow hawk), *Aeriodotherco giniginianus* (Bank myna), *Alcedo atthis*(Small blue kingfisher), *Athene brama* (Spotted owlet), *Ceryle rudis* (Pied kingfisher), *Dicrurus adsimilis*(King crow or Drongo), *Streptopelia chinensis*(Spotted dove), *Tockus birostris*(Grey hornbill), *Podiceps niger* (Little Cormorant).Migratory Birds includes *Anas acuta (*Pintail), *A. clyopeata (*Shoveller), *A. penelope* Wigeon, *A. platyrhynchos (*Mallard), *A. poeccilorhyncha (*Spotbill duck), *A. steopera (*Gadwall), *Aythya ferina (*Common pochard), *Circus aeruginosus (*Marsh harrier), *Hydrophasianuschirurgus (*Pheasat tailedjacana) etc.

45. **Demographic Profile.** The total population in Rupnagar district were estimated to be 5,83,478, which includes the rural and urban population. The Rupnagar constitutes 30.8% to the total population followed by Anandpur Sahib (25.7), Nurpur Bedi (16.5), Morinda (14.8%) and Chamkaur Sahib (12.2%). The following Table 5 depicts the census information for the Rupnagar District. The total SC populations in Rupnagar District were estimated to be 22.43% of the total population. Rupnagar has 28.8% of SC population which is followed by Chamkaur Sahib (18.97%), AnandpurSahib (18.80%), Morinda (18.07%) and Nurpur Bedi(15.29%).

Table 5: Rupnagar District Statistics

Sl.No	Particulars	Anandpur Sahib	Chamkaur Sahib	Morinda	Nurpur Bedi	Rupnagar	Total
1	**Rural Population**						
	Male	70661	38100	34520	50123	70236	263640
	Female	65284	33179	29449	45960	60283	234155
	No. Of Families	24183	12165	10439	16685	22764	86236
	No. Of S.Cs	24599	24830	23643	20016	37781	130869
2	**Urban Population**						
	Male	7400	-	11945	-	26057	45402
	Female	6489	-	10690	-	23102	40281

Source: Rupnagar District Statistics, Rupnagar Administration

46. **Population Density.** As per the census 2011, the population density of Rupnagar is 505 people per sq. km. In 2001, the population density was about 449 people per sq. km. In comparison with 2001 census, the population density has an increased by 12.47%.

47. **Literacy Rate.** Average literacy rate of Rupnagar in 2011 were 82.19% compared to 76.10% of 2001. Gender wise, male and female literacy were 87.50% and 76.42% respectively. For 2001 census, same figures stood at 82.70% and 68.70%. Total literates were 502,731 of which male and female were 278,534 and 224,197 respectively.

48. **Sex Ratio.** With regards to sex ratio in Rupnagar, it stood at 915 per 1000 male compared to 2001 census of 889 per 1000 male. The average national sex ratio in India is 940 per 1000 male. The child sex ratio is 863 girls per 1000 boys compared to a figure of 799 girls per 1000 boys of 2001 census.

49. **Employment.** Non-agricultural workers are edging over the agricultural workers. As per the census information, the Anandpur Sahib constitutes 27.26% of worker populace, followed by Rupnagar (24%), Nurpur Bedi (21.42%), Morinda (13.92%) and Chamkaur Sahib (13.4%).

Table 6: Rupnagar Employment Statistics

Sl.no	Particulars	Anandpur Sahib	Chamkaur Sahib	Morinda	Nurpur Bedi	Rupnagar	Total
1	Agriculture workers	21989	11360	13098	18005	15585	80037
2	Non-agriculture workers	34880	16611	15963	26664	34429	128547

Source: Rupnagar District Statistics, Rupnagar Administration

B. Tarn Taran District

50. The subproject site in Harike wetland falls under the Tarn Taran District; hence the environmental and social profile of the district has been taken for discussion. Tarn Taran District is the south western most district of Punjab State with a total geographical area of 5850 sq.km which is located between 29°56'47" and 31°0'7" north latitudes and 72°52'54" and 75°01'11" east longitudes. The Tarn Taran district forms a part of Sutlej sub basin of main Indus basin and is interrupted by clusters of sand dunes. It is surrounded by District Mukatsar in the South, Districts Faridkot and Moga in the East, District Ganganagar of Rajasthan State in the Southwest. On the Northeast side, River Sutlej separates it from District Kapurthala. On the Northwest side, a united stream of Rivers Beas and Sutlej separates it from District Amritsar. India - Pakistan Border is on the West side.

51. **Topography.** Topographically, the Tarn Taran District constitutes a part of the Punjab plain, which is largely flat and featureless and is formed of Pleistocene and Sub-recent alluvial deposits of the Indo-Gangetic system. Wind act has also played a part in shaping the relief of the District, as it is located in the vicinity of the Rajasthan Desert. That is why the alluvial surface of the District is strewn with sand-dunes in some parts.

52. The general elevation of the District ranges from 230 metres in the north-east to about 175 metres in the south-west, giving a north-east-to south-west gradient of one metre in 4km. Though the physiography of the District is apparently a homogeneous plain, in general, it displays significant variations, when examined at local levels. The following three terrain units can be identified:

- The floodplain of the Sutlej
- The sand-dune infested tract
- The upland plain.

53. **Climate.** The climate of the Tarn Taran District is generally dry and is characterized by a very hot summer, a short rainy season and a bracing winter. The year may be divided into four seasons. The cold season starts from November to March. This is followed by the summer season which lasts up to about the end of June. The period from July to the middle of September constitutes the south-westerly monsoon season. The latter half of September and October may be termed as the post-monsoon or the transition period.

- **Temperature:** By the end of March, the temperature increases rapidly till June, which is generally the hottest month, with the mean daily maximum temperature of 41.1°C and the minimum of 26.3°C. On individual days, the maximum temperature may be above 47°C. With the onset of the monsoon by about the end of June or early in July, there is an appreciable drop in the day temperature. By the second week of September, when the monsoon withdraws from the District, both day and night temperatures begin to fall. The drop in the night temperature, even in October, is much more than the fall in the day temperature. After October, both the day and night temperatures decrease rapidly till January, which is the coldest month. The mean daily maximum temperature in January is 19.3°C and the mean daily minimum is 5.1°C.
- **Humidity:** During the south-westerly monsoon, the relative humidity in the air varies from 65 to 70 percent and the atmosphere is generally dry. The driest part of the year is the summer season, where the relative humidity in the afternoons is about 30 percent or less. Generally, the morning is more humid than the afternoon.

54. **Rainfall.** The average annual rainfall of the Tarn Taran District is 340.5 mm. The intensity of the rainfall increases during the south-west monsoon and partly during the north-east monsoon. On an average, there are 19 rainy days (i.e. days with rainfall of 2.5 mm or more) in a year in the District. About 70 percent of the annual normal rainfall in the District is received during the monsoon months of July to September, July and August being the rainiest months. Some rainfall occurs during the pre-monsoon months, mostly in the form of thunder-showers. In the cold season, in association with the passing westerly disturbances, some rainfall occurs.

55. **Soils.** In general, the soils of Tarn Taran are mostly sandy loam and alkaline in nature. There are three types of soils that are found in the Tarn Taran District:

- **Bet Land** - The bet land extends along the Sutlej River in the form of a belt, about 5 to 10km in width and 160km in length. This belt comprises two types of soils, viz. clayey soils and clayey-loam soils. Patches of kallar are also seen in this area.
- **Maira Land** - The maira land is neither clayey nor sandy, there is usually an equal proportion of sand and clay.
- **Sandy or 'Tibba' Soils** - This belt of land is situated along the border of Rajasthan and the Hisar District. The land is mainly sandy and is poor in fertility. Most of the crops in this tract depend upon rain for their growth. The main crops grown are gram, barely and taramira in the rabi and jawar, bajraguara during the kharif.

56. **Geology.** The area forms a part of Indo-Gangetic alluvium. It is practically flat except for occurrence of small scattered sand-dunes. The geological formations identified in the area are:

- Sandy clay with saltpeter encrustations at places,
- Clay with sporadic sandy nodules,
- Coarse sand, a water-bearing sand horizon. and
- Impervious clay.

57. **Surface Water Quality.** The sub project area is influenced by the presence of two rivers namely Beas and Sutlej. Both the rivers confluence at the Harike. Hence to describe the water quality of the rivers, the information from the MINARS (Monitoring of Indian Aquatic Resources Series) conducted by the Central Pollution Control Board (CPCB) has been referred and the following **Table 7** has been generated.

Table 7: River Beas and Sutlej Surface Water Quality

Sl.no	Parameters	Unit	Beas (Harike)	Sutlej (Harike Bridge)	CPCB norms for surface water
1	Temperature	°C	18	13	40
2	D.O	mg/l	6.9	6.5	>4
3	pH	mg/l	7.7	7.6	6.5 to 8.5
4	Conductivity	µmhos/cm	354	478	-
5	C.O.D	mg/l	5.2	26	-
6	B.O.D	mg/l	0.8	2.7	<3
7	Nitrate	mg/l	2.2	3	-
8	Nitrite	mg/l	1	3	-
9	Ammonia	mg/l	1	1	-
10	Fecal Coliforms	MPN/ 100ml	20	370	<2500
11	Total Coliforms	MPN/ 100ml	280	2333	<5000

Source: MINARS, CPCB Delhi

58. The outcome of the analysis shows, the water quality of both the rivers are within the stipulated limits prescribed by the Central Pollution Control Board (CPCB) for surface water quality. However the presence of the fecal and total coliforms in the Sutlej River is very high in comparison with Beas River indicating the domestic sewerage inlet to the river.

59. **Groundwater Quality.** Water quality data obtained from the CGWB based on the analysis of groundwater samples those representing shallow aquifers reveals that groundwater is alkaline in nature. The Electrical Conductivity (EC) of water samples is either fresh or very saline. Concentration of chemical constituents, in most of the water samples are within the permissible limit of drinking water standards. However in few water samples, the EC is more than 3000 µs /cm, Fluoride is more than 1.5mg/l, NO3 is above 45mg/l and Iron (Fe) is more than 1.0mg/l. Excess Iron concentration (more than1.0mg/l) was observed at Waryam Khera (1.82mg/l) and Sitogna (1.97mg/l). The bicarbonate and chloride are the dominant anions. The quality of ground water is of permissible class for domestic purpose and can be used for drinking purposes.

60. **Ambient Air Quality.** The availability of the secondary information on ambient air quality is very scanty and limited. The AAQ information from the NAMP carried out for the state of Punjab by the Central Pollution Control Board, New Delhi has been taken for discussion. The monitored information has been given in the following Table 8.

Table 8: National Ambient Air Quality Monitoring Programme (NAMP)

Parameters	SO_2		NO_2		RSPM		SPM	
Location/ Class	Industrial	Residential	Industrial	Residential	Industrial	Residential	Industrial	Residential
Tarn Taran	L	L	L	L	H	H	H	H

Source: National Ambient Air Quality Status; LEGEND: L: Low, M: Moderate, H: High, C: Critical

61. From the observation it shall be concluded that the noxious gases like SO_2, NO_2 are well within the limits, however, the RSPM and SPM exceeds the limitation. This may be due to the moving traffic or due to any anthropogenic activities. The given information shall be updated during the DPR stage of the project, where the primary environmental monitoring shall be performed surrounding the sub project area to get a clear analysis of the construction impacts on the ambient air.

62. **Noise Quality.** Ambient noise quality has been monitored by Punjab Pollution Control Board Pollution (PPCB) at various locations, indicates high noise levels and is attributed to those arising largely from vehicles. Noise level measured ranges from 65 dB (A) to 68 dB (A).

63. **Agriculture.** There are two main growing seasons, viz kharif and rabi, locally named sawni and harhi. The kharif season covers the summer months and the crops grown during this period are harvested in the autumn. The rabi season covers the winter months and the crops grown during this period are harvested in the spring. In between these two main seasons, additional crops are raised where conditions permit. These are known as zaid kharif and raid rabi crops. Torai is a zaid kharif crop, whereas tobacco, onion, spring potato and early jawar are zaid rabi crops.

64. The principal kharif crops are paddy, cotton, maize and sugarcane whereas the minor ones or subsidiary crops are vegetables, such as tomato, water-melon, brinjal, lady's finger (bhindi), kharif pulses and fruits. The principal rabi crops are wheat, gram, barely and berseem, whereas the minor rabi crops are rabi oilseeds (sarson, taramira, alsi and toria) and winter vegetables, such as peas, cabbage, turnip, carrot and lobia.

65. **Flora**: The floral diversity consists of scattered Khair (*Acacia catechu*), Chhal (*Anogeisus latifolia*), Jhingan (*Lanea grandis*), Kikar (*Acacia nilotica*) Phalahi (*Acacia modesta*), Ber (*Zizyphus mauritiana*), shisham (*Dalbergia sisoos*), neem (*Azadirachta Indica*), mango(*Mangifera indica*), dhak (*Butea monosperma*) etc., Shrubs such as garna (*Carissa spinarum*), mehnder (*Dodona viscasa*), mallah (*Zizyphus nummularia*) gandhala (*Marraya koenigil*), basuti (*Adathoda vasica*), jhav(*Artemesia spp*), hins (*Capparis decidua*), panwar (*Cassia tara*), phul buti (*Lantana camara*), etc. and grasses such as (*Saccharum bengalenese*).

66. The forest strips have mostly artificially raised plantations like shisham (Dalbergia sissoo), eucalyptus (*Edcalyptus spp*), siris (*Albizzia lebbek*), mango (*Mangifera indica*) jaman (*Syzygium communi*) tun (*Cedrela toona*) neem (*Azadiachta indica*). Some of the mixed plantations are amaltas (*Cassia fistula*) jacranda (*Jacranda ovalifolia*), kachnar (*Bauhinca variegata*), bottle brush (*Callistemon vimnalis*) gulmohar (*Delomix rigia*) amla (*Emblica officivalis*) etc.

67. **Fauna**: The main animals found in these areas are Blue Bull (*Boselaphus tragocamelus*), Wild boar (*Sus scrofa*), Sambhar (*Cervas unicolor*), Jackal (*Canis aureus*),

Common Mongoose (*Herpestes spp.*), Indian Porcupine (*Hystrix indica*) and Rhesus Monkey (*Macaca mulatta*) etc.

68. The common birds found in the district are :*Phalacrocorax niger* (vieillot), *Butorides striatus chloriceps* (Bonaparte), *Ardeola grayii* (sykes), *Bubulcus ibis coromandus* (Boddaert), *Egretta alba modesta* (Gray), *E. garzetta* (Linnaeus), *Anastomus oscitans* (Boddaert), *C. ciconia* (Linnaeus), *C. migra* (Linnacus), *Tadorna ferruginea* (pallas), *T tadorna*(Linnaeus), *Nettapus coromandelianus* (Gmelin), *Haliaeetus leucoryphus* (Pallas), *Coturnix coromandelica* (Gmelin), *T. stagnatili* (Bechastein), *S. pagodrum*(Gmelin), *Chrysomma sinense* (Gmelin).

69. **Protected Area.** Harike Wetland has been identified as one of the sites for conservation under Indian National Wetland Programme. The State Government has prepared a Management Action Plan for conservation of the wetland, and has been funded by the Central Government. This wetland has also been declared as wildlife sanctuary by the State Government. Harike Lake, formed by damming of Beas-Sutlej watershed, is the biggest watershed of Punjab. This lake attracts a number of migratory birds. On account of heavy siltation due to denuded catchment area, the ponded area is gradually decreasing. The lake is heavily infested by water hyacinth. The main fish fauna in the lake is Hilsa. Harike wetland is source of water supply for drinking and irrigation and has an important role in the economy of the State. During the winter period, about 196 species of birds visit the lake, which include migratory species as well as resident birds. The livelihood of nearby villagers to some extent depend upon fish resources of the lake. The lake is also getting contaminated with chemicals and insecticides used in the surrounding areas. Due to deforestation in the catchment area, the lake is getting heavily silted and the ponded area is gradually decreasing.

70. **Population Distribution.** As per 2011 Census, Punjab population is 2.77 crores, which shows an increase in the population in comparison with the 2001 Census (2.44 crores). Total population of the Tarn Taran District is 20.29 lakh in 2011 which was 17.46 lakh in 2001. The district population growth shows an increase in Average Annual Growth Rate (AAGR) of nearly 1.5 percent. As per the census 2011, the total number of HH in the district is 3,85,994. The Average Household (HH) size has reduced from 5.8 (census 2001) to 5.3 (census 2011).

71. **Urban and Rural Population.** The urban population in Punjab during 2001 was 33.9% which has increased to 37.5% in 2011. The urban population in Tarn Taran District is 26% as per 2001 census which is increased to 27.2% in 2011 census. The Table 9 below presents the Population distribution of the State and the Tarn Taran District.

Table 9: Population Distribution – Tarn Taran District

Population Distribution	2001		2011	
	Punjab	Tarn Taran	Punjab	Tarn Taran
Area (Sq.km)	50,362	5305	50,362	5305
Avg. HH size	5.6	5.8	5.0	5.3
Tot Population	24,358,999	1746107	27,743,338	2029074
AAGR (1991-2001-2011)	1.8	0.8	1.3	1.5
Tot Urban Pop	8,262,511	450725	10,399,146	552556
Tot Rural Pop	16,096,488	1295382	17,344,192	1476518
% of Urban Population	33.92	25.81	37.48	27.23

Source: Compiled from Primary Census Abstract, 1991, 2001 and 2011

72. **Population Density.** Population Density of Punjab is 551 per sq.km in 2011. Density of Tarn Taran is 382 per sq.km in 2011, which is higher than the value of 2001 census (329 Sq.km).

73. **Sex Ratio.** As per 2011 census, the sex ratio of the state was 895 females per 1000 males. Whereas it was 876 females per 1000 males in 2001. In the Tarn Taran District it was 893 females per 1000 males, which is higher than the 2001 figures (885 females per 1000 males).

74. **Literacy Rate.** The average literacy rate for the Tarn Taran District is 68.9% as per 2011 census which is lower than the Punjab state average of 75.8%. However, the district has a substantial growth in the literacy rate in comparison to the 2001 census (60.7%).

75. **Work Participation Rate.** As per 2011 census, the Workforce Participation Rate in the Tarn Taran District is 37.3 percent, which is slightly higher than the Punjab state average of 36 percent. Tarn Taran District Workforce Participation was 37.1 percent in 2001 which is now slightly increased to 37.3 percent.

76. **Social Characteristics.** There is no ST population in the Punjab state. The percentage of the SC in the Punjab state is 32% and the Tarn Taran District constitutes to 42% (as per 2011 census). The Table 10 below presents the demographic status of the Punjab state and the Tarn Taran district.

Table 10: Social Characteristic – Tarn Taran District

Social component	2001		2011	
	Punjab	Tarn Taran	Punjab	Tarn Taran
Population Density	484	329	551	382
Sex Ratio	876	885	895	893
Literacy Rate	69.65	60.69	75.84	68.92
Workforce Rate	37.47	37.15	35.67	37.29
% of SC	28.85	22.82	31.94	42.17

Source: Compiled from Primary Census Abstract, 2001& 2011

V. ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

77. The assessment of environmental impacts for the proposed interventions under this package has been carried out during the preparation of summary appraisal report (SAR). An environmental assessment as per preliminary design using ADB's Rapid Environmental Assessment (REA) checklist for urban development (Annex 1) was conducted. The following are categories of impacts assessed:

- **Location impacts**. Impacts associated with site selection, including impacts on environment and resettlement or livelihood related impacts on communities and wildlife
- **Design impacts**. Impacts arising from project design, including the technology used, scale of operations, discharge standards etc.
- **Construction impacts**. Impacts resulting from construction activities including site clearance, earthworks, civil works, etc.

- **O&M impacts**. Impacts associated with the operation and maintenance of the infrastructure built in the project.

78. **Land Acquisition and Resettlement Impacts.** The sites of subproject components are planned to be developed in the government-owned land (i.e. State Forest and Wildlife Preservation Department and PWD, Punjab) thus the implementation of the sub projects will not require any land acquisition. The subproject components for wetlands (Ropar and Harike wetlands) shall be implemented with prior clearance (NoC) from the concerned wildlife authorities and it is proposed to be implemented within the wetland area, hence diversion of forest/ sanctuary land is not envisaged. All required NoCs and undertakings have been obtained and attached at Annex 2.

79. **Design considerations to avoid environmental impacts.** The following are design considerations to avoid environmental impacts

- Proposed interventions in accordance to government-approved wetland management plans.
- Close coordination with and approval of designs by State Department for Forest and Wildlife.
- Adoption of design compatible with the natural environment and suitable selection of materials to enhance the aesthetic appeal and blend with the natural surroundings.
- Straight lines and simple geometry in the proposed landscape and architectural features.
- Use of subtle colors and simple ornamentation in the structures.
- Natural tree species in the proposed landscape.
- Use of local stone in the proposed walkways and built structures thus maintaining a natural environment character.
- Use of movable and non-permanent bird towers and bird hides.
- Minimal footprint areas for bird towers and bird hides.

80. The results of interventions are unobtrusive and will be integral part of the ambience of the site. The physical components have been proposed with minimalist design and footprints emphasizing use of local materials (wood, stone, etc.).

A. Assessment of Environmental Impacts

81. **Determination of Area of Influence.** The primary impact areas are (i) sites for subproject components; (ii) main routes/intersections which will be traversed by construction vehicles; and (iii) quarries and borrow pits as sources of construction materials. The secondary impact areas are: (i) Construction impact to the settlements in the vicinity of the subproject area and (ii) positive impacts to entire project districts in terms of over-all environmental and tourism improvement.

82. In the case of this subproject Package No. PB/IDIPT/T3/04/03, the proposed interventions in the wetlands are within the areas designated for wetland eco-tourism development as per government-approved wetland management plans. Hence location-related impacts are not anticipated.

83. For the improvement of connectivity under subproject Package No. PB/IDIPT/T3/04/03, 5.17 km out of 16.245 km will require widening. Information from the State Public Works Department indicates there is sufficient available right-of-way for the proposed widening. Formal permission/ NOC from both the departments are requested by the Tourism Department. In response to it, the NOC from the PWD has been obtained (refer to Appendix 3). The NOC from the Irrigation department will be obtained prior to award of civil works contract. Hence, it shall be concluded that there are no impacts are envisaged on land acquisition or resettlement due to the proposed subprojects. In the event of any land acquisition or resettlement requirements during the project implementation, the same shall be carried out in line with the provisions of the Resettlement Framework developed for the project and will be detailed in the Social Assessment Report and Resettlement Plan, if required.

B. Pre-construction Impacts and Mitigation Measures

84. **Consents, permits, clearances, no objection certificate (NOC), etc.** Failure to obtain necessary consents, permits, NOCs, etc. can result in design revisions and/or stoppage of works.

85. **Mitigation measures.** The following will be conducted during detailed design phase:

- Obtain all necessary consents, permits, clearance, NOCs, etc. prior to start of civil works.
- Acknowledge in writing and provide report on compliance on all obtained consents, permits, clearance, NOCs, etc.
- Include detailed design drawings and documents with necessary conditions and provisions as necessary.

86. **Erosion control.** The impacts associated with the earth works/ excavation and earth movement shall be mitigated through appropriate soil erosion control measures. Prior to commencement of civil works, the contractor will be required to:

- Apart from the archaeologists, consult a certified geologist to look into soil stability to enable contractors to employ effective soil stabilization and erosion control measures to sustain restorative measures under the subproject
- Develop an erosion control and re-vegetation plan to minimize soil loss and reduce sedimentation to protect water quality.
- Minimize the potential for erosion by balancing cuts and fills to the extent feasible.
- Identify and avoid areas with unstable slopes and local factors that can cause slope instability (groundwater conditions, precipitation, seismic activity, slope angles, and geologic structure).
- Minimize the amount of land disturbed as much as possible. Use existing roads, disturbed areas and borrow pits and quarries when possible. Minimize vegetation removal. Stage construction to limit the exposed area at any point of time.

87. **Utilities.** As per the reconnaissance survey, the subproject area does not have any public utilities (Water supply, toilets, sewer pipelines etc,). However, during the implementation if any of the public utilities has been identified, an appropriate mitigation measure as listed below shall be carried out by the PIU/DSC.

- Identify and include locations and operators of these utilities in the detailed design documents to prevent unnecessary disruption of services during the construction phase.
- Require contractors to prepare a contingency plan to include actions to be carried out in case of unintentional interruption of services.
- Require contractor to obtain from the PIU and/or DSC the list of affected utilities and operators;
- If relocations are necessary, contractor will coordinate with the providers to relocate the utility.
- Obtain appropriate NoC from the concerned department for shifting the utilities
- Require contractor to specify condition of general housekeeping (storage of construction implements, stockpiles, wastes, chemicals) in order to ensure compliance with environmental laws and provide reference for monitoring purposes.

88. **Social and Cultural Resources.** There is a risk that any work involving ground disturbance can uncover and damage archaeological and historical remains. The proposed subproject components in the wetland area do not involve any major excavation/ ground clearance works. However, the upgradation of the approach road to the rural villages shall have marginal excavation works, since the subproject area is known for the rich historical background, there are possibilities in obtaining the historical remains. Hence the contractor shall adopt the following measures.

- Consult Archaeological Survey of India and/or State Department of Archaeology to obtain an expert assessment of the archaeological potential of the site.
- Consider alternatives analysis, if the site is found to be of medium or high risk.
- Include state and local archaeological, cultural and historical authorities, and interest groups in consultation forums as project stakeholders so that their expertise can be made available.
- Develop a protocol for use by the construction contractors in conducting any excavation work, to ensure that any chance finds are recognized and measures are taken to ensure they are protected and conserved.

89. **Sites for construction work camps and areas for stockpile, storage and disposal.** The subproject areas are very sensitive and are in the vicinity of the wetland, which is considered as an eco-sensitive area, hence the site for construction camp, warehouses and disposal of construction debris shall be done with utmost care. The contractor will be required to meet the following criteria for the sites:

- Will not promote instability and result in destruction of property, vegetation, irrigation, and drinking water supply systems, etc.
- Residential areas will not be considered so as to protect the human environment (i.e., to curb accident risks, health risks due to air and water pollution and dust, and noise, and to prevent social conflicts, shortages of amenities, and crime).
- Disposal will not be allowed near sensitive areas which will cause inconvenience to the community.
- The construction camp, storage of fuel and lubricants should be avoided at the wetland/ river bank. Any construction camp site will be finalized in consultation with DSC and PIU.

90. **Sources of construction materials.** Significant amounts of gravel, sand, and cement will be required for this subproject. Extraction of materials can disrupt natural land contours and vegetation resulting in accelerated erosion, disturbance in natural drainage patterns, ponding, water logging, and water pollution. The contractor will be required to:

- Use quarry sites and sources permitted by government.
- Verify suitability of all material sources and obtain approval from PIU/DSC.
- If additional quarries are required after construction has started, obtain written approval from PIU/DSC.
- Submit to DSC on a monthly basis documentation of sources of materials.
- If the contractor is planning to have his own quarry for this project purpose, then he should obtain necessary clearance from the Mining Department, Punjab.

91. **Access.** Hauling of construction materials and operation of equipment on-site can cause traffic problems. Construction traffic will access most of the work areas from the existing roads therefore potential impacts will be of short-duration, localized and can be mitigated. The contractor will need to adopt the following mitigation measures:

- Plan transportation routes so that heavy vehicles do not use narrow local roads, except in the immediate vicinity of delivery sites.
- Schedule transport and hauling activities during non-peak hours.
- Locate entry and exit points in areas where there is low potential for traffic congestion.
- Keep the site free from all unnecessary obstructions.
- Drive vehicles in a considerate manner.
- Coordinate with the Traffic Police Department for temporary road diversions and for provision of traffic aids if transportation activities cannot be avoided during peak hours.
- Notify affected sensitive receptors by providing sign boards with information about the nature and duration of construction works and contact numbers for concerns/complaints.

92. Summary of pre-construction activities is presented in **Table 11**. The responsibilities, monitoring program and costs are provided in detail in the EMP. The contractor is required to update the information during detailed design phase. Sample waste/spoils management plan, traffic management plan, etc. are attached as **Appendix 4 to 10**. Site-specific plans will be developed as per detailed design.

Table 11: Summary of Pre-Construction Mitigation Measures

Parameters	Mitigation Measures
Consents, permits, clearances, no objection certificate (NOC), etc.	• Obtain all necessary consents, permits, clearance, NOCs, etc. prior to start of civil works. • Acknowledge in writing and provide report on compliance all obtained consents, permits, clearance, NOCs, etc. • Include in detailed design drawings and documents all conditions and provisions if necessary
Erosion control	• Apart from the archaeologists, consult a certified geologist to look into soil stability to enable contractors to employ effective soil stabilization and erosion control measures to sustain restorative measures under the subproject • Develop an erosion control and re-vegetation plan to minimize soil

Parameters	Mitigation Measures
	loss and reduce sedimentation to protect water quality. • Minimize the potential for erosion by balancing cuts and fills to the extent feasible. • Identify and avoid areas with unstable slopes and local factors that can cause slope instability (groundwater conditions, precipitation, seismic activity, slope angles, and geologic structure). • Minimize the amount of land disturbed as much as possible. Use existing roads, disturbed areas, and borrow pits and quarries when possible. Minimize vegetation removal. Stage construction to limit the exposed area at any one time.
Utilities	• Identify and include locations and operators of these utilities in the detailed design documents to prevent unnecessary disruption of services during the construction phase. • Require contractors to prepare a contingency plan to include actions to be done in case of unintentional interruption of services. • Obtain from the PIU and/or DSC the list of affected utilities and operators; • Prepare a contingency plan to include actions to be done in case of unintentional interruption of services. • If relocations are necessary, contractor will coordinate with the providers to relocate the utility. • Require contractor to specify condition of general housekeeping (storage of construction implements, stockpiles, wastes, chemicals) in order to ensure compliance with environmental laws and provide reference for monitoring purposes
Social and Cultural Resources	• Consult Archaeological Survey of India or State Department of Archaeology to obtain an expert assessment of the archaeological potential of the site. • Consider alternatives analysis, if the site is found to be of medium or high risk. • Include state and local archaeological, cultural and historical authorities, and interest groups in consultation forums as project stakeholders so that their expertise can be made available. • Develop a protocol for use by the construction contractors in conducting any excavation work, to ensure that any chance finds are recognized and measures are taken to ensure they are protected and conserved.
Sites for construction work camps, areas for stockpile, storage and disposal	• Will not promote instability and result in destruction of property, vegetation, irrigation, and drinking water supply systems, etc. • Residential areas will not be considered so as to protect the human environment (i.e., to curb accident risks, health risks due to air and water pollution and dust, and noise, and to prevent social conflicts, shortages of amenities, and crime). • Disposal will not be allowed near sensitive areas which will inconvenience the community. • The construction camp, storage of fuel and lubricants should be avoided at the river bank..
Sources of construction materials	• Use quarry sites and sources permitted by government. • Verify suitability of all material sources and obtain approval from PIU/DSC. • If additional quarries are required after construction has started, obtain written approval from PIU/DSC. • Submit to DSC on a monthly basis documentation of sources of

Parameters	Mitigation Measures
	materials. • For new quarry, appropriate clearance shall be obtained from the mining department, punjab
Access	• Plan transportation routes so that heavy vehicles do not use narrow local roads, except in the immediate vicinity of delivery sites. • Schedule transport and hauling activities during non-peak hours. • Locate entry and exit points in areas where there is low potential for traffic congestion. • Keep the site free from all unnecessary obstructions. • Drive vehicles in a considerate manner. • Coordinate with the Traffic Police Department for temporary road diversions and for provision of traffic aids if transportation activities cannot be avoided during peak hours. • Notify affected sensitive receptors by providing sign boards with information about the nature and duration of construction works and contact numbers for concerns/complaints. • Provide free access to households and businesses/shops along ROWs during the construction phase.

C. Anticipated Construction Impacts and Mitigation Measures

93. **Construction Schedule and Method.** As per preliminary design, construction activities will cover 24 months. The exact implementation schedule will be updated during detailed design phase. The construction stage impacts due to the proposed subproject components are generic to the construction activities. However, given that the sub-projects are located in an ecologically sensitive area, it is important to take all possible care to avoid any possible ecological impacts on these sensitive locations. Hence, the EMP emphasizes on the construction impacts and necessary mitigation measures that are to be strictly followed by the Contractor and supervised by the DSC. Key impacts during construction are envisaged on the following aspects: (i) earthwork in excavation (ii) disposal of construction waste materials (iii) dust generation, air and noise from construction activities, (iv) impacts arising from the phasing of the project i.e. project should be phased out avoiding the birds migration and breeding periods. Other construction related impacts during implementation of the subprojects include:

94. **Erosion Hazards.** As per the reconnaissance survey, the risks involved due to erosion in the project area is low and limited during the construction phase and are not expected to have any negative impact on the drainage and hydrology of the project area. Runoff will produce a highly variable discharge in terms of volume and quality, and in most instances will have no discernible environmental impact. The contractor will be required to:

- Save topsoil removed during excavation and use to reclaim disturbed areas, as soon as it is possible to do so.
- Use dust abatement such as spraying of water to minimize windblown erosion.
- Provide temporary stabilization of disturbed/excavated areas that are not actively under construction.
- Apply erosion controls (e.g., silt traps) along the drainage leading to the water bodies.
- Maintain vegetative cover surrounding the project area to prevent erosion and periodically monitor in order to assess erosion.
- Clean and maintain catch basins, drainage ditches and culverts regularly.

- Conduct routine site inspections to assess the effectiveness and the maintenance requirements for erosion and sediment control systems.

95. **Impacts on Water Quality.** Excavated materials/ construction debris may end up in drainages and water bodies adjacent to the subproject sites, particularly during monsoon season. Other risks of water pollution may be caused by: (i) poorly managed construction sediments, wastes and hazardous substances; and (ii) poor sanitation practices of construction workers. The contractor will be required to:

- Schedule civil works during non-monsoon season, to the maximum extent possible.
- Ensure drainages and water bodies within the construction zones are kept free of obstructions.
- Keep loose soil material and stockpiles out of drains, flow-lines and watercourses.
- Avoid stockpiling of excavated and construction materials (sand, gravel, cement, etc.) unless covered by tarpaulins or plastic sheets.
- Re-use/utilize, to maximum extent possible of excavated materials.
- Dispose any residuals at identified disposal site (PIU/DSC will identify approved sites).
- Dispose waste oil and lubricants generated as per provisions of Hazardous Waste (Management and Handling) Rules, 1989.
- Develop a spill prevention and containment plan, educate workers about the plan, and have the necessary materials on site prior to and during construction.
- Refuel equipment within the designated refueling containment area away from drainages, *nallahs*, or any water body.
- Inspect all vehicles daily for fluid leaks before leaving the vehicle staging area, and repair any leaks before the vehicle resumes operation.

96. **Impacts on Air Quality.** There is a potential for increased dust particularly during summer/dry season due to stockpiling of excavated materials. Emissions from vehicles transporting workers, construction materials and debris/materials to be disposed may cause increase in air pollutants within the construction zone. These are inherent impacts which are site-specific, low magnitude, short in duration and can be easily mitigated. The contractor will be required to:

- Conduct regular water spraying on earth piles, trenches and sand piles.
- Conduct regular visual inspection at the project site and construction zones to ensure there are no excessive dust emissions.
- Maintain construction vehicles and obtain “pollution under control” certificate from PPCB.
- Obtain CFE and CFO for hot mix plants, crushers, diesel generators, etc., if they are to be used in the project.

97. Noise and Vibration Impacts. Generation of noise from construction equipments is a major concern during construction stage. Use of heavy construction machinery in the construction site would generate vibrations and subsequently affect the ecosystem of the wetlands and adjacent structures in the nearby settlements. Noise generated during construction is however intermittent and would be of limited duration but would affect the construction workers in case of unprotected prolonged exposure. However, these impacts will

be temporary, short-term, intermittent and are expected to be in the range of 80 to 100 dB(A) as per Table 12 (typical noise levels of principal construction equipment).

Table 12: Typical Noise Levels of Principal Construction Equipment

Clearing		Structure Construction	
Bulldozer	80	Crane	75-77
Front end loader	72-84	Welding generator	71-82
Jack hammer	81-98	Concrete mixer	74-88
Crane with ball	75-87	Concrete pump	81-84
		Concrete vibrator	76
Excavation & Earth Moving		Air compressor	74-87
Bulldozer	80	Pneumatic tools	81-98
Backhoe	72-93	Bulldozer	80
Front end loader	72-84	Cement and dump trucks	83-94
Dump truck	83-94	Front end loader	72-84
Jack hammer	81-98	Dump truck	83-94
Scraper	80-93	Paver	86-88
Grading and Compacting		Landscaping and Clean-Up	
Grader	80-93	Bulldozer	80
Roller	73-75	Backhoe	72-93
		Truck	83-94
PAVING		Front end loader	72-84
Paver	86-88	Dump truck	83-94
Truck	83-94	Paver	86-88
Tamper	74-77	Dump truck	83-94

Source: U.S. Environmental Protection Agency. Noise from Construction Equipment and Operations. Building Equipment and Home Appliances. NJID. 300.1. December 31. 1971

98. The contractor will be required to:

- Monitor the construction activities surrounding the wetland areas that are carried out in the daytime. Night time construction activities shall not be allowed.
- Plan activities in consultation with the PIU/DSC so that activities with the greatest potential to generate noise are conducted during periods of the day which will result in least disturbance.
- Minimize noise from construction equipment by using vehicle silencers and by fitting jackhammers with noise-reducing mufflers.
- Avoid loud random noise from sirens, air compression, etc.
- Train the drivers to ensure that they do not honk unless it is necessary to warn other road users or animals of the vehicle's approach.
- If specific noise complaints are received during construction, the contractor may be required to implement one or more of the following noise mitigation measures, as directed by the project manager:
    - Locate stationary construction equipment as far as possible from nearby noise-sensitive areas.
    - Turn off idling equipment.
    - Reschedule construction operations to avoid periods of noise annoyance identified in the complaint.
    - Notify nearby residents whenever extremely noisy work are planned.

- Follow Noise Pollution (Regulation and Control) Rules, 2000, day time ambient noise levels should not exceed 65 dB(A) in commercial areas, 55 dB(A) in residential areas and 50 dB(A) in silence zones.[2]
- Ensure vehicles comply with Government of India noise regulations for vehicles. The test method to be followed shall be IS:3028-1998.

99. **Impacts on Flora and Fauna.** As per preliminary design, tree-cutting is not required. This will be reassessed during detailed design phase. However, the proposed subproject activities are planned within the wetlands and wetland area of influence, hence significant impact on the avi faunal population has been anticipated during the project construction. The noise and vibration from the construction equipment's will have direct impact on the birds and aquatic animals. Therefore the contractor shall plan to fix his construction equipment and construction camps at least 500m from the wetland boundary to avoid any significant impacts.

100. The construction shall be restricted during the bird's migratory season (December to February). During the winter period the wetland attracts migratory birds (list of avi-fauna has been discussed in the chapter on Description of the Environment). Hence the contractor should plan his construction activities accordingly and shall also adopt the following mitigation measures

- Conduct site induction and environmental awareness.
- Limit activities within the work area.
- Replant trees in the area using a minimum ratio of 2 new trees for every 1 tree cut, if any. Replacement species must be approved by Department of Forest and Wildlife Preservation, Punjab.

101. **Impacts on Physical Cultural Resources.** The proposed subproject is not envisaged to have any impacts on physical cultural resources. However, during the construction works, minor impacts to the existing structures within the wetland and those adjoining the approach road are anticipated. The potential impacts are site-specific, short-term and can be mitigated. The contractor will be required to:

- Ensure there are no damages to structures/properties near construction zone.
- Provide walkways and metal sheets where required to maintain access of people and vehicles.
- Provide sign boards to inform nature and duration of construction works and contact numbers for concerns/complaints.
- Implement good housekeeping. Remove wastes immediately. Prohibit stockpiling of materials that may obstruct/slow down pedestrians and/or vehicle movement.
- Ensure workers will not use nearby/adjacent areas as toilet facility.
- Coordinate with DSC for transportation routes and schedule. Schedule transport and hauling activities during non-peak hours. Communicate road detours via visible boards, advertising, pamphlets, etc.
- Ensure heavy vehicles do not use narrow local roads, except in the immediate vicinity of delivery sites.

[2] Day time shall mean from 6.00 am to 10.00 pm. Silence zone does an area comprise not less than 200 meters around eco sensitive areas, hospitals, educational institutions, courts, religious places or any other area which is declared as such by PPCB. Mixed categories of areas may be declared as one of the above mentioned categories.

- Provide instructions on event of chance finds for archaeological and/or ethno-botanical resources. Work must be stopped immediately until such time chance finds are cleared by experts.

102. **Impact due to Waste Generation.** Demolished structures will be reused to the maximum extent possible. Construction activities will produce excavated soils, construction materials and solid wastes (such as removed concrete, wood, trees and plants, packaging materials, empty containers, oils, lubricants, and other similar items). These impacts are negative but short-term and reversible by mitigation measures. The contractor will need to adopt the following mitigation measures:

- Prepare and implement a waste management plan. Manage solid waste according to the following hierarchy: reuse, recycling and disposal. Include them in the waste management plan with designated/approved disposal areas.
- Coordinate with Local Municipal Authority for beneficial uses of excavated soils/silts/sediments or immediately dispose them to designated areas.
- Recover used oil and lubricants and reuse; or remove from the sites.
- Avoid stockpiling and remove all excavated soils, excess construction materials, and solid waste (removed concrete, wood, trees and plants, packaging materials, empty containers, oils, lubricants, and other similar items) immediately.
- Prohibit disposal of any material or wastes (including human waste) into drainage, nallah, or watercourse.

103. **Impacts on Occupational Health and Safety.** Residential accommodation for workers shall be proposed at least 500m from the wetlands/ water bodies and nearby settlements. Exposure to work-related chemical, physical, biological and social hazard is typically intermittent and of short duration, but it is likely to reoccur. Potential impacts are negative and long-term but reversible by mitigation measures. Overall, the contractor should comply with IFC EHS Guidelines on Occupational Health and Safety (source: http://www1.ifc.org/wps/wcm/connect/9aef2880488559a983acd36a6515bb18/2%2BOccupational%2BHealth%2Band%2BSafety.pdf?MOD=AJPERES) as below:

- Disallow worker exposure to noise level greater than 85 dBA for duration of more than 8 hours per day without hearing protection. The use of hearing protection shall be enforced actively.
- Develop comprehensive site-specific health and safety (H&S) plan. The overall objective is to provide guidance to contractors on establishing a management strategy and applying practices that are intended to eliminate, or reduce, fatalities, injuries and illnesses for workers performing activities and tasks associated with the project.
- Include in H&S plan measures such as: (i) type of hazards during excavation works; (ii) corresponding personal protective equipment for each identified hazard; (iii) H&S training for all site personnel; (iv) procedures to be followed for all site activities; and (v) documentation of work-related accidents.
- Provide H&S orientation training to all new workers to ensure that they are apprised of the rules of work at the site, personal protective protection and prevention of injury to fellow workers.
- Ensure that qualified first-aiders are available and first aid can be provided at all times. Equipped first-aid stations shall be easily accessible throughout the site as well as in construction camps.

- Provide medical insurance coverage for workers.
- Secure construction zone from unauthorized intrusion and accident risks.
- Provide supplies of potable drinking water.
- Provide clean eating areas where workers are not exposed to hazardous or noxious substances.
- Provide visitor orientation if visitors to the site can gain access to areas where hazardous conditions or substances may be present. Ensure also that visitor/s do not enter hazard areas unescorted.
- Ensure the visibility of workers through the use of high visibility vests when working in or walking through heavy equipment operating areas.
- Ensure moving equipment is outfitted with audible back-up alarms.
- Mark and provide sign boards in the construction zone and areas for storage and disposal. Signage shall be in accordance with international standards and be well known to, and easily understood by workers, visitors, and the general public as appropriate.

104. **Impacts on Socio-Economic Activities.** Manpower will be required during the 24 months construction phase. This can help generate contractual employment and increase in local revenue. Thus potential impact is positive and long-term. As per preliminary design, land acquisition and closure of roads are not required. However, minor negative impacts are anticipated, these impacts are negative and moderate but short-term and temporary. The contractor will need to adopt the following mitigation measures:

- Leave space for access in the project area.
- Consult the local people and institutions regarding operating hours and factoring this in to work schedules.
- Provide sign boards for pedestrians to inform nature and duration of construction works and contact numbers for concerns/complaints.
- Employ at least 50% of the labor force, or to the maximum extent, local persons within the 2-km immediate area if manpower is available.

105. **Summary of Mitigation Measures during Construction. Table 13** provides summary of mitigation measures that needs to be considered by the contractor during construction phase.

Table 13: Summary of Mitigation Measures during Construction Phase

Potential Impact	Mitigation Measures
Erosion hazards	• Save topsoil removed during excavation and use to reclaim disturbed areas, as soon as it is possible to do so. • Use dust abatement such as water spraying to minimize windblown erosion. • Provide temporary stabilization of disturbed/excavated areas that are not actively under construction. • Apply erosion controls (e.g., silt traps) along the drainage leading to the water bodies. • Maintain vegetative cover surrounding the project area to prevent erosion and periodically monitor to assess erosion. • Clean and maintain catch basins, drainage ditches, and culverts regularly. • Conduct routine site inspections to assess the effectiveness of and the maintenance requirements for erosion and sediment control systems
Impacts on water quality	• Schedule civil works during non-monsoon season, to the maximum extent possible.

Potential Impact	Mitigation Measures
	• Ensure drainages and water bodies within the construction zones are kept free of obstructions. • Keep loose soil material and stockpiles out of drains, flow-lines and watercourses. • Avoid stockpiling of excavated and construction materials (sand, gravel, cement, etc.) unless covered by tarpaulins or plastic sheets. • Re-use/utilize, to maximum extent possible, excavated materials. • Dispose any residuals at identified disposal site (PIU/DSC will identify approved sites). • Dispose waste oil and lubricants generated as per provisions of Hazardous Waste (Management and Handling) Rules, 1989. • Develop a spill prevention and containment plan, educate workers about the plan, and have the necessary materials on site prior to and during construction. • Refuel equipment within the designated refueling containment area away from drainages, *nallah*s, or any water body. • Inspect all vehicles daily for fluid leaks before leaving the vehicle staging area, and repair any leaks before the vehicle resumes operation.
Impacts on air quality	• Conduct regular water spraying on earth piles, trenches and sand piles. • Conduct regular visual inspection at the project site and construction zones to ensure no excessive dust emissions. • Maintain construction vehicles and obtain “pollution under control” certificate from PPCB. • Obtain CFE and CFO for hot mix plants, crushers, diesel generators, etc., if to be used in the project.
Noise and vibrations impacts	• Construction activities surrounding the wetland areas should be carried out in the daytime. Night time construction activities shall not be allowed. • Plan activities in consultation with PIU/DSC so that activities having high noise generation shall be performed in the day which will result in least disturbance to the surrounding. • Minimize noise from construction equipment by using vehicle silencers and fitting jackhammers with noise-reducing mufflers. • Avoid loud random noise from sirens, air compression, etc. • Require drivers that horns not be used unless it is necessary to warn other road users or animals of the vehicle’s approach. • If specific noise complaints are received during construction, the contractor may be required to implement one or more of the following noise mitigation measures, as directed by the project manager: • Locate stationary construction equipment as far from nearby noise-sensitive areas as possible. • Shut off idling equipment. • Reschedule construction operations to avoid periods of noise annoyance identified in the complaint. • Notify nearby residents whenever extremely noisy work will be occurring. • Follow Noise Pollution (Regulation and Control) Rules, day time ambient noise levels should not exceed 65 dB(A) in commercial areas, 55 dB(A) in residential areas, and 50 dB(A) in silence zone.3 • Ensure vehicles comply with Government of India noise regulations for vehicles. The test method to be followed shall be IS: 3028-1998.

[3] Day time shall mean from 6.00 am to 10.00 pm. Silence zone is an area comprising not less than 100 meters around hospitals, educational institutions, courts, religious places or any other area which is declared as such by BSPCB. Mixed categories of areas may be declared as one of the above mentioned categories by BSPCB.

Potential Impact	Mitigation Measures
Impacts on flora and fauna	• Conduct site induction and environmental awareness. • Limit activities within the work area. • Replant trees in the area using minimum ratio of 2 new trees for every 1 tree cut, if any. Replacement species must be approved by Department of Forest and Wildlife Preservation, Punjab
Impacts on physical resources	• Ensure no damage to structures/properties near construction zone. • Provide walkways and metal sheets where required to maintain access of people and vehicles. • Provide sign boards to inform nature and duration of construction works and contact numbers for concerns/complaints. • Implement good housekeeping. Remove wastes immediately. Prohibit stockpiling of materials that may obstruct/slow down pedestrians and/or vehicle movement. • Ensure workers will not use nearby/adjacent areas as toilet facility. • Coordinate with DSC for transportation routes and schedule. Schedule transport and hauling activities during non-peak hours. Communicate road detours via visible boards, advertising, pamphlets, etc. • Ensure heavy vehicles do not use narrow local roads, except in the immediate vicinity of delivery sites. • Provide instructions on event of chance finds for archaeological and/or ethno-botanical resources. Works must be stopped immediately until such time chance finds are cleared by experts.
Impacts on waste generation	• Prepare and implement a waste management plan. Manage solid waste according to the following hierarchy: reuse, recycling and disposal. Include in waste management plan designated/approved disposal areas. • Coordinate with Local Municipal Authorities/ village panchayats for beneficial uses of excavated soils/silts/sediments or immediately dispose to designated areas. • Recover used oil and lubricants and reuse; or remove from the sites. • Avoid stockpiling and remove immediately all excavated soils, excess construction materials, and solid waste (removed concrete, wood, trees and plants, packaging materials, empty containers, oils, lubricants, and other similar items). • Prohibit disposal of any material or wastes (including human waste) into drainage, nallah, or watercourse.
Impacts on occupational health and safety	• Disallow worker exposure to noise level greater than 85 dBA for duration of more than 8 hours per day without hearing protection. The use of hearing protection shall be enforced actively. • Develop comprehensive site-specific health and safety (H&S) plan. The overall objective is to provide guidance to contractors on establishing a management strategy and applying practices that are intended to eliminate, or reduce, fatalities, injuries and illnesses for workers performing activities and tasks associated with the project. • Include in H&S plan measures such as: (i) type of hazards during excavation works; (ii) corresponding personal protective equipment for each identified hazard; (iii) H&S training for all site personnel; (iv) procedures to be followed for all site activities; and (v) documentation of work-related accidents. • Provide H&S orientation training to all new workers to ensure that they are apprised of the rules of work at the site, personal protective protection, and preventing injury to fellow workers. • Ensure that qualified first-aid can be provided at all times. Equipped first-aid stations shall be easily accessible throughout the site as well as at construction camps. • Provide medical insurance coverage for workers. • Secure construction zone from unauthorized intrusion and accident risks. • Provide supplies of potable drinking water.

Potential Impact	Mitigation Measures
	• Provide clean eating areas where workers are not exposed to hazardous or noxious substances. • Provide visitor orientation if visitors to the site can gain access to areas where hazardous conditions or substances may be present. Ensure also that visitor/s do not enter hazard areas unescorted. • Ensure the visibility of workers through their use of high visibility vests when working in or walking through heavy equipment operating areas. • Ensure moving equipment is outfitted with audible back-up alarms. • Mark and provide sign boards in the construction zone, and areas for storage and disposal. Signage shall be in accordance with international standards and be well known to, and easily understood by workers, visitors, and the general public as appropriate.
Impacts on socio-economic activities	• Leave space for access in the project area. • Consult the local people and institutions regarding operating hours and factoring this in to work schedules. • Provide sign boards for pedestrians to inform nature and duration of construction works and contact numbers for concerns/complaints. • Employ at least 50% of the labor force, or to the maximum extent, local persons within the 2 km immediate area if manpower is available.

D. Post-Construction Impacts and Mitigation Measures

106. Site clean-up is necessary after construction activities. The contractor will be adopt the following mitigation measures:

- Backfill any excavation and trenches, preferably with excess excavation material generated during the construction phase.
- Use removed topsoil to reclaim disturbed areas.
- Reestablish the original grade and drainage pattern to the extent practicable.
- Stabilize all areas of disturbed vegetation using weed-free native shrubs, grasses, and trees.
- Restore access roads, staging areas, and temporary work areas.
- Remove all tools, equipment, barricades, signs, surplus materials, debris, and rubbish. Demolish buildings/structures not required for O&M. Dispose in designated disposal sites.
- Monitor success of re-vegetation and tree re-planting. Replace all plants determined to be in an unhealthy condition.
- Request in writing from PIU/DSC that construction zones have been restored.

E. Anticipated Operations and Maintenance (O&M) Impacts and Mitigation Measures

107. Impacts on environmental conditions associated with the operation stage of the subproject components arise mainly due to impacts resulting from enhanced tourist activities. Measures pertaining to regulation of tourist movements, planning of the extent of facilities and amenities in line with the carrying capacity will help minimize adverse impacts arising at the time of operation stage. Other impacts during operation stages include:

- Deficiency in implementation of appropriate maintenance facilities for the tourist assets including the toilet facilities, parking facilities and drainage system of the tourist destinations. These impacts are proposed to be addressed through

participation of the communities for the better management and operation of such facilities. Impacts on environment shall be significant, if the collection systems, treatment and disposal of waste; both solid and liquid wastes, are not addressed properly.

- The increased tourist level will also lead to uncontrolled solid waste management issues due to littering of waste by the tourist and also food waste from the proposed fast food centres.

108. Other issues include improper maintenance of the landscaped areas. To mitigate such operational impacts, the project shall train such operators to improve their existing operations for such services. Potential induced impacts are addressed through the following:

- Capacity building for the PMU/tourism staff and other line agencies/ departments on implementation and monitoring of environmental management plan/ safeguard measures
- Environmental awareness campaign for the locals and tourists through distribution of pamphlets, hoardings, written slogans etc.

F. Cumulative Impact Assessment

109. The cumulative impact assessment examined the interaction between the subproject's residual effects (i.e., those effects that remain after mitigation measures have been applied) and those associated with other past, existing, and reasonably foreseeable future projects or activities. The interaction of residual effects associated with multiple projects and/or activities can result in cumulative impacts, both positive and negative. The project's potential cumulative effects were considered with respect to valued components in environmental and socioeconomic categories, in four areas:

- of any potential residual project effects that may occur incrementally over time;
- consideration of other known relevant projects or activities within the specified study area boundaries, even if not directly related to the project;
- potential overlapping impacts that may occur due to other developments, even if not directly related to the proposed subproject; and
- future developments that are reasonably foreseeable and sufficiently certain to proceed.

110. The project has identified the valued components as biodiversity, air quality, acoustic environment, socioeconomic and socio-community components, and human health and safety. There are no foreseeable projects that will overlap with the subproject. The spatial boundary of the subproject is the subproject component sites and the temporal boundary can be considered as the districts of Rupnagar and Tarn Taran.

111. It has been recommended that infrastructures be designed to the current best practice standard and notified Government of Punjab codes and management plans. No negative cumulative impact and the potential long-term environmental impacts are positive.

112. **Biodiversity.** Disturbance to flora and fauna within the active work sites may be expected due to the inherent nature of construction activities. However these impacts will be short-term and localized to the immediate of the sites. Priority will be to avoid the impacts thru

proper scheduling of activities, particularly no civil works during winter season when population of migratory birds in the wetlands are high. Contractors will also be prohibited in core protected areas and will be sensitized on EMP implementation prior to mobilization. Sites of storage of construction materials will only be allowed 500 meters from the work sites. Wastes generated will be removed on a daily basis. The overall significance rating of potential residual and cumulative effects is considered to be negligible.

113. **Air quality.** Emissions of common air contaminants and fugitive dust may be elevated in proximity to active work sites during construction and O&M phases, these impacts will be short-term and localized to the immediate of the sites. Greenhouse gas (GHG) emissions may increase as a result of the subproject activities (i.e., vehicle and equipment operation, concrete production, disposal of excavated material, land-filling of residual wastes). Given the subproject's relatively minor contribution to common air contaminants and GHG emissions during construction, the overall significance rating of both these potential residual and cumulative effects is considered to be negligible.

114. **Acoustic environment.** Noise levels during construction and O&M activities in immediate proximity of work sites are expected to increase. The duration of exposure will be relatively brief and imperceptible. The exposure represents a temporary, localized, adverse residual effect of low significance for affected receptors. While building damage due to ground vibrations is unlikely, there may be annoyance to spatially located receptors during construction and O&M activities. The overall significance rating of potential residual and cumulative effects is considered to be negligible.

115. **Socioeconomic and socio-community.** Concerns on existing provisions for community and tourists will occur spatially during construction and O&M activities. Existing conditions within the subproject sites and immediate surroundings will be improved once the activities are completed. Since the subproject will be improvement of existing infrastructures, it will not conflict with existing or planned land use. However, following improvement in infrastructures and services, added residential developments, commercial, and business facilities and increased densities are expected to develop and enhance the districts of Rupnagar and Tarn Taran. This can be considered a long-term cumulative benefit of the subproject.

116. Given the scale of the project it is likely that local people will obtain at least temporary socio-economic benefits, by gaining employment in the construction workforce, and thus raising their levels of income. These benefits can bring wider social gains if they are directed at vulnerable[4] groups.

117. **Community and workers health and safety.** No adverse residual effects to human health will occur as a result of construction or O&M activities, and mitigation measures are in place to ensure public and worker safety, and will be closely monitored. While exposure to elevated noise levels, fugitive dust and common air pollutants will occur in proximity to work sites, due to their short-term and localized nature, these effects are expected to be minor and insignificant with no measurable effects on human health.

118. Therefore the project will benefit the general public by contributing to the long-term improvement of tourism and community livability in the districts of Rupnagar and Tarn Taran.

[4]Vulnerable groups as those without legal title to land and other assets; households headed by single earner females, the elderly or disabled; indigenous peoples (based on ADB OM); and households with incomes that are below the poverty line.

VI. PUBLIC CONSULTATION AND INFORMATION DISCLOSURE

A. ADB Disclosure Policy

119. Public consultation was undertaken as per ADB SPS requirements. All the five principles of information dissemination, information solicitation, integration, coordination and engagement into dialogue were incorporated during the task. A framework of different environmental impacts likely from the subproject was prepared based on opinions of all those consulted, especially at the micro level, by setting up dialogues with the local people and fishing communities from whom information on site facts and prevailing conditions were collected.

120. As per ADB safeguard requirement, public consultation is to be carried out before and after impact identification. Public consultation was therefore carried out twice, once at the time of start of work with the key stakeholders particularly with wildlife/ forest authorities and NGOs, and secondly to discuss mitigating measures and get concurrence of stakeholders.

B. Process for Consultation Followed

121. During project preparation, consultations were held with the Department of Tourism, Punjab Heritage and Tourism Promotion Board (PHTPB), Department of Forest and Wildlife Preservation, Punjab, Municipal Corporation Rupnagar, Punjab State Council for Science and Technology, PWD department, Fisheries department, Irrigation department, NGOs and tourists on issues pertaining to the selection of subprojects and identification of key issues including addressing the current gaps in provision of basic services and improvement of tourist infrastructure. These consultations (**Table 14**) provide the necessary inputs in identification of the actual needs of the communities and the relevant stakeholders.

Table 14: Stakeholders' Consultations

S.No.	Place	Date	Number of participants	Participants	Issues discussed
1.	Chandigarh	December 2013	10	Officials of Tourism Department and other line departments (including Revenue Department, Forest Department, PWD etc.,)	Finalization of project components, environment and social safeguard requirements
2.	Rupnagar	December 2013	12	Officials of forest department, tourism department, and revenue department	Proposed design elements, clearance requirements, environment and social policies of ADB.
3.	Rupnagar	December 2013	7	Representatives of village panchayat committee and Tourists/ NGO's	Discussion on the project components, Infrastructure requirement. Land availability, environmental issues and other tourism issues
4.	Chandigarh	December 2013	6	Officials of PWD Dept / Irrigation Dept Forest	Proposed design elements, Land availability, NOC/ clearance requirements,

S.No.	Place	Date	Number of participants	Participants	Issues discussed
				Department/ Punjab Pollution Control Board	environment and social policies of ADB.
5.	Chandigarh	December 2013	11	Officials of Tourism Department and line departments	Role of Environmental and Social safeguard and the necessity of IEE in the project implementation and methodology adopted

C. Plan for Continued Public Participation

122. To ensure continued public participation, provisions to ensure regular and continued stakeholder participation, at all stages during the project design and implementation is proposed. A grievance redressal cell (refer section VII) will be established in PIUs. The process is designed to be transparent, gender responsive, culturally appropriate and commensurate to the risks and adverse impacts of the project, as well as readily accessible to all segments of the affected people. Affected people are to be appropriately informed about the mechanism through media and public outlets. This participatory process will ensure that all views of the people are adequately reviewed and suitably incorporated in the design and implementation process. Further, to ensure an effective disclosure of the project proposals to the stakeholders and the communities in the vicinity of the subproject locations, extensive project awareness campaigns will be carried out.

123. The public consultation and disclosure program with all interested and affected partied will remain a continuous process throughout the project implementation, and shall include the following:

(i) **Consultations during construction phase:** (a) public meetings with affected communities to discuss and plan work programs and allow issues to be raised and addressed once construction has started; and (b) smaller-scale meetings to discuss and plan construction work with individual communities to reduce disturbance and other impacts, and to provide a mechanism through which stakeholders can participate in project monitoring and evaluation.

(ii) **Project disclosure:** (a) public information campaigns (via newspaper, flyers, and media) to explain the project to the wider city population and prepare them for disruptions they may experience once construction is underway; (b) public disclosure meetings at key project stages to inform the public of progress and future plans, and to provide copies of summary documents in local language; (c) formal disclosure of completed project reports by making copies available at convenient locations in the study areas, and informing the public of their availability; and (d) providing a mechanism through which comments can be made.

124. For the benefit of the community a summary IEE shall be translated in the local language (Punjabi) and made available at: (i) Office of the PMU; and, (ii) Office of the Deputy Commissioner, Rupnagar and Tarn Taran Districts. These copies shall be made available free of cost to any person seeking information on the same. Hard copies of the IEE shall be available in the PMU/PIU as well as the district libraries at Rupnagar and Tarn Taran, and accessible to citizens as a mean to disclose the document and at the same time creating wider public awareness. On demand, the person seeking information can obtain a hard copy of the complete

IEE document such that to cover the cost of photocopy from the office of the PMU/PIU, on a written request and after initiating a payment for the same to the Project Director (PD). Electronic version of the IEE shall be placed in the official website of the Tourism Department and the website of ADB after approval of the documents by Government of Punjab and ADB. The PMU shall issue notification on the disclosure mechanism in local newspapers, ahead of the initiation of implementation of the project, providing information on the project, as well as the start dates etc. The notice shall be issued by the PMU in local newspapers one month ahead of the implementation works. This shall create awareness of the project implementation among the public. Posters designed such that it creates mass awareness regarding the basic tenets of the IEE and the same shall be distributed to libraries in different localities that shall be part of such mass campaign.

VII. GRIEVANCE REDRESS MECHANISM

125. The project affected person/aggrieved party can give their grievance verbally or in written to the local grievances committee. Grievances of affected person will first be brought to the attention of the PIU who can resolve the issue at site level. If the matter is not solved within 7 days period by the PIU, it will be brought to the Grievance Redress Committee constituted for the purpose in PIU. This GRC shall discuss the issue in its monthly meeting and resolve the issues within one month of time after receiving the grievance. If the matter is not resolved by GRC at PIU level within stipulated time, it shall be referred to GRC at PMU level by Executive Engineer of PIU.

126. GRC at PMU shall discuss the issue and try to resolve it and inform the PIU accordingly. If the matter is not resolved by the GRC at PMU level within one month of time, the aggrieved person/party can bring the matter to The Court of Law. The PIU shall keep records of all grievances received including contact details of complainant, date of receiving the complaint, nature of grievance, agreed corrective actions and the date these were affected and final outcome. The grievance redress process is shown below.

A. Composition and functions of GRC

127. **Local Grievance Committee (LGC).** In this LGC has worked with NGO, SHG, Line Agency, representative of Gram Panchayat, Special invitee.

128. **Grievance Redress Committee (GRC) at PIU.** In each PIU there shall be one GRC, which will include Project Manager (PIU), District Tourist Officer of the Punjab Heritage & Tourism Promotion Board, Govt. of Punjab, Community Development Officer of PIU, nominated representative of District Magistrate and nominated representative committee shall be headed by Project Manager (PIU). The committee will meet at least once in every month. Agenda of meeting shall be circulated to all the members and affected persons/aggrieved party along with venue, date and time; informed in written at least 7 days in advance of meeting. The matters shall remain with GRC at PIU level for one month and if grievance is not resolved within this time period, the matter shall be referred to GRC at PMU.

129. **GRC within Environmental and Social Management Cell (ESMC) at PMU**. There shall be one GRC in PMU. The matters not resolved by the GRC at PIU level within one month shall come under GRC at PMU. GRC at PMU will include Community Development Expert of PMU, Safeguard Specialist of PMU and Additional Project Director (APD) of PMU. The Committee shall be headed by APD of PMU. This committee shall look the matters, which are referred to and not resolved by GRC at PIU level. If the matter is not resolved by the GRC at

PMU level within one month of time, the aggrieved person/party can bring the matter to The Executive Committee/State Level Empowered Committee (SLEC).

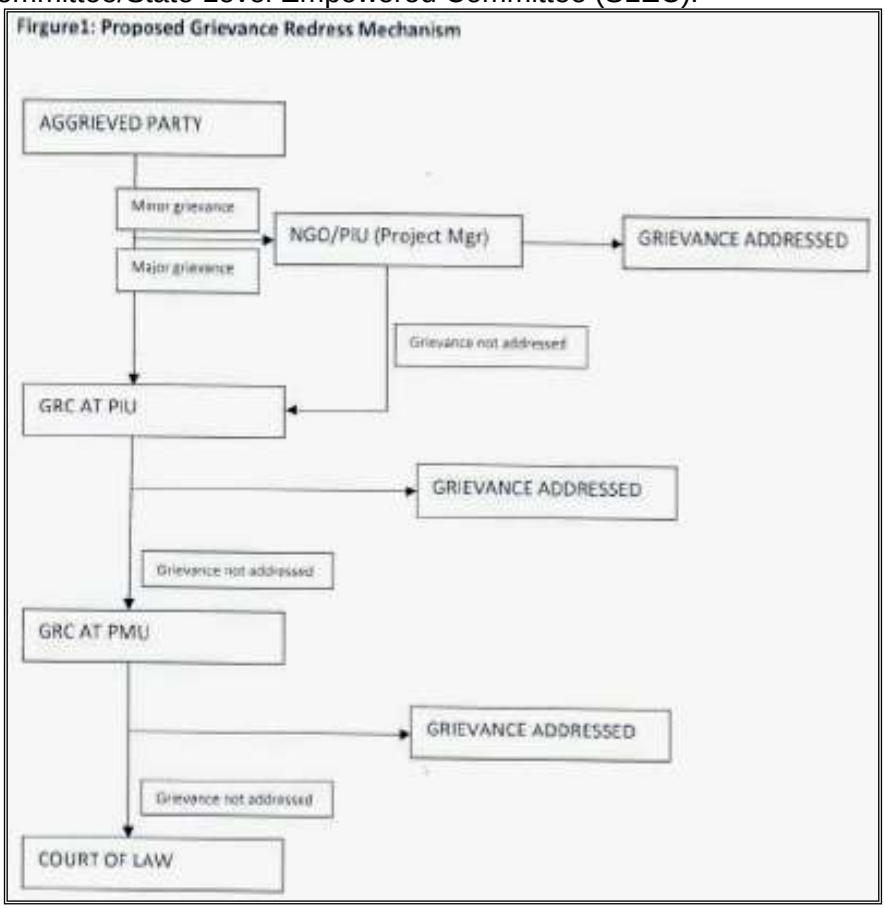


Figure 4: Grievance Redress Mechanism in IDIPT, Punjab

Note: LGC -NGO, SHG, Line Agency, Representative of Gram Panchayat, Special invitee
GRC – PM, CDO, Engineer, DFO, DTO, SDM GRC in Environment and Social Management Cell (ESMC) –PMU (APD, SS, CDS, FS), PMC (EE, CDE)

130. **Approach to GRC.** Affected person/aggrieved party can approach to GRC for redress of his/their grievances through any of the following modes:

- Web based: A separate corner will be developed at the program website so that public / community/ affected person can register their complaint in the online column.
- Telecom based: A toll free no. Will be issued by the PMU/ PIU so that general public can register their complaint through telephone / mobile phone to the PIU/PMU office.

VIII. ENVIRONMENTAL MANAGEMENT PLAN

131. The purpose of the Environmental Management Plan (EMP) is to ensure that the activities are undertaken in a responsible, non-detrimental manner with the objectives of: (i) providing a proactive, feasible, and practical working tool to enable the measurement and monitoring of environmental performance on-site; (ii) guiding and controlling the implementation of findings and recommendations of the environmental assessment conducted for the project;

(iii) detailing specific actions deemed necessary to assist in mitigating the environmental impact of the project; and (iv) ensuring that safety recommendations are complied with.

132. A copy of the EMP must be kept on work sites at all times. This EMP will be included in the bid documents and will be further reviewed and updated during implementation. The EMP will be made binding on all contractors operating on the site and will be included in the contractual clauses. Non-compliance with, or any deviation from, the conditions set out in this document constitutes a failure in compliance.

133. The contractor will be required to (i) establish an operational system for managing environmental impacts (ii) carry out all of the monitoring and mitigation measures set forth in the EMP; and (iii) implement any corrective or preventative actions set out in safeguards monitoring reports that PMU and PIU will prepare from time to time to monitor implementation of this IEE and EMP. The contractor shall allocate a budget for compliance with these EMP measures, requirements and actions.

A. Responsibilities for EMP Implementation

134. The following agencies will be responsible for EMP Implementation:

- Department of Tourist, Government of Punjab is the executing agency responsible for overall management, coordination, and execution of all activities funded under the loan. Punjab Heritage and Tourism Promotion Board is the implementing agency responsible for coordinating procurement and construction of the project.
- Project Management Unit (PMU) is set up in Chandigarh to coordinate the overall execution. Project Management Consultant (PMC) in Chandigarh provides assistance to PMU in execution, including procurement and assures technical quality of design and construction.
- Project Implementation Unit (PIUs) are established in Amritsar and Rupnagar. These PIUs will look into progress and coordination of day to day construction works with the assistance of respective DSC teams, who will prepare the detailed project report (DPR) of the subproject and will carry out construction supervision during project implementation. Their responsibility will also include updating this IEE based on detailed design and EMP implementation supervision;
- The contractor will be responsible for execution of all construction works. The contractor will work under the guidance of the PIUs and DSCs in Amritsar and Rupnagar. The EMP mitigation measures relevant to construction phase will also be implemented by the contractor.

135. The contractor's conformity with contract procedures and specifications during construction will be carefully monitored by the PIU. Safeguard Specialists are deputed in PMU, PMC and DSC, who will monitor the environmental performance of contractors. Terms of References of Safeguards Specialists are given in boxes below.

Box 1: Terms of Reference of Safeguards Specialist – PMU
• A working knowledge of India's national environmental policies and ADB SPS to reconcile parallelism and compliance between the two policy frameworks • Review the IEE document and ensure adequacy under Safeguard Policy Statement, 2009 and identify any areas for improvement. • Ensure that the project design and specification adequately reflect the IEE, co-ordinate the

Box 1: Terms of Reference of Safeguards Specialist – PMU

obtaining of requisite environmental clearances for the project

- Monitor construction activities to ensure that identified and appropriate control measures are effective and in compliance with the IEE and advise PIU for compliance with statutory requirements.
- Develop training programme for the PMU/PIUs staff, the contractors and others involved in the project implementation, in collaboration with the Environmental Specialist of the PMC and DSC
- Review and approve the Contractor's Implementation Plan for the environmental measures, as per IEE.
- Liaise with the Contractors and Consultants on the implementation of the Environmental management measures proposed in the IEE
- Liaise with the various Government agencies on environmental and other regulatory matters
- Continuously interact with the NGOs and Community groups to be involved in the project
- Establish dialogue with the affected communities and ensure that the environmental concerns and suggestions are incorporated and implemented in the project.
- Review the environmental performance of the project through an assessment of the periodic environmental monitoring reports submitted by the DSC; provide a summary of the same to the Project Director, and initiate necessary follow-up actions
- Provide support and assistance to the Government Agencies and the Asian Development Bank to supervise the implementation of the IEE during the construction as well as operation stage of the project
- Document the good practices in the project on incorporation and integration of environmental issues into engineering design and on implementing measures in the construction, and dissemination of the same

Box 2: Terms of Reference of Safeguards Specialist of DSC

- A working knowledge of India's national environmental policies and ADB SPS to reconcile parallelism and compliance between the two policy frameworks
- Review the IEE document and ensure adequacy under ADB SPS, 2009.
- Interact on a regular basis with the sector specialists of the DSC and integrate environmentally sound practices into the detailed design of project components.
- Advise PMU/PIU for compliance with statutory clearances.
- Work out the site specific mitigation measures for components as required and integrate the same into contractual provisions.
- Develop, organise and deliver environmental training programmes and workshops for the staff of the PIU and Contractors and in accordance to the Capacity Building Programme as specified in the IEE.
- Preparation of Activity Plans as identified in IEE (these include Site Management Plans, Waste Management Plans, Sludge Management and Disposal Plans, Occupational Safety Plans etc).
- Supervise the implementation of the Environmental provisions by the Contractors.
- Review and approve site specific environmental enhancement/mitigation designs worked out by the Contractor. Hold regular consultation meetings with the Environmental specialist of the PMU
- Review the Contractors' Environmental Implementation Plans to ensure compliance with the IEE.
- Develop good practice construction guidelines to assist the contractors in implementing the provisions of IEE.
- Prepare and submit regular environmental monitoring and implementation progress reports.
- Assist Environmental Specialist of the PMU to prepare good practice dissemination notes based on the experience gained from site supervision.

Box 3: Terms of Reference of Safeguards Specialist (Environment) of PMC

- Support and Advice the PMU and Consultants team in-
- A working knowledge of India's national environmental policies and ADB SPS to reconcile parallelism and compliance between the two policy frameworks
- Best Environmental Practices for responding to environmental issues involved with implementation of the projects on a sustainable basis
- Assistance and advice on institutional strengthening and capacity building at the PMU and PIU levels in regards to environmental practices.

Box 3: Terms of Reference of Safeguards Specialist (Environment) of PMC
• Ensure that baseline surveys, environmental monitoring plans and programs, initial environmental examinations (IEE) as may be required are carried out. • Preparation of ADB procedure compliant environmental safeguard actions including impact assessment if any during the design stage • Management plan and mitigation measures • Oversight of implementation of environmental standards and safeguards as part of project implementation • Participate in preparation of Master Plan for additional sites and contribute to the environmental safeguards to the plan and sub components • Preparation of performance monitoring reports

136. **Responsibility for updating IEE during detailed design.** DSC will update this IEE during detailed design and submit to PMU for final review before submission to ADB. PMC will assist PMU and coordinate with DSC.

137. **Responsibility for monitoring.** During construction, DSC's Environmental Specialist and the designated representative engineer of the PIU will monitor the contractor's environmental performance on day to day basis while PMC expert will randomly monitor the performance for corrective measures if required. During the operation phase, monitoring will be the responsibility of the PMU/PIU.

138. **Responsibility for reporting.** PIU in coordination with DSC will submit monthly monitoring report to PMU on the basis PMU will submit to ADB semi-annual reports on implementation of the EMP and will permit ADB to field environmental review missions which will review in detail the environmental aspects of the project. Any major accidents having serious environmental consequences will be reported immediately. PMC environmental expert will help in preparing quarterly, semi-annual and annual progress reports. The sample environmental monitoring template is attached as **Appendix 8 to10**.

B. EMP Tables

139. **Table 17** to **Table 19** shows the potential adverse environmental impacts, proposed mitigation measures, responsible parties, and cost of implementation. This EMP will be included in the bid documents and will be further reviewed and updated during implementation.

Table 15: Pre-Construction Stage Environmental Management Plan

Parameters	Mitigation Measures	Parameter/ Indicator of Compliance	Responsible for Implementation	Responsible for Supervision	Frequency of monitoring	Source of Funds to Implement Mitigation Measures
Consents, permits, clearances, no objection certificate (NOC), etc.	• Obtain all necessary consents, permits, clearance, NOCs, etc. prior to start of civil works.	Consents, permits, clearance, NOCs, etc.	PMU	EA to be reported to ADB in environmental monitoring report (EMR)	check CFEs, permits, clearance, prior to start of civil works	PMU
	• Acknowledge in writing and provide report on compliance all obtained consents, permits, clearance, NOCs, etc.	Records and communications	PMU	EA to be reported to ADB in EMR	Acknowledge upon receipt Send report as specified in CFE, permits, etc.	PMU
	• Include in detailed design drawings and documents all conditions and provisions if necessary	Detailed design documents and drawings	Contractor	PMU and PMC PIU and DSC	Upon submission by contractor	Contractor
Location impacts pertaining to siting of facilities and improvements within the boundaries of the wetlands	• Location of the watch tower, bird hideout and public utilities has to be finalized in consultation with the Chief wildlife warden (deciding authority). • The worked out plan will be in line with the Wildlife Conservation Act 1972. • Siting of the components and planning of construction activities will be worked out to avoid sensitive ecology (the key areas for bird habitats). • All construction activities shall minimize the clearance of trees wherever	Detailed design documents and drawings	DSC	PMU and PMC	As per the instruction from the Wildlife warden	PMU

Parameters	Mitigation Measures	Parameter/ Indicator of Compliance	Responsible for Implementation	Responsible for Supervision	Frequency of monitoring	Source of Funds to Implement Mitigation Measures
	practicable.					
Lack of sufficient planning to assure long-term sustainability of the improvements and ensure protection of the assets created and the architectural character of the proposed facilities	• The sub-project design will include adequate provisions for ensuring effective maintenance and protection of the assets created so as to ensure the long term sustainability of the sites.	Detailed design documents and drawings	DSC	PMU and PMC	As per the monitoring plan	PMU
Establishment of baseline environmental conditions prior to start of civil works	• Conduct documentation of location of components, areas for construction zone (camps, staging, storage, stockpiling, etc.) and surroundings (within direct impact zones). Include photos and GPS coordinates	Records	Contractor	PMU and PMC PIU and DSC	to be included in updated IEE report	PMU
Layout of components to avoid impacts on sensitive areas	• The sub project components in the vicinity of protected areas (location of infrastructure development, upgradation of interpretation centre, natural trail facilities, locations where the toilet blocks, provision of water	Construction layout plan	Contractor	PMU and PMC PIU and DSC	Upon submission by contractor	PMU

Parameters	Mitigation Measures	Parameter/ Indicator of Compliance	Responsible for Implementation	Responsible for Supervision	Frequency of monitoring	Source of Funds to Implement Mitigation Measures
	supply to tourists, signage etc.) siting will avoid impacts on the wetlands. • Access roads to the construction site will be worked out to ensure minimal impacts					
Erosion control	• Apart from the archaeologists, consult a certified geologist to look into soil stability to enable contractors to employ effective soil stabilization and erosion control measures to sustain restorative measures under the subproject • Develop an erosion control and re-vegetation plan to minimize soil loss and reduce sedimentation to protect water quality. • Minimize the potential for erosion by balancing cuts and fills to the extent feasible. • Identify and avoid areas with unstable slopes and local factors that can cause slope instability (groundwater conditions, precipita-tion, seismic activity, slope angles, and geologic structure). • Minimize the amount of land disturbed as much as possible. Use existing roads, disturbed areas, and borrow	Erosion control and re-vegetation plan covering construction phase	Contractor	PMU and PMC PIU and DSC	to be included in updated IEE report	Contractor

Parameters	Mitigation Measures	Parameter/ Indicator of Compliance	Responsible for Implementation	Responsible for Supervision	Frequency of monitoring	Source of Funds to Implement Mitigation Measures
	pits and quarries when possible. Minimize vegetation removal. Stage construction to limit the exposed area at any one time.					
Increase in storm water runoff from alterations of the site's natural drainage patterns due to landscaping, excavation works in the periphery of the wetland, construction of addition of paved surfaces	• Design of proposed components will enable efficient drainage of the sites and maintain natural drainage patterns. • Siting of the project components, involving physical construction will be done to ensure no disruption of natural drainage patterns or flows enter into the wetland. • In case, paved surfaces if any are to be provided will be provided at a distance of 500m of the periphery of the wetland boundaries to minimize impacts.	Detailed design documents and drawings	Contractor	PMU and PMC PIU and DSC	to be included in updated IEE report	Contractor
Potential impacts on ground water quality and impacts due to siting of Septic tanks in the toilets proposed in the vicinity of the wetlands and in other	• At locations with shallow water table, the design of the septic tanks will be done to ensure that there is a difference of at least 1.5m between the bottom bed of the septic tank and the maximum ground water level, to avoid any contamination of ground water	Detailed design documents and drawings	Contractor	PMU and PMC PIU and DSC	to be included in updated IEE report	Contractor

Parameters	Mitigation Measures	Parameter/ Indicator of Compliance	Responsible for Implementation	Responsible for Supervision	Frequency of monitoring	Source of Funds to Implement Mitigation Measures
locations with high water table.						
Integration of energy efficient and energy conservation programs in design of sub-project components	• The detailed designs for the sub-project components will ensure that environmental sustainability principles, including energy efficiency, resource recycling, waste minimization etc. are integrated, and designs are accordingly worked out	Detailed design documents and drawings	Contractor	PMU and PMC PIU and DSC	Upon submission by contractor	Contractor
Public Utilities	• Identify and include locations and operators of these utilities in the detailed design documents to prevent unnecessary disruption of services during the construction phase. • Require contractors to prepare a contingency plan to include actions to be done in case of unintentional interruption of services. • Obtain from the PIU and/or DSC the list of affected utilities and operators; • If relocations are necessary, contractor will coordinate with the concern department to relocate the utility. • Require contractor to specify condition of general	List and maps showing utilities to be shifted Contingency plan for services disruption	- DSC to prepare preliminary list and maps of utilities to be shifted - During detailed design phase, contractor to (i) prepare list and operators of utilities to be shifted; (ii) contingency plan	PMU and PMC PIU and DSC	to be included in updated IEE report	DSC – preliminary design stage Contractor – detailed design stage

Parameters	Mitigation Measures	Parameter/ Indicator of Compliance	Responsible for Implementation	Responsible for Supervision	Frequency of monitoring	Source of Funds to Implement Mitigation Measures
	housekeeping (storage of construction implements, stockpiles, wastes, chemicals) in order to ensure compliance with environmental laws and provide reference for monitoring purposes.					
Social and Cultural Resources	• Consult Archaeological Survey of India (ASI) or Punjab State Archaeology Department to obtain an expert assessment of the archaeological potential of the site. • Consider alternatives if the site is found to be of medium or high risk. • Include state and local archaeological, cultural and historical authorities, and interest groups in consultation forums as project stakeholders so that their expertise can be made available. • Develop a protocol for use by the construction contractors in conducting any excavation work, to ensure that any chance finds are recognized and measures are taken to ensure they are protected and conserved.	Chance find protocol	- PMC to consult ASI or Punjab State Archaeology Department - PMC to develop protocol for chance finds	PMU	to be included in updated IEE report	PMC
Sites for construction work camps,	• Will not promote instability and result in destruction of property,	List of pre-approved sites for construction	DSC to prepare list of potential sites	PMU PIU	to be included in updated IEE report	DSC

Parameters	Mitigation Measures	Parameter/ Indicator of Compliance	Responsible for Implementation	Responsible for Supervision	Frequency of monitoring	Source of Funds to Implement Mitigation Measures
areas for stockpile, storage and disposal	vegetation, irrigation, and drinking water supply systems, etc. • Residential areas will not be considered so as to protect the human environment (i.e., to curb accident risks, health risks due to air and water pollution and dust, and noise, and to prevent social conflicts, shortages of amenities, and crime). • Disposal will not be allowed near sensitive areas which will inconvenience the community. • The construction camp, storage of fuel and lubricants should be avoided at the river bank. The construction camp site for intake well should be finalized in consultation with DSC and PIU.	work camps, areas for stockpile, storage and disposal Waste management plan	DSC to inspect sites proposed by contractor if not included in pre-approved sites			
Defining of construction/ work areas on ground, for activities within 200m of the boundaries of the wetland areas	• Construction work area will be demarcated on ground. • Free standing fencing will be erected in advance of construction works to protect the ecological resources near to the construction footprint and any working areas. • No storage of materials will be allowed within 200 m of the boundaries of such	List of pre-approved sites for construction work camps, areas for stockpile, storage and disposal Waste management plan	DSC to prepare list of potential sites DSC to inspect sites proposed by contractor if not included in pre-approved sites	PMU, PIU and PMC	to be included in updated IEE report	DSC

Parameters	Mitigation Measures	Parameter/ Indicator of Compliance	Responsible for Implementation	Responsible for Supervision	Frequency of monitoring	Source of Funds to Implement Mitigation Measures
	protected/sensitive areas. • Planning of works to ensure that no entry will be allowed by employees/construction/site workers to the protected areas during the construction period in order to limit disturbance impacts on the associated habitats and fauna.					
Drinking water availability and water arrangement	• The contractor will be responsible for arrangement of water in every workplace at suitable and easily accessible place for the whole construction period. • Sufficient supply of cold potable water to be provided and maintained. If the drinking water is obtained from an intermittent public water supply then, storage tanks will be provided.	List of pre-approved sites for construction work camps, areas for stockpile, storage and disposal	DSC to prepare list of potential sites DSC to inspect sites proposed by contractor if not included in pre-approved sites	PMU, PIU and PMC	to be included in updated IEE report	DSC
Sources of construction materials	• Use quarry sites and sources permitted by government. • Verify suitability of all material sources and obtain approval from PIU. • If additional quarries are required after construction has started, obtain written approval from PIU. • Submit to DSC on a	Permits issued to quarries/sources of materials	Contractor PMC and DSC to verify sources (including permits) if additional is requested by contractor	PMU PIU	Upon submission by contractor	PMC and DSC

Parameters	Mitigation Measures	Parameter/ Indicator of Compliance	Responsible for Implementation	Responsible for Supervision	Frequency of monitoring	Source of Funds to Implement Mitigation Measures
	monthly basis documentation of sources of materials.					
Access	• Plan transportation routes so that heavy vehicles do not use narrow local roads, except in the immediate vicinity of delivery sites. • Schedule transport and hauling activities during non-peak hours. • Locate entry and exit points in areas where there is low potential for traffic congestion. • Keep the site free from all unnecessary obstructions. • Drive vehicles in a considerate manner. • Coordinate with the Traffic Police Department for temporary road diversions and for provision of traffic aids if transportation activities cannot be avoided during peak hours. • Notify affected sensitive receptors by providing sign boards with information about the nature and duration of construction works and contact numbers for concerns/complaints..	Traffic management plan	Contractor	PIU and DSC	to be included in updated IEE report	Contractor
Occupational health and safety	• Comply with IFC EHS Guidelines on Occupational Health and Safety	Health and safety (H&S) plan	Contractor	PMU and PMC PIU and DSC	to be included in updated IEE report	Contractor

Parameters	Mitigation Measures	Parameter/ Indicator of Compliance	Responsible for Implementation	Responsible for Supervision	Frequency of monitoring	Source of Funds to Implement Mitigation Measures
	• Develop comprehensive site-specific health and safety (H&S) plan. The overall objective is to provide guidance to contractors on establishing a management strategy and applying practices that are intended to eliminate, or reduce, fatalities, injuries and illnesses for workers performing activities and tasks associated with the project. • Include in H&S plan measures such as: (i) type of hazards in the intake wells site; (ii) corresponding personal protective equipment for each identified hazard; (iii) H&S training for all site personnel; (iv) procedures to be followed for all site activities; and (v) documentation of work-related accidents. • Provide medical insurance coverage for workers.					
Public consultations	• Continue information dissemination, consultations, and involvement/participation of stakeholders during project implementation.	- Disclosure records - Consultations	PMU and PMC PIU and DSC Temple administrators Contractor	PMU and PMC	- During updating of IEE Report - During preparation of site- and activity-specific plans as per EMP	PMU Contractor to allocate funds to support

Parameters	Mitigation Measures	Parameter/ Indicator of Compliance	Responsible for Implementation	Responsible for Supervision	Frequency of monitoring	Source of Funds to Implement Mitigation Measures
					- Prior to start of construction - During construction	

Table 16: Construction Stage Environmental Management Plan

Potential Impact	Mitigation Measures	Parameter/ Indicator of Compliance	Responsible for Implementation	Responsible for Supervision	Frequency of Monitoring	Source of Funds
Erosion hazards	• Save topsoil removed during excavation and use to reclaim disturbed areas, as soon as it is possible to do so. • Use dust abatement such as water spraying to minimize windblown erosion. • Provide temporary stabilization of disturbed/excavated areas that are not actively under construction. • Apply erosion controls (e.g., silt traps) along the drainage leading to the water bodies. • Clean and maintain catch basins, drainage ditches, and culverts regularly. • Conduct routine site inspections to assess the effectiveness of and the maintenance requirements for erosion and sediment control systems.	Erosion control and re-vegetation plan	Contractor	PIU and DSC PIU to submit EMP monitoring report to PMU	- daily visual inspection by contractor supervisor and/or environment specialist - weekly visual inspection by DSC (more frequent during monsoon season and if corrective action is required) - random inspection by PMU, PIU, PMC and/or DSC	Contractor

Potential Impact	Mitigation Measures	Parameter/ Indicator of Compliance	Responsible for Implementation	Responsible for Supervision	Frequency of Monitoring	Source of Funds
Improper stockpiling of construction materials results in impacts starting from obstruction of drainage, disturbance/ safety hazard to tourists, etc.	• Adequate safety precautions will be ensured during transportation of quarry material from quarries to the construction site. • Vehicles transporting the material will be covered to prevent spillage. • Operations to be undertaken by the contractor as per the direction and satisfaction of the Engineer.	condition in list of pre-approved sites for construction work camps, areas for stockpile, storage and disposal prepared by the Contractor	Contractor	PIU and DSC PIU to submit EMP monitoring report to PMU	- daily visual inspection by contractor supervisor and/or environment specialist - weekly visual inspection by DSC (more frequent during monsoon season and if corrective action is required) - random inspection by PMU, PIU, PMC and/or DSC	Contractor
Stripping, stocking and preservation of top soil	• The topsoil from areas of cutting and areas to be permanently covered (proposed site for bird watching towers, bird's hideout and other tourist amenities) will be stripped to a specified depth of150mm, trans located and stored in stock piles. • The stockpile shall be designed such that the slope does not exceed1:2 (vertical to horizontal). Stockpiles will not be surcharged or otherwise loaded and multiple handling will be kept to a minimum to ensure that no	condition in list of pre-approved sites for construction work camps, areas for stockpile, storage and disposal prepared by the Contractor	Contractor	PIU and DSC PIU to submit EMP monitoring report to PMU	- daily visual inspection by contractor supervisor and/or environment specialist - weekly visual inspection by DSC (more frequent during monsoon season and if corrective action is required) - random inspection by PMU, PIU, PMC	Contractor

Potential Impact	Mitigation Measures	Parameter/ Indicator of Compliance	Responsible for Implementation	Responsible for Supervision	Frequency of Monitoring	Source of Funds
	compaction will occur. • The stockpiles will be covered with gunny bags or tarpaulin. It will be ensured by the contractor that the topsoil will not be unnecessarily trafficked either before stripping or when in stockpiles. Such stockpiled topsoil will be returned to cover the disturbed area and cut slopes.				and/or DSC	
Soil and Water Pollution due to fuel and lubricants, construction waste	• The fuel storage and vehicle cleaning area will be stationed such that water discharge does not drain into the surface water bodies. • Soil and water pollution parameters will be monitored as per monitoring plan.	condition in list of pre-approved sites for construction work camps, areas for stockpile, storage and disposal prepared by the Contractor	Contractor	PIU and DSC PIU to submit EMP monitoring report to PMU	Weekly visual inspection by DSC (more frequent during monsoon season and if corrective action is required) - random inspection by PMU, PIU, PMC and/or DSC	Contractor
Siltation of water bodies due to spillage of construction wastes	• Silt fencing to be provided surrounding the construction sites to prevent sediments entering into the watercourses. • The number of units of silt fencing to be installed is to be decided by the Engineer. • Haul roads on the site and approaches to the watercourse (or drains leading	condition in list of pre-approved sites for construction work camps, areas for stockpile, storage and disposal prepared by the Contractor	Contractor	PIU and DSC PIU to submit EMP monitoring report to PMU	- daily visual inspection by contractor supervisor and/or environment specialist - weekly visual inspection by DSC (more frequent during monsoon season and if	Contractor

Potential Impact	Mitigation Measures	Parameter/ Indicator of Compliance	Responsible for Implementation	Responsible for Supervision	Frequency of Monitoring	Source of Funds
	to watercourses) will be regularly cleaned to prevent the build-up of mud; areas of bare soil will be kept to a practical minimum to reduce silt runoff. • No disposal of construction wastes will be carried out into the wetlands. • Extraneous construction wastes will be transported to the pre-identified disposal site for safe disposal				corrective action is required) - random inspection by PMU, PIU, PMC and/or DSC	
Material Handling at Site	• All workers employed on mixing asphaltic material, cement, lime mortars, concrete etc., will be provided with protective footwear and protective goggles. • Workers, who are engaged in welding works, will be provided with welder's protective eye shields. • Workers engaged in stone breaking activities will be provided with protective goggles and clothing and will be seated at sufficiently safe intervals. • The use of any toxic chemicals will be strictly in accordance with the manufacturer's instructions.	As per the OSHAS safety standards	Contractor	PMU and PMC PIU and DSC	- daily visual inspection by contractor supervisor and/or environment specialist and DSC - random inspection by PMU, PIU, PMC and/or DSC	Contractor
Impacts on water quality	• Schedule construction activities during non-monsoon	Work schedule Visual	Contractor	PIU and DSC	- daily inspection by	Contractor

Potential Impact	Mitigation Measures	Parameter/ Indicator of Compliance	Responsible for Implementation	Responsible for Supervision	Frequency of Monitoring	Source of Funds
	season, to the maximum extent possible. • Ensure drainages and water bodies within the construction zones are kept free of obstructions. • Keep loose soil material and stockpiles out of drains and flow-lines. • Avoid stockpiling of excavated and construction materials (sand, gravel, cement, etc.) unless covered by tarpaulins or plastic sheets. • Re-use/utilize, to maximum extent possible, excavated materials. • Dispose any residuals at identified disposal site (PIU/DSC will identify approved sites). • Dispose waste oil and lubricants generated as per provisions of Hazardous Waste (Management and Handling) Rules, 1989. • Refuel equipment within the designated refueling containment area away from drainages, nallahs, or water body. • Inspect all vehicles daily for fluid leaks before leaving the vehicle staging area, and repair any leaks before the vehicle resumes	inspection condition in waste management plan condition in list of pre-approved sites for construction work camps, areas for stockpile, storage and disposal Vehicle inspection report		PIU to submit EMP monitoring report to PMU	contractor supervisor and/or environment specialist - weekly visual inspection by DSC (more frequent during monsoon season and if corrective action is required) - random inspection by PMU, PIU, PMC and/or DSC	

Potential Impact	Mitigation Measures	Parameter/ Indicator of Compliance	Responsible for Implementation	Responsible for Supervision	Frequency of Monitoring	Source of Funds
	operation.					
Emission from Construction Vehicles, Equipment and Machinery	• The discharge standards promulgated under the Environmental Protection Act will be strictly adhered to. • All vehicles, equipment and machinery used for construction will conform to the relevant Standard. • All vehicles, equipment's and machinery used for construction will be regularly maintained to ensure that pollution emission levels comply with the relevant requirements.	As per the Punjab Pollution Control Broad (PPCB)	Contactor	PMU and PMC PIU and DSC	daily inspection by contractor supervisor and/or environment specialist - weekly visual inspection by DSC - random inspection by PMU, PIU, PMC and/or DSC	Contractor
Impacts on air quality	• Conduct regular water spraying on stockpiles.	- Visual inspection - No complaints from sensitive receptors - Records	Contractor	PIU and DSC PIU to submit EMP monitoring report to PMU	- daily inspection by contractor supervisor and/or environment specialist - weekly visual inspection by DSC (more frequent during dry season and if corrective action is required) - random inspection by PMU, PIU, PMC and/or DSC	Contractor
	• Conduct regular visual inspection in the construction zones to ensure no excessive dust emissions.	Visual inspection				
	• Maintain construction vehicles and obtain "pollution under control" certificate from PPCB.	PUC certificates				
	• Obtain CFE and CFO for hot mix plants, crushers, diesel generators, etc., if to be used in the project.	CTE and CTO				
Noise and	• Construction activities	Work schedule	Contractor	PIU and DSC	- daily inspection	Contractors

Potential Impact	Mitigation Measures	Parameter/ Indicator of Compliance	Responsible for Implementation	Responsible for Supervision	Frequency of Monitoring	Source of Funds
vibrations impacts	surrounding the wetland areas should be carried out in the daytime. Night time construction activities shall not be allowed. • Plan activities in consultation with PIU/DSC so that activities having high noise generation shall be performed in the day which will result in least disturbance.			PIU to submit EMP monitoring report to PMU	by contractor supervisor and/or environment specialist - weekly visual inspection by DSC (more frequent during noise-generating activities and if corrective action is required) - random inspection by PMU, PIU, PMC and/or DSC	
	• Minimize noise from construction equipment by using vehicle silencers and fitting jackhammers with noise-reducing mufflers.	Report on ambient noise level monitoring within direct impact zones				
	• Avoid loud random noise from sirens, air compression, etc.	zero incidence				
	• Require drivers that horns not be used unless it is necessary to warn other road users or animals of the vehicle's approach.	feedback from receptors within direct and direct impact zone				
	• If specific noise complaints are received during construction, the contractor may be required to implement one or more of the following noise mitigation measures, as directed by the Engineer: • Locate stationary construction equipment as far from nearby noise-sensitive properties, such as the	- Complaints addressed satisfactory - GRM records				

Potential Impact	Mitigation Measures	Parameter/ Indicator of Compliance	Responsible for Implementation	Responsible for Supervision	Frequency of Monitoring	Source of Funds
	environmental sensitive areas, hospital, as possible. • Shut off idling equipment. • Reschedule construction operations to avoid periods of noise annoyance identified in the complaint. • Notify nearby residents whenever extremely noisy work will be occurring.					
Impacts on flora and fauna	• Conduct site induction and environmental awareness.	Records	Contractor	PIU and DSC PIU to submit EMP monitoring report to PMU	- daily inspection by contractor supervisor and/or environment specialist - weekly visual inspection by DSC (more frequent if corrective action is required) - random inspection by PMU, PIU, PMC and/or DSC	Contractor
	• Limit activities within the work area.	Barricades along excavation works				
	• Replant trees in the area using minimum ratio of 2 new trees for every 1 tree cut. Replacement species must be approved by Chief Wildlife Warden of Department of Forest and Wildlife Preservation, Punjab	Number and species approved by Department of Forest and Wildlife Preservation, Punjab				
Impacts on physical cultural resources	• Ensure no damage to structures/properties adjacent to construction zone.	- Visual inspection - any impact should be addressed by project resettlement plan	Contractor In coordination with PIU and DSC for any structures within WTP site and construction	PIU and DSC	- daily inspection by contractor supervisor and/or environment specialist - weekly visual inspection by	Contractor

Potential Impact	Mitigation Measures	Parameter/ Indicator of Compliance	Responsible for Implementation	Responsible for Supervision	Frequency of Monitoring	Source of Funds
	• Provide sign boards to inform nature and duration of construction works and contact numbers for concerns/complaints.	- no complaints received - photo-documentation	zone		DSC (more frequent if corrective action is required) - random inspection by PMU, PIU, PMC and/or DSC	
	• Implement good housekeeping. Remove wastes immediately.	- Visual inspection • - No stockpiled/ stored wastes				
	• Ensure workers will not use nearby/adjacent areas as toilet facility.	- No complaints received - Sanitation facilities for use of workers				
	• Coordinate with PIU/DSC for transportation routes and schedule. Schedule transport and hauling activities during non-peak hours. Communicate road detours via visible boards, advertising, pamphlets, etc. • Ensure heavy vehicles do not use narrow local roads, except in the immediate vicinity of delivery sites.	- Approved routes in traffic management plan				
	• Provide instructions on event of chance finds for archaeological and/or ethno-botanical resources. Works must be stopped immediately until such time chance finds are cleared by experts.	condition in chance find protocol				

Potential Impact	Mitigation Measures	Parameter/ Indicator of Compliance	Responsible for Implementation	Responsible for Supervision	Frequency of Monitoring	Source of Funds
Impact due to waste generation	• Prepare and implement a waste management plan. Manage solid waste according to the following hierarchy: reuse, recycling and disposal. Include in waste management plan designated/approved disposal areas. • Coordinate with PIU/DSC for beneficial uses of excavated soils or immediately dispose to designated areas. • Recover used oil and lubricants and reuse; or remove from the site. • Avoid stockpiling and remove immediately all excavated soils, excess construction materials, and solid waste (removed concrete, wood, trees and plants, packaging materials, empty containers, oils, lubricants, and other similar items). • Prohibit disposal of any material or wastes (including human waste) into drainage, nallah, or watercourse.	condition in waste management plan	Contractor	PIU and DSC	- daily inspection by contractor supervisor and/or environment specialist - weekly visual inspection by DSC (more frequent if corrective action is required) - random inspection by PMU, PIU, PMC and/or DSC	Contractor
Impacts on occupational health and safety	• Comply with IFC EHS Guidelines on Occupational Health and Safety • Disallow worker	- Visual inspection - Records - Visual	Contractor	PIU and DSC	- daily inspection by contractor supervisor and/or	Contractor

Potential Impact	Mitigation Measures	Parameter/ Indicator of Compliance	Responsible for Implementation	Responsible for Supervision	Frequency of Monitoring	Source of Funds
	exposure to noise level greater than 85 dBA for duration of more than 8 hours per day without hearing protection. The use of hearing protection shall be enforced actively.	inspection - Work schedule - Noise level monitoring in work area			environment specialist - weekly visual inspection by DSC (more frequent if corrective action is required) - random inspection by PMU, PIU, PMC and/or DSC	
	● Provide H&S orientation training to all new workers to ensure that they are apprised of the rules of work at the site, personal protective protection, and preventing injury to fellow workers.	- Records - Condition in H&S plan				
	● Ensure that qualified first-aid can be provided at all times. Equipped first-aid stations shall be easily accessible throughout the site as well as at construction camps.	- Visible first aid equipment and medical supplies - Condition in H&S plan				
	● Provide medical insurance coverage for workers.	Records				
	● Secure construction zone from unauthorized intrusion and accident risks.	- Area secured - Trenches barricaded				
	● Provide supplies of potable drinking water.	- Supply of water				
	● Provide clean eating areas where workers are not exposed to hazardous or noxious substances.	- Workers area				
	● Provide visitor orientation if visitors to the site	- Records - Condition in				

Potential Impact	Mitigation Measures	Parameter/ Indicator of Compliance	Responsible for Implementation	Responsible for Supervision	Frequency of Monitoring	Source of Funds
	can gain access to areas where hazardous conditions or substances may be present. Ensure also that visitor/s do not enter hazard areas unescorted.	H&S plan				
	• Ensure the visibility of workers through their use of high visibility vests when working in or walking through heavy equipment operating areas.	- Visual inspection - Condition in H&S plan				
	• Ensure moving equipment is outfitted with audible back-up alarms.	- Construction vehicles - Condition in H&S plan				
	• Mark and provide sign boards in the construction zone, and areas for storage and disposal. Signage shall be in accordance with international standards and be well known to, and easily understood by workers, visitors, and the general public as appropriate.	- Visible and understandable sign boards in construction zone - H&S plan includes appropriate signs for each hazard present				
Impacts on socio-economic activities	• Provide sign boards for pedestrians to inform nature and duration of construction works and contact numbers for concerns/complaints.	Visible and understandable sign boards in construction zone	Contractor	PIU and DSC	- daily inspection by contractor supervisor and/or environment specialist - weekly visual inspection by DSC (more frequent if corrective action	Contractor
	• Employ at least 50% of the labor force, or to the maximum extent, local persons within the 2-km	Employment records				

Potential Impact	Mitigation Measures	Parameter/ Indicator of Compliance	Responsible for Implementation	Responsible for Supervision	Frequency of Monitoring	Source of Funds
	immediate area if manpower is available.				is required) - random inspection by PMU, PIU, PMC and/or DSC	
Construction Staff causing disruption to migratory birds	The contractor shall ensure that the construction staff shall adhere to the following code of conduct while undertaking construction activities: • No person shall carry on activity that is harmful to migratory birds or the eggs, nests or habitat of migratory birds, except under supervision and authority of a permit; • No person shall have in his possession a live migratory bird, or a carcass, skin, nest or egg of a migratory bird; • Post the Wetlands with signs reading "Bird Sanctuary, No Hunting, No Dogs/Cats, Day Use Only, Please help us protect birds, wildlife and vegetation". This posting language will allow workers, visitors, nature photographers, birdwatchers, and boaters to access the wetlands, and prohibit overnight camping, fires, trash disposal, collection of plants and animals, and other disallowed activities;	code of conduct	Contractor	PIU and DSC	- daily inspection by contractor supervisor and/or environment specialist - weekly visual inspection by DSC (more frequent if corrective action is required) - random inspection by PMU, PIU, PMC and/or DSC	Contractor

Potential Impact	Mitigation Measures	Parameter/ Indicator of Compliance	Responsible for Implementation	Responsible for Supervision	Frequency of Monitoring	Source of Funds
	• Regularly remove trash from wetlands on scheduled clean-up days					
Clearing of Construction Camps &Restoration	• Contractor has to prepare site restoration plans for approval by the Engineer. • The plan has to be implemented by the contractor prior to demobilization. • On completion of the works, all temporary structures will be cleared away, all rubbish burnt, excreta or other disposal pits or trenches filled in and effectively sealed off and the site left clean and tidy, at the Contractor's expense, to the entire satisfaction of the Engineer.	Restoration Plan prepared by the Contractor	Contractor	PMU and PMC PIU and DSC	Inspection by PMU, PIU, PMC and/or DSC	Contractor

Table 17: Operation and Maintenance Stage Environmental Management Plan

Potential Impact	Mitigation Measures	Parameter/ Indicator of Compliance	Responsible for Implementation	Responsible for Supervision	Frequency of Monitoring	Source of Funds
Unsustainable Induced development	• Potential induced impacts are addressed through the following: ○ Awareness building in preservation of Wetlands and its importance and display and awareness of Punjab's Eco-tourism Policy at proposed sites specifically addressing the need to regulate tourism related development and	EIA Notification 2006	PMU	PMU	Quarterly monitoring / inspection to the project site	PMU

Potential Impact	Mitigation Measures	Parameter/ Indicator of Compliance	Responsible for Implementation	Responsible for Supervision	Frequency of Monitoring	Source of Funds
	planning the area through coordination with related government departments and local landuse committees; and ○ Project supported environmental awareness campaigns in surrounding communities to encourage ecotourism related development. Moreover, to further regulate future development in the project areas, central government policies require automatic EIA of development activities (≥20,000 sqm and <150,000sqm of built-up area) within10km of notified protected areas					
Environmental Conditions	• The tourism department /forest department will undertake seasonal monitoring of air, water, noise and soil quality through an approved monitoring agency. • The parameters to be monitored, frequency and duration of monitoring as well as the locations to be monitored will be as per the Monitoring Plan prepared.	Punjab Pollution Control Board stipulated environmental monitoring rules and regulations	PMU	PMU	As per Environmental monitoring Plan	PMU
Uncontrolled tourism development can cause congestion, increased	• While the actions of the environmental monitoring plan during the operation stage will result in monitoring of the environmental impacts after project implementation, the	Tourism Master Plan	PMU	PMU	Quarterly monitoring / inspection to the project site	PMU

Potential Impact	Mitigation Measures	Parameter/ Indicator of Compliance	Responsible for Implementation	Responsible for Supervision	Frequency of Monitoring	Source of Funds
pollution, deterioration of destinations. Over commerce-alization of cultural traditions may degrade the natural / cultural identity of the site	Master Plan for the various cultural destinations in the circuit will include apart from provision of development controls and regulations in the zone, measures for tourism planning for the key destinations. These plans will be monitored to avoid uncontrolled tourism development					
Management of the toilet blocks	• The Tourism Department /Forest Department will carry out regular cleaning of the septic tanks to prevent any impacts, including pollution of ground water and nearby water courses. • For the wastewater generated, it Is necessary to ensure proper and adequate treatment is carried out prior to discharge	As per PWSSB.	PMU	PMU	Quarterly monitoring / inspection to the project site	PMU
Unhygienic conditions due to poor maintenance of sanitation facilities and irregular solid waste collection in the project site necessitate regular	• The Tourism department will carry out maintenance of the toilets, and imitate regular collection of wastes, and will also ensure that: Sanitation improvements proposed do not result in pollution of groundwater; • Sanitary facilities do not interfere with other utilities and block access to buildings,	As per PWSSB and PPCB	PMU	PMU	Quarterly monitoring / inspection to the project site	PMU

Potential Impact	Mitigation Measures	Parameter/ Indicator of Compliance	Responsible for Implementation	Responsible for Supervision	Frequency of Monitoring	Source of Funds
maintenance of constructed amenities	which might cause nuisance to neighboring areas. ● During transportation of waste it is necessary to ensure that no spillage occurs and all wastes shall be transported to a designated solid waste treatment site					
Invasion of Species	● Conduct regular "vegetation" patrols to remove non-native vegetation on the proposed landscaping areas within the wetlands	Floral Biodiversity of Punjab (Dep of Forests & Wildlife Preservation)	Forest Department	PMU	Quarterly monitoring / inspection to the project site	PMU

C. Summary of Site- and Activity-Specific Plans as per EMP

140. **Table 18** summarizes site- and activity-specific plans to be prepared as per EMP tables.

Table 18: Site- and Activity-Specific Plans/Programs as per EMP

To be Prepared During	Specific Plan/Program	Purpose	Responsible for Preparation	Responsible for Implementation
Detailed Design Phase	Environmental monitoring program as per detailed design	Indicate sampling locations, methodology and parameters	PMU/PIU and PMC/DSC	Contractor
Detailed Design Phase	Erosion control and re-vegetation plan	Mitigate impacts due to erosion	Contractor	Contractor
Detailed Design Phase	List and maps showing utilities to be shifted	Utilities shifting	DSC during preliminary stage Contractor as per detailed design	Contractor
Detailed Design Phase	Contingency plan	Mitigate impacts due to interruption of services during utilities shifting	Contractor	Contractor
Detailed Design Phase	Chance find protocol	Address archaeological or historical finds	PMU and PMC	Contractor
Detailed Design Phase	List of pre-approved sites	Location/s for work camps, areas for stockpile, storage and disposal	PIU and DSC	Contractor
Detailed Design Phase	Waste management plan	Mitigate impacts due to waste generation	Contractor	Contractor
Detailed Design Phase	Traffic management plan	Mitigate impacts due to transport of materials and pipe laying works	Contractor	Contractor
Detailed Design Phase	H&S plan	Occupational health and safety	Contractor	Contractor
Detailed Design Phase	Spill prevention and containment plan	Mitigate impacts of accidental spills of oil, lubricants, fuels, concrete, and other hazardous materials	Contractor	Contractor

D. Environmental Monitoring Program

141. Through integration of mitigation measures in project design, impacts are mostly insignificant, temporary in nature and can be properly avoided or mitigated by following proposed mitigation measures given in the EMP of this IEE report.

142. **Error! Reference source not found.** provides the indicative environmental monitoring program which includes relevant environmental parameters, with a description of the sampling

stations, frequency of monitoring, applicable standards, and responsibility. This will be updated during detailed design to ensure EMP and monitoring program is commensurate to the impacts of the subproject.

Table 19: Indicative Environmental Monitoring Program

Potential Impact	Parameter to be monitored	Proposed Locations	Method of Monitoring	Frequency of monitoring	Indicator of Compliance	Cost	Source of Funds
1. Detailed Design Phase							
Consents, permits, clearances, no objection certificate (NOC), etc.	- Consents, permits, clearance, NOCs, etc. - Records and communications - Detailed design documents and drawings	n/a	Visual inspection	check CFEs, permits, clearance, Acknowledge upon receipt Send report as specified in CFE, permits, etc.	Obtained prior to start of civil works Conditions of consents, permits, clearance, NOCs, etc incorporated in detailed design	already covered under PMU and PIU	PMU
Location impacts pertaining to siting of facilities and improvements within the boundaries of the wetlands	- Detailed design documents and drawings - Location of the watch tower, bird hideout and public utilities - Compliance with Wildlife Act 1972 - Sensitive ecological sites (key areas for bird habitat)-	Harike and Ropar Wetlands	Check of records Check of detailed design documents	Upon finalization of detailed design	As per Wildlife Act 1972 and wetland management plans	PMU, PIU, PMC and DSC	PMU, PIU, PMC and DSC
Lack of sufficient planning to assure long-term sustainability of the improvements and ensure protection of the assets created	- Asset management plan	Forest Department in charge of harike and Ropar wetlands	Consultations and active participation in development of the asset management plan	Upon finalization of design and drafting of asset management plan	Project requirements	PMU, PIU, PMC and DSC Forest Department	PMU, PIU, PMC and DSC Forest Department
Establishment of baseline environmental conditions prior to start of civil works	Ambient air quality - particulate matter in sensitive receptors	Harike and Ropar Wetlands	Collection of air samples (continuously 24 hours)	prior to start of civil works	baseline data included in updated IEE report	10,000 per sample	PMU
	Noise levels – day time	Harike and Ropar Wetlands	Use of noise meters (once)	prior to start of civil works	baseline data included in updated IEE report	4,000 per sample	PMU
Erosion control	Erosion control and re-	n/a	Checking of	Upon	included in updated	already covered	Contractor

Potential Impact	Parameter to be monitored	Proposed Locations	Method of Monitoring	Frequency of monitoring	Indicator of Compliance	Cost	Source of Funds
	vegetation plan covering construction phase		erosion control and re-vegetation plan	finalization of detailed design	IEE report provided to contractor	under PMU and PIU	
Utilities	List and maps showing utilities to be shifted Contingency plan for services disruption	n/a	Checking of list and maps showing utilities to be shifted Checking of contingency plan for services disruption	Upon finalization of detailed design	included in updated IEE report provided to contractor	already covered under PMU/PIU and PMC/DSC	DSC – preliminary design stage Contractor – detailed design stage
Social and Cultural Resources	Chance find protocol	n/a	Checking of chance find protocol	Upon finalization of detailed design	included in updated IEE report copy and orientation provided to contractor	already covered under PMU/PIU and PMC/DSC	PMU
Sites for construction work camps, areas for stockpile, storage and disposal	List of pre-approved sites for construction work camps, areas for stockpile, storage and disposal	sites for construction work camps, areas for stockpile, storage and disposal	Visual inspection	Upon approval of site/s	included in updated IEE report information provided to contractor		DSC
	Waste management plan	n/a	Checking of waste management plan	Upon finalization of detailed design	included in updated IEE report provided to contractor	already covered under PMU/PIU and PMC/DSC	
Sources of construction materials	Permits issued to quarries/sources of materials	n/a	Checking of permits	Upon submission by contractor	contractor's submission	already covered under PMU/PIU and PMC/DSC	PMC and DSC
Access	Traffic management plan	n/a	Checking of traffic management plan as per detailed design (alignment, routes, etc)	Prior to start of civil works	contractor's submission	contractor's cost	Contractor
Occupational	Health and safety	n/a	Checking of	Prior to start of	contractor's	contractor's	Contractor

Potential Impact	Parameter to be monitored	Proposed Locations	Method of Monitoring	Frequency of monitoring	Indicator of Compliance	Cost	Source of Funds
health and safety	(H&S) plan		H&S plan	civil works	submission	cost	
Public consultations	- Disclosure records - Consultations	- locations of affected persons - locations of stakeholders	Documentation of (minutes of consultations, date/s, location/s, issue/s raised, photographs, etc.)	- During updating of IEE Report - During preparation of site- and activity-specific plans as per EMP - Prior to start of construction - During construction	included in updated IEE	already covered under PMU/PIU and PMC/DSC	PMU/PMC/DSC
2. Construction Phase							
Erosion hazards	Erosion control and re-vegetation plan	- Construction zone - storage areas	Visual inspection	- daily visual inspection by contractor supervisor and/or environment specialist - weekly visual inspection by DSC (more frequent during monsoon season and if corrective action is required) - random inspection by PMU, PIU, PMC and/or DSC	- no erosion - erosion control in place - measures in erosion control and re-vegetation plan implemented	Contractor's cost	Contractor
Impacts on water quality	- Any construction related materials - visible seepage of paints, oils, silts, etc. from storage areas	Adjacent bodies of water including drainages, canals/nallahs,	Visual inspection	- daily visual inspection by contractor supervisor and/or	- no visible change in pre-construction quality of adjacent bodies of water including drainages,	Contractor's cost	Contractor

Potential Impact	Parameter to be monitored	Proposed Locations	Method of Monitoring	Frequency of monitoring	Indicator of Compliance	Cost	Source of Funds
	- complaints related to water quality	etc.		environment specialist - weekly visual inspection by DSC (more frequent during monsoon season and if corrective action is required) - random inspection by PMU, PIU, PMC and/or DSC	canals/nallahs, etc. - no disposal and/or seepage to adjacent bodies of water including drainages, canals/nallahs, etc.		
Impacts on water quality	TDS, TSS, pH, Hardness	At four locations in each of the wetland: (i) water channel inlet to the wetlands (2 samples) (ii) water channel outlet to the wetlands (2 samples)	As per Indian Standard IS 2296	Twice a year (pre monsoon and post monsoon) for the entire period of construction	IS: 2296	Contractor (Through approved Environmental Monitoring Agency)	Contractor
Impacts on air quality	- SO_2, NO_2, PM_{10}, $PM_{2.5}$ - water spraying on stockpiles - excessive dust emissions - vehicles “pollution under control” certificate from Himachal Pradesh SPCB - CFE and CFO for hot mix plants, crushers, diesel generators, etc., if to be used in the	- Construction zone - Sensitive receptors site/s	- Visual inspection	- air sampling: once in a season (except monsoons) for the entire construction period - daily visual inspection by contractor supervisor and/or environment specialist - weekly visual	- no excessive dust emissions - no complaints from sensitive receptors - Valid pollution under control certificate/s. CFE, and/or CFO - As per PPCB/ CPCB guidelines	Contractor’s cost	Contractor

Potential Impact	Parameter to be monitored	Proposed Locations	Method of Monitoring	Frequency of monitoring	Indicator of Compliance	Cost	Source of Funds
	project - complaints related to air quality			inspection by DSC (more frequent during monsoon season and if corrective action is required) - random inspection by PMU, PIU, PMC and/or DSC			
Noise and vibrations impacts	- work schedule (limit to day time only in temple complexes and other important areas) - activities with the greatest potential to generate noise (conducted during periods of the day which will result in least disturbance) - vehicle silencers and noise-reducing mufflers - complaints related to noise and vibrations	- Construction zone - Sensitive receptors site/s - silence zone/s	Visual inspection	- daily visual inspection by contractor supervisor and/or environment specialist - weekly visual inspection by DSC (more frequent during monsoon season and if corrective action is required) - random inspection by PMU, PIU, PMC and/or DSC	- no complaints from sensitive receptors	Contractor's cost	Contractor
Impacts on flora and fauna	- site induction and environmental awareness - number of trees cut - number of trees replanted - survival rate of trees planted	- construction zone - sites approved by Forest Department for replanting, if any	Visual inspection	- daily visual inspection by contractor supervisor and/or environment specialist - weekly visual	- all contractor's employees have undertaken site induction and environmental awareness prior to mobilization - approved trees to be	Contractor's cost	Contractor

Potential Impact	Parameter to be monitored	Proposed Locations	Method of Monitoring	Frequency of monitoring	Indicator of Compliance	Cost	Source of Funds
				inspection by DSC (more frequent during monsoon season and if corrective action is required) - random inspection by PMU, PIU, PMC and/or DSC	cut - approved tree species for replantation		
Impacts on physical and cultural resources	- damage to structures/properties adjacent to construction zone - sign boards to inform nature and duration of construction works and contact numbers for concerns/complaints - number of workforce near the school/s and other sensitive receptor/s - housekeeping practices, wastes around construction zones - toilet facilities for workers - transportation routes and schedule - chance find procedure	- construction zone	Visual monitoring	- daily visual inspection by contractor supervisor and/or environment specialist - weekly visual inspection by DSC (more frequent during monsoon season and if corrective action is required) - random inspection by PMU, PIU, PMC and/or DSC	- no damage to structures/properties adjacent to construction zone - sign boards understandable by local people - sufficient number of workforce near the school/s and other sensitive receptor/s - wastes managed according to waste management plan - clean and usable toilet facilities for workers - transportation routes and schedule followed - no complaints from sensitive receptors - chance find procedures followed, as necessary	Contractor's cost	Contractor
Impact due to waste generation	- provisions of the waste management plan - quantity of excavated soils	- construction zone	Visual monitoring	- daily visual inspection by contractor supervisor and/or	- wastes managed according to waste management plan - no complaints from sensitive receptors	Contractor's cost	Contractor

Potential Impact	Parameter to be monitored	Proposed Locations	Method of Monitoring	Frequency of monitoring	Indicator of Compliance	Cost	Source of Funds
	- quantity of used oil and lubricants - excess construction materials, and solid waste (removed concrete, wood, trees and plants, packaging materials, empty containers, oils, lubricants, and other similar items)			environment specialist - weekly visual inspection by DSC (more frequent during monsoon season and if corrective action is required) - random inspection by PMU, PIU, PMC and/or DSC			
Impacts on occupational health and safety	- IFC EHS Guidelines on Occupational Health and Safety - noise level and duration of exposure - PPEs, high visibility vests, hearing protection, etc. - conduct of H&S orientation training - qualified first aider and equipped first aid stations - medical insurance coverage for workers - security in construction zone - potable drinking water supply - clean eating areas - conduct of visitor orientation - audible back-up alarms for vehicles - sign boards in the construction zone - site accident records	- construction zone	- visual monitoring - checking of records	- daily visual inspection by contractor supervisor and/or environment specialist - weekly visual inspection by DSC (more frequent during monsoon season and if corrective action is required) - random inspection by PMU, PIU, PMC and/or DSC	- conditions in H&S plan - all workers oriented on H&S plan - use of PPEs, etc at all times - max of 80 dBA and 8 hours exposure - visible first aid equipment and medical supplies - areas secured - trenches barricaded - adequate potable drinking water - clean eating areas away from hazardous or noxious substances - visible and understandable sign boards in construction zone	Contractor's cost	Contractor

Potential Impact	Parameter to be monitored	Proposed Locations	Method of Monitoring	Frequency of monitoring	Indicator of Compliance	Cost	Source of Funds
Impacts on socio-economic activities	- % of locals in labor force - complaints/ grievances	- construction zone	checking of records	- random inspection by PMU, PIU, PMC and/or DSC - during complaints/ grievance redressal	- least 50% of the labor force, or to the maximum extent, local persons within the 2-km immediate area if manpower is available - complaints/grievance addressed as per GRM	Contractor's cost	Contractor
3. Post-construction Phase							
Solid waste (debris, excavated soils, etc.)	- disturbed areas	- construction zone	visual inspection	upon completion of civil works prior to turn over to asset owner	- backfilled any excavation and trenches - reclaimed disturbed areas. - Re-established origial grade and drainage pattern to the extent practicable. - stabilized all areas of disturbed vegetation using weed-free native shrubs, grasses, and trees - restored access roads, staging areas, and temporary work areas. - restored roadside vegetation, if removed - removed all tools, equipment, barricades, signs, surplus materials, debris, and rubbish. - demolished buildings/structures not required for O&M. - disposed in designated disposal sites. - success of re-	Contractor's cost	Contractor

Potential Impact	Parameter to be monitored	Proposed Locations	Method of Monitoring	Frequency of monitoring	Indicator of Compliance	Cost	Source of Funds
					vegetation and tree re-planting. Replaced all plants determined to be in an unhealthy condition. - documentation from PIU/DSC that construction zones have been restored.		

E. Capacity Building

143. The Environmental Specialist of the DSC will provide the basic training required for environmental awareness followed by specific aspects of infrastructure improvement Projects along with Environmental implications for projects. Specific modules customized for the available skill set will be devised after assessing the capabilities of the members of the Training Programme and the requirements of the project. The entire training will cover basic principles of environmental assessment and management; mitigation plans and programmes, implementation techniques, monitoring methods and tools. The proposed training program along with the frequency of sessions is presented in **Table 20** below. This training program is intended for the entire destination and is not just specific to this package.

Table 20: Training Modules for Environmental Management (Common for Entire Project)

Program	Description	Participants	Form of Training	Duration/ Location	Training Conducting Agency
A. Pre-Construction Stage					
Sensitization Workshop	Introduction to Environment: Basic Concept of environment Environmental Regulations and Statutory requirements as per Govt. of India and ADB	Tourism / Forest / Roads / Culture Department Officials, Project Director (PD) and Environmental Specialist (ES) of the PMU/PIU	Workshop	½ Working Day	Environmental Specialist of the PMC and DSC
B. Construction Stage					
Module 1	Roles and Responsibilities of officials / contractors / consultants towards protection of environment Implementation Arrangements	Engineers and staff of line depts. of GoHP, and PMU/PIU (including the ES)	Lecture / Interactive Sessions	½ Working Day	Safeguards Specialist of the PMC and DSC
Module 2	Monitoring and Reporting System	Engineers and staff of implementing agencies and PMU/ PIU (including ES)	Lecture / Interactive Sessions	½ Working Day	Safeguards Specialist of the PMC and DSC

F. EMP Implementation Cost

144. As part of good engineering practices in the project, there have been several measures as safety, signage, dust suppression, procurement of personal protective equipment, provision of drains, etc. and the costs for which will be included in the design costs of specific subprojects. Therefore, these items of costs have not been included in the IEE budget. Only those items that are not covered under budget for construction are considered in the IEE budget.

145. This is a small construction project and it is not expected to cause much significant air, water and noise pollution. The main EMP cost will arise from monitoring of environmental parameters (air, water and noise) and training.

146. The costs of water sprinkling for dust suppression and providing personal protective equipment's to construction workers shall be borne by contractor as part of conditions of contract. In addition, the sources of funds for Mitigation measures during construction stage

including those for monitoring during the construction stage are also to be borne by the contractor. These are deemed to be included as part of the contract price amount quoted by the contractor for the works. The cost of components for monitoring during the operation stage and the capacity building costs are to be funded by the PMU. The EMP cost is given in the **Table 21** below.

Table 21: Indicative EMP Budget

Sl. No.	Particulars	Stages	Unit	Rate (INR)	Quantity	Cost (INR)	Source of fund
A.	**Mitigation Measures**						
1	Silt Fencing (surrounding wetlands)	Construction	Per running meter	2000	800	16,00,000	Contractor
2	Oil and Grease Trap	Construction	Per Unit	5000	20	100,000	Contractor
					Sub -Total (A)	**17,00,000**	
B.	**Monitoring Measures**						
1	Air Quality at subproject area	Construction	Per sample	10000	54	5,40,000	Contractor
2	Air Quality at Construction Camp	Construction	Per sample	10000	36	360,000	Contractor
3	Air Quality at Wetlands	Operation	Per sample	10000	36	360,000	PMU
4	Noise Quality at Wetlands	Construction	Per sample	4000	72	288,000	Contractor
5	Noise Quality at Construction Camp	Construction	Per sample	4000	36	144,000	Contractor
6	Noise Quality at Wetlands	Operation	Per sample	4000	36	144,000	PMU
7	Water Quality	Construction	Per sample	8000	48	384,000	Contractor
8	Landscaping / green belt	Operation	LS			500,000	Contractor
					Sub -Total (B)	**27,20,000**	
C	**Capacity Building**						
1	Sensitization Workshop	Pre-Construction	L.S			150,000	PMU
2	Training Session I (Environmental Safeguard)	Pre-Construction	L.S			150,000	PMU
3	Training Session II (Social Safeguard)	Pre-Construction	L.S			150,000	PMU
					Sub-Total (C)	**450,000**	
					Total (A+B+C)	**48,70,000**	

IX. FINDINGS & RECOMMENDATIONS

147. The proposed sub project component involves various interventions in and around the natural and cultural heritage destinations. However, the selection of components are in line with the sub project selection criteria which are aimed at protecting such sites and ensuring that the components avoid any major encroachment / direct impact on the environmentally sensitive locations or protected area networks. Further, the siting of the locations for the components has been based on appropriate considerations to minimize and avoid environmental impacts. The sub project will conform to all the Government and ADB regulations, policies and standards including those required by all necessary government permits and clearances.

148. The proposed sub project is planned/ designed to develop within the land available with the government. Hence the land acquisition and R&R issues are avoided utmost. The significance of the environmental impacts shall be moderately high due to the construction related impacts than any impacts associated with areas of rich environmental sensitivity. It is to be noted that the resultant potential impacts from this subproject can be offset through provision of proven mitigation measures during the design and adoption of good engineering practices during construction and implementation. The EMP prepared in view of the anticipated impacts

shall address all potential impacts through appropriate mitigation, management and monitoring measures.

149. The effective implementation of the proposed measures shall be ensured through the capacity building towards environmental management within the PMU supplemented with the technical expertise of an Environmental Specialist as part of the DSC. Further, the environmental monitoring plans prepared as part of the EMP shall provide adequate opportunities towards course correction to address any residual impacts during construction or operation stages.

X. CONCLUSIONS

150. The IEE carried out for the subproject shows that the proposed sub-components will result in net environmental benefits, and that any adverse environmental impact can be addressed through proper location, planning and design of the proposed subproject; control of construction activity and mitigation measures. The EMP provides for mitigation of all identified impacts and the Contract clauses for the environmental provisions will be part of the civil work contracts. Further, the proposed designs have been consulted with the stakeholders and no significant issues requiring redressal in terms of environmental safeguards are known to exist at present.

151. Based on the findings of the IEE, there are no significant impacts and the classification of the subproject as Category “B” has been confirmed. No further special study or detailed environmental impact assessment (EIA) needs to be undertaken to comply with ADB SPS (2009).

Appendix 1: Rapid Environmental Assessment (REA) Checklist (for all subprojects)

Instructions:
(i) The project team completes this checklist to support the environmental classification of a project. It is to be attached to the environmental categorization form and submitted to the Environment and Safeguards Division (RSES) for endorsement by Director, RSES and for approval by the Chief Compliance Officer.
(ii) This checklist focuses on environmental issues and concerns. To ensure that social dimensions are adequately considered, refer also to ADB's (a) checklists on involuntary resettlement and Indigenous Peoples; (b) poverty reduction handbook; (c) staff guide to consultation and participation; and (d) gender checklists.
(iii) Answer the questions assuming the "without mitigation" case. The purpose is to identify potential impacts. Use the "remarks" section to discuss any anticipated mitigation measures.

Country/Project Title: Eco-tourism Development using Wetlands of Punjab

Sector Division:

Screening Questions	Yes	No	Remarks
A. Project Siting Is the Project area adjacent to or within any of the following environmentally sensitive areas?			
▪ Densely populated?		✓	
▪ Heavy with development activities?		✓	
▪ Adjacent to or within any environmentally sensitive areas?			
▪ Cultural heritage site	✓		There are no cultural heritage sites near Ropar Wetlands. However, the two sites are of international importance for natural heritage.
▪ Legally protected Area (core zone or buffer zone)	✓		The Wetlands of Ropar and Harike are designated RAMSAR sites. However all the project activities are as per the Comprehensive Management Action Plan (2013-18) For Conservation Of Ropar Wetland and Harike Wetland. The proposals were reviewed by representatives of Chief Wildlife Warden and Chief Conservator of Soils, Punjab on 2-08-12. Proposals were also discussed with Scientific Officer, MEF, GOI, New Delhi on 3.08.12. The proposals were also approved by the steering committee on wetlands headed by Chief Secretary Punjab during 16th meeting held on 16-01-2013.
▪ Wetland	✓		The project area itself is designated as wetland.
▪ Mangrove		✓	
▪ Estuarine		✓	
▪ Buffer zone of protected area	✓		The proposed activities are within the buffer zone of the protected areas (wetlands).
▪ Special area for protecting biodiversity	✓		The wetland is known for bird watching and home for migratory birds.
B. Potential Environmental Impacts Will the Project cause…			

Screening Questions	Yes	No	Remarks
▪ Impacts on the sustainability of associated sanitation and solid waste disposal systems and their interactions with other urban services.		✓	Not anticipated.
▪ Deterioration of surrounding environmental conditions due to rapid urban population growth, commercial and industrial activity, and increased waste generation to the point that both manmade and natural systems are overloaded and the capacities to manage these systems are overwhelmed?		✓	Not anticipated.
▪ Degradation of land and ecosystems (e.g. loss of wetlands and wild lands, coastal zones, watersheds and forests)?		✓	Not anticipated.
▪ Dislocation or involuntary resettlement of people?		✓	Not anticipated. Land acquisition and resettlement are not required for the subprojects. RF to guide any resettlement related issues.
▪ Disproportionate impacts on the poor, women and children, Indigenous Peoples or other vulnerable group?		✓	Not anticipated.
▪ Degradation of cultural property, and loss of cultural heritage and tourism revenues?		✓	Not anticipated.
▪ Occupation of low-lying lands, floodplains and steep hillsides by squatters and low-income groups, and their exposure to increased health hazards and risks due to pollutive industries?		✓	Not anticipated.
▪ Water resource problems (e.g. depletion/ degradation of available water supply, deterioration for surface and ground water quality , and pollution of receiving waters?		✓	Not anticipated.
▪ Air pollution due to urban emissions?		✓	Not anticipated.
▪ Risks and vulnerabilities related to occupational health and safety due to physical, chemical and biological hazards during project construction and operation?		✓	Not anticipated.
▪ road blocking and temporary flooding due to land excavation during rainy season?		✓	Not anticipated.
▪ Noise and dust from construction activities? ▪	✓		Anticipated during construction phase. However, impacts are temporary and short in duration. The EMP includes measures to mitigate impacts.
▪ Traffic disturbances due to construction material transport and wastes? ▪	✓		Anticipated during construction phase. However, impacts are temporary and short in duration. The EMP includes measures to mitigate impacts.
▪ Temporary silt runoff due to construction?		✓	Not anticipated.
▪ Hazards to public health due to ambient, household and occupational pollution, thermal inversion, and smog formation?		✓	Not anticipated.
▪ Water depletion and/or degradation?		✓	Not anticipated.
▪ Overpaying of ground water, leading to land subsidence, lowered ground water table, and salinization?		✓	Not anticipated.
▪ Contamination of surface and ground waters		✓	Not anticipated.

Screening Questions	Yes	No	Remarks
due to improper waste disposal? ▪			
▪ Pollution of receiving waters resulting in amenity losses, fisheries and marine resource depletion, and health problems?		✓	Not anticipated.
▪ Large population influx during project construction and operation that causes increased burden on social infrastructure and services (such as water supply and sanitation systems)?		✓	Improved management systems through capacity building and institutional development will ensure reduced burden on services and infrastructure.
▪ Social conflicts if workers from other regions or countries are hired?		✓	Priority in employment will be given to local residents.
▪ Risks to community health and safety due to the transport, storage, and use and/or disposal of materials such as explosives, fuel and other chemicals during operation and construction?		✓	Not applicable. Construction will not involve use of explosives and chemicals. Excavations/trenching will be done manually. Chemicals will not be used during O&M.
▪ Community safety risks due to both accidental and natural hazards, especially where the structural elements or components of the project are accessible to members of the affected community or where their failure could result in injury to the community throughout project construction, operation and decommissioning?		✓	Operational area will be clearly demarcated and access will be controlled. Only worker and project concerned members will be allowed to visit the operational sites.
▪ Large population influx during project construction and operation that causes increased burden on social infrastructure and services (such as water supply and sanitation systems)?		✓	Improved management systems through capacity building and institutional development will ensure reduced burden on services and infrastructure.
▪ Impacts on the sustainability of associated sanitation and solid waste disposal systems and their interactions with other urban services.		✓	Not anticipated.
▪ Deterioration of surrounding environmental conditions due to rapid urban population growth, commercial and industrial activity, and increased waste generation to the point that both manmade and natural systems are overloaded and the capacities to manage these systems are overwhelmed?		✓	Not anticipated.
▪ Degradation of land and ecosystems (e.g. loss of wetlands and wild lands, coastal zones, watersheds and forests)?		✓	Not anticipated.
▪ Dislocation or involuntary resettlement of people?		✓	Not anticipated. Land acquisition and resettlement are not required for the subprojects. RF to guide any resettlement related issues.
▪ Disproportionate impacts on the poor, women and children, Indigenous Peoples or other vulnerable group?		✓	Not anticipated.
▪ Degradation of cultural property, and loss of cultural heritage and tourism revenues?		✓	Not anticipated.
▪ Occupation of low-lying lands, floodplains and steep hillsides by squatters and low-income groups, and their exposure to increased health		✓	Not anticipated.

Screening Questions	Yes	No	Remarks
hazards and risks due to pollutive industries?			
▪ Water resource problems (e.g. depletion/ degradation of available water supply, deterioration for surface and ground water quality , and pollution of receiving waters?		✓	Not anticipated.
▪ Air pollution due to urban emissions?		✓	Not anticipated.

A Checklist for Preliminary Climate Risk Screening

Country/Project Title: Eco-tourism Development using Wetlands of Punjab
Sector: SARD (Urban Development and Water Division)
Subsector:
Division/Department:

Screening Questions		Score	Remarks[5]
Location and Design of project	Is siting and/or routing of the project (or its components) likely to be affected by climate conditions including extreme weather related events such as floods, droughts, storms, landslides?	0	Investments will not likely be affected by climate change and extreme weather events due to the siting/location of the subprojects. No investments will be sited in flood plains etc.
	Would the project design (e.g. the clearance for bridges) need to consider any hydro-meteorological parameters (e.g., sea-level, peak river flow, reliable water level, peak wind speed etc)?	0	not applicable
Materials and Maintenance	Would weather, current and likely future climate conditions (e.g. prevailing humidity level, temperature contrast between hot summer days and cold winter days, exposure to wind and humidity hydro-meteorological parameters likely affect the selection of project inputs over the life of project outputs (e.g. construction material)?	0	Works involving conservation and restoration will use local materials similar to the existing structures.
	Would weather, current and likely future climate conditions, and related extreme events likely affect the maintenance (scheduling and cost) of project output(s) ?	0	Maintenance will not likely be affected by climate change and extreme weather events.
Performance of project outputs	Would weather/climate conditions, and related extreme events likely affect the performance (e.g. annual power production) of project output(s) (e.g. hydro-power generation facilities) throughout their design life time?	0	Not likely to be affected by climate change and extreme weather events.

Options for answers and corresponding score are provided below:

Response	Score
Not Likely	0
Likely	1
Very Likely	2

[5] If possible, provide details on the sensitivity of project components to climate conditions, such as how climate parameters are considered in design standards for infrastructure components, how changes in key climate parameters and sea level might affect the siting/routing of project, the selection of construction material and/or scheduling, performances and/or the maintenance cost/scheduling of project outputs.

Responses when added that provide a score of 0 will be considered low risk project. If adding all responses will result to a score of 1-4 and that no score of 2 was given to any single response, the project will be assigned a medium risk category. A total score of 5 or more (which include providing a score of 1 in all responses) or a 2 in any single response, will be categorized as high risk project.
Result of Initial Screening (Low, Medium, High): Low
Other Comments:

Appendix 2:NOC from Line Departments

NO OBJECTION CERTIFICATE

It is certified that there is no objection if the proposed project Infrastructure development of Rural tourism cluster eg sewerage system, solid waste disposal accessibility to tourist sites etc on bank of River Sutluj (4-5 villages) including tourist facilities, Distt. Ropar.
(Name of the project)

is executed by PHTPB of the Tourism Department (Punjab) as per the guide lines of Govt. of India and ADB loan funded projects under IDIPT at Katli village Distt. Ropar
(details of land/area/ building)

Place: KATLI

Date:

Signature .....
Department /owner

Amrit kaur
Sarpanch
Gram Panchayat Katli
Block Roop Nagar (pb)
(Official Stamp)

Counter Signed

Deputy Commissioner

(Official Stamp)

Rural Tourism Development – NOC from Katli Village

CERTIFICATE AND UNDERTAKING

It is certified that: -

1. The. ....Katli village
(details of land/area/ building)
..... Where
the Infrastructure development of Rural tourism cluster eg sewerage
(name of the project)
system, solid waste disposal, accessibility to tourist sites etc.
On bank of River Satluj (4-5 villages) including tourist facilities, Ropar
Project is proposed, for execution by PHTPB of the Tourism Department (Punjab),
is under the ownership of
.....Sarpanch, village Katli.....and is
(Details of the owner)
under the possession of .....Sarpanch, village Katli.....
(Details of possessor)
.....

2. There is NO encroachment and NO resettlement/displacement/rehabilitation of people involved in the above Proposed Project area/building/land.
3. The proposed Project is not Partially/Fully part of any other project funded under any other scheme/programme of the State/Central Govt. or any external funding.
4. The assets created as a result of the execution of above stated project will be taken over for operation and maintenance by .....Sarpanch, village Katli.....
(Name of the department/organization
.....

Place:
Date:

Signature .....
Department/Organisation/Owner
(Official Stamp) Amrit Kaur
Sarpanch
Gram Panchyat katli
Block Roop Nagar (pb)

Counter Signed
Deputy Commissioner
(Official Stamp)

Rural Tourism Development – Undertaking certificate from Katli Village

NO OBJECTION CERTIFICATE

It is certified that there is no objection if the proposed project Infrastructure development of Rural tourism cluster. eg. sewerage system, solid waste disposal accessibility to tourist sites etc on bank of River Satluj (4-Swllages) including tourist facilities, Distt. Ropar

(Name of the project)

is executed by PHTPB of the Tourism Department (Punjab) as per the guide lines of Govt. of India and ADB loan funded projects under IDIPT at Ranjitpura Bas village, Distt. Ropar

(details of land/area/ building)

Place:

Signature .....
Department /owner

Date: 4/7/2014

(Official Stamp)

ਸਰਪੰਚ
ਗ੍ਰਾਮ ਪੰਚਾਇਤ
ਰਣਜੀਤਪੁਰ ਬਾਸ (ਰੋਪੜ)

Counter Signed

Deputy Commissioner

(Official Stamp)

Rural Tourism Development – NOC from Ranjitpura Bas

CERTIFICATE AND UNDERTAKING

It is certified that: -

1. The Ranjitpura bas
(details of land/area/ building)
Where the Infrastructure development & Rural tourism cluster eg sewerage system, solid waste disposal, accessibility to tourist sites etc on banks of River Satluj (4-5 Villages) including tourist facilities, Distt. Ropar
(name of the project)
Project is proposed, for execution by PHTPB of the Tourism Department (Punjab), is under the ownership of Sarpanch, Ranjitpura bas and is
(Details of the owner)
under the possession of Sarpanch, Ranjitpura bas
(Details of possessor)

2. There is NO encroachment and NO resettlement/displacement/rehabilitation of people involved in the above Proposed Project area/building/land.

3. The proposed Project is not Partially/Fully part of any other project funded under any other scheme/programme5 of the State/Central Govt. or any external funding.

4. The assets created as a result of the execution of above stated project will be taken over for operation and maintenance by Sarpanch Ranjitpura bas
(Name of the department/organization

Place:

Date: 4/7/2014

Signature .....

Department/Organisation/Owner

(Official Stamp)

Counter Signed

Deputy Commissioner

(Official Stamp)

Rural Tourism Development – Undertaking certificate from Ranjitpura Bas

NO OBJECTION CERTIFICATE

It is certified that there is no objection if the proposed project Infrastructure development of Rural tourism cluster e.g. sewerage system, solid waste disposal accessibility to tourist sites etc on bank of River Satluj (4-5 villages) including tourist facilities, Distt Ropar

(Name of the project)

is executed by PHTPB of the Tourism Department (Punjab) as per the guide lines of Govt. of India and ADB loan funded projects under IDIPT at ...Village Bahadurpur Distt.-Ropar

(details of land/area/ building)

Place: Ropar

Date: 3/7/2014

Signature .....

Department /owner

(Official Stamp)

Counter Signed

Deputy Commissioner

(Official Stamp)

Rural Tourism Development – NOC from Bahadurpur

CERTIFICATE AND UNDERTAKING

It is certified that: -

1. The ...village Bahadurpur... (details of land/area/ building) ..... Where the ...Infrastructure development of Rural tourism cluster e.g. sewerage system, solid waste disposal accessibility to tourist sites etc on bank of river Satluj (4-5 villages) including tourist facilities, Ropar. (name of the project) Project is proposed, for execution by PHTPB of the Tourism Department (Punjab), is under the ownership of ...Sarpanch, village Bahadurpur... (Details of the owner) and is under the possession of ...Sarpanch, village Bahadurpur... (Details of possessor)

2. There is NO encroachment and NO resettlement/displacement/rehabilitation of people involved in the above Proposed Project area/building/land.

3. The proposed Project is not Partially/Fully part of any other project funded under any other scheme/programme5 of the State/Central Govt. or any external funding.

4. The assets created as a result of the execution of above stated project will be taken over for operation and maintenance by ...Sarpanch, village Bahadurpur... (Name of the department/organization ...Distt - Ropar...

Place: Ropar

Date: 3/7/2014

Signature .....

Department/Organisation/Owner

(Official Stamp)

Counter Signed

Deputy Commissioner

(Official Stamp)

Rural Tourism Development – Undertaking certificate from Bahadurpur

NO OBJECTION CERTIFICATE

It is certified that there is no objection if the proposed project Infrastructure development of Rural tourism cluster e.g. sewerage system, solid waste disposal accessibility to tourist sites etc on bank of river Satluj (4-5 villages) including tourist facilities, Ropar

(Name of the project)

is executed by PHTPB of the Tourism Department (Punjab) as per the guide lines of Govt. of India and ADB loan funded projects under IDIPT at Tibba Tappiran Distt. Ropar

(details of land/area/ building)

Place:

Date:

Signature .....

Department /owner

ਸਰਪੰਚ
ਗ੍ਰਾਮ ਪੰਚਾਇਤ
ਟਿੱਬਾ ਟੱਪਰੀਆਂ (ਰੋਪੜ)

(Official Stamp)

Counter Signed

Deputy Commissioner

(Official Stamp)

Rural Tourism Development – NOC from Tibba Tappiran

CERTIFICATE AND UNDERTAKING

It is certified that: -

1. The Tibba Tappriyan, Distt. Ropar
(details of land/area/ building)
..... Where
the Infrastructure development & Rural tourism cluster e.g. sewerage system, solid waste disposal, accessibility to tourist sites etc. on bank of river Sathj (4-5 villages) including tourist facilities, Ropar.
(name of the project)

Project is proposed, for execution by PHTPB of the Tourism Department (Punjab),

is under the ownership of Sarpanch, Tibba Tappriyan and is
(Details of the owner)

under the possession of Sarpanch, Tibba Tappriyan
(Details of possessor)

2. There is NO encroachment and NO resettlement/displacement/rehabilitation of people involved in the above Proposed Project area/building/land.

3. The proposed Project is not Partially/Fully part of any other project funded under any other scheme/programme5 of the State/Central Govt. or any external funding.

4. The assets created as a result of the execution of above stated project will be taken over for operation and maintenance by Sarpanch, Tibba Tappriyan
(Name of the department/organization

Place:

Date:

Signature .....

Department/Organisation/Owner

(Official Stamp) सरपंच Dhanwant

Counter Signed

Deputy Commissioner

(Official Stamp)

Rural Tourism Development – Undertaking certificate from Tibba Tappiran

NO OBEJECTION CERTIFICATE

It is certified that there is no objection if the project ***Widening and Strengthening of Link road from Skew bridge to Gurdwara Mata Gujri Ji via Fish Seed Farm Katli, Lodhimajra Gate, Bhadurpur, ChakDheran*** is proposed under ADB loan funded projects under IDIPT. at ***Ropar , Distt. Ropar. Punjab.***

Place:
Date:

Signature.....

Department
Executive Engineer
Constn. Division PWD B & R
Roopnagar

(Official Stamp)

Counter Signed

Deputy Commissioner
(Official Stamp)

Last Mile connectivity – NOC from PWD

CERTIFICATE AND UNDERTAKING

It is Certified that:-

1. The ***Widening and Strengthening of Link road from Skew bridge to Gurdwara Mata Gujri Ji via Fish Seed Farm Katli, Lodhimajra Gate, Bhadurpur, ChakDheran*** project is proposed and is under the ownership & possession of ***Public Works Department.***
2. There is NO encroachment and NO resettlement/displacing /rehabilitation of people scheme involved in the above Proposed Project area/building/land.
3. The Proposed Project is not Partially/Fully part of any other project funded under any other scheme/programme of the State/Central Govt. or any external funding.
4. The assets created as a result of the execution of above stated project will be taken over for operation and maintenance by ***Public Works Department.***

5. **Place:**
   Date:

Signature.....
Executive Engineer
C...
R...
Department/Organization/Owner
(Official Stamp)

Counter Signed

Deputy Commissioner
(Official Stamp)

Last Mile connectivity – Undertaking certificate from PWD

ਨੰ: ਮ.ਪ.ਮ. ਸਭਮਪ(ਰ) ਮਿਤੀ 21-11-2013
ਵੱਲੋ

ਸਹਾਇਕ ਡਾਇਰੈਕਟਰ ਮੱਛੀ ਪਾਲਣ,
ਰੂਪਨਗਰ ।

ਸੇਵਾਵਿਖੇ,

ਚੀਫ ਜਨਰਲ ਮੈਨੇਜਰ,
ਪੰਜਾਬ ਹੈਰੀਟੇਜ਼ ਐਂਡ ਟੂਰਿਜ਼ਮ ਪ੍ਰਮੋਸ਼ਨ ਬੋਰਡ,
ਚੰਡੀਗੜ੍ਹ ।

ਵਿਸ਼ਾ: **Finalization of IDIPT- ADB Tranche-2, Projects.**

ਹਵਾਲਾ: ਆਪ ਜੀ ਦਾ ਪੱਤਰ ਨੰ: PHTPB/IDIPT/2013/Tr-2/229/2494 ਮਿਤੀ 11-11-2013

ਉਪਰੋਕਤ ਵਿਸ਼ੇ ਤੇ ਹਵਾਲੇ ਅਧੀਨ ਪੱਤਰ ਦੇ ਸਬੰਧ ਵਿੱਚ ਆਪ ਜੀ ਨੂੰ ਸੂਚਿਤ ਕੀਤਾ ਜਾਂਦਾ ਹੈ, ਕਿ ਟੂਰਿਜ਼ਮ ਵਿਭਾਗ ਵੱਲੋ ਮੱਛੀ ਪੂੰਗ ਫਾਰਮ ਕੱਟਲੀ ਵਿਖੇ ਐਕੁਏਰੀਅਮ-ਕਮ-ਅਵੇਅਰਨੈਸ ਸੈਂਟਰ ਦੀ ਸਥਾਪਨਾਂ ਕਰਨ ਲਈ ਮਾਨਯੋਗ ਮੁੱਖ ਸਕੱਤਰ ਪੰਜਾਬ ਜੀ ਦੀ ਪ੍ਰਧਾਨਗੀ ਹੇਠ ਮਿਤੀ 26-3-2008 ਨੂੰ ਹੋਈ ਮੀਟਿੰਗ ਵਿੱਚ ਲਏ ਗਏ ਫੈਸਲੇ ਅਨੁਸਾਰ ਸਕੱਤਰ ਪਸ਼ੂ ਪਾਲਣ, ਮੱਛੀ ਪਾਲਣ ਅਤੇ ਡੇਅਰੀ ਵਿਕਾਸ ਵਿਭਾਗ ਜੀ ਵੱਲੋ ਡਾਇਰੈਕਟਰ ਟੂਰਿਜ਼ਮ ਪੰਜਾਬ ਚੰਡੀਗੜ੍ਹ ਜੀ ਨੂੰ ਪ੍ਰਵਾਨਗੀ ਦਿੱਤੀ ਜਾ ਚੁੱਕੀ ਹੈ (ਪੱਤਰ ਦੀ ਨਕਲ ਨੱਥੀ ਹੈ)। ਪਾਰਕਿੰਗ ਲਈ ਜਗ੍ਹਾ ਅਤੇ ਪਾਥ ਵੇਅ ਬਨਾਉਣ ਸਬੰਧੀ ਮਾਨਯੋਗ ਵਿੱਤੀ ਕਮਿਸ਼ਨਰ ਪਸ਼ੂ ਪਾਲਣ,ਮੱਛੀ ਪਾਲਣ ਅਤੇ ਡੇਅਰੀ ਵਿਕਾਸ ਵਿਭਾਗ ਪੰਜਾਬ ਜੀ ਦੀ ਪ੍ਰਧਾਨਗੀ ਹੇਠ ਮਿਤੀ 17-7-2009 ਨੂੰ ਮਿੰਨੀ ਸਕਤਰੇਤ ਚੰਡੀਗੜ੍ਹ ਵਿਖੇ ਹੋਈ ਮੀਟਿੰਗ ਵਿੱਚ ਲਏ ਗਏ ਫੈਸਲੇ ਅਨੁਸਾਰ ਇਜ਼ਾਜਤ ਦੇ ਦਿੱਤੀ ਗਈ ਸੀ (ਕਾਰਵਾਈ ਦੀ ਕਾਪੀ ਨੱਥੀ ਹੈ) ਅਤੇ ਡਾਇਰੈਕਟਰ ਏ ਵਾਰਡਨ ਮੱਛੀ ਪਾਲਣ, ਵਿਭਾਗ ਪੰਜਾਬ ਜੀ ਦੇ ਆਪ ਜੀ ਵੱਲ ਮੀਮੋ ਨੰ: 12/3/09/ਐਫ.ਈ.ਓ/ਜੀਏ/11971 ਮਿਤੀ 25-9-09 ਰਾਹੀਂ ਇਤਰਾਜ਼ਹੀਣਤਾ ਸਰਟੀਫਿਕੇਟ ਜਾਰੀ ਕੀਤਾ ਜਾ ਚੁੱਕਾ ਹੈ,ਜੀ (ਕਾਪੀ ਨੱਥੀ ਹੈ)।

ਇਥੇ ਆਪ ਜੀ ਦੇ ਧਿਆਨ ਵਿੱਚ ਲਿਆਂਦਿਆ ਜਾਂਦਾ ਹੈ, ਕਿ ਆਪ ਜੀ ਦੇ ਵਿਭਾਗ ਵੱਲੋ ਮੱਛੀ ਪੂੰਗ ਫਾਰਮ ਕੱਟਲੀ (ਰੂਪਨਗਰ) ਵਿਖੇ ਐਕੁਏਰੀਅਮ-ਕਮ-ਅਵੇਅਰਨੈਸ ਸੈਂਟਰ ਦੀ ਉਸਾਰੀ ਦਾ ਕੰਮ ਜੁਲਾਈ 2012 ਦੇ ਆਖਰੀ ਹਫਤੇ ਸ਼ੁਰੂ ਕੀਤਾ ਗਿਆ ਸੀ ਅਤੇ ਇੱਕ ਹਫਤੇ ਬਾਦ ਹੀ ਇਹ ਕੰਮ ਬੰਦ ਕਰ ਦਿੱਤਾ ਗਿਆ ।ਇਹ ਆਪ ਜੀ ਦੀ ਸੂਚਨਾਂ ਤੇ ਅਗਲੇਰੀ ਕਾਰਵਾਈ ਹਿੱਤ ਹੈ,ਜੀ ।

ਨੱਥੀ ਉਕਤ ਅਨੁਸਾਰ

ਸਹਾਇਕ ਡਾਇਰੈਕਟਰ ਮੱਛੀ ਪਾਲਣ,
ਰੂਪਨਗਰ ।

ਪਿੱਠ ਅੰਕਣ ਨੰ: 1025 ਸਭਮਪ(ਰ) ਮਿਤੀ 21-11-2013

ਉਤਾਰਾ ਡਾਇਰੈਕਟਰ ਤੇ ਵਾਰਡਨ ਮੱਛੀ ਪਾਲਣ ਵਿਭਾਗ, ਪੰਜਾਬ ਚੰਡੀਗੜ੍ਹ ਜੀ ਨੂੰ ਉਨ੍ਹਾਂ ਦੇ ਇਸ ਦਫਤਰ ਵੱਲ ਮੀਮੋ ਨੰ: 12/3/09/ਐਫ.ਈ.ਓ/ਜੀ.ਏ./12063 ਮਿਤੀ 19-11-2013 ਦੇ ਸਬੰਧ ਵਿੱਚ ਸੂਚਨਾਂ ਹਿੱਤ ਭੇਜਿਆ ਜਾਂਦਾ ਹੈ,ਜੀ ।

ਸਹਾਇਕ ਡਾਇਰੈਕਟਰ ਮੱਛੀ ਪਾਲਣ,
ਰੂਪਨਗਰ ।

DATE : DECEMBER 18,2013

NO OBJECTION CERTIFICATE & UNDERTAKINGS

I do hereby certify that the Department of forests and Wildlife Preservation, Punjab has no objection in recommending the proposed project to be taken under IDIPT-PB for execution and development as per the guidelines laid by GOI and ADB for loan funded projects for the states of Punjab.

I hereby certify that; (Ropar Eco-Tourism Project)

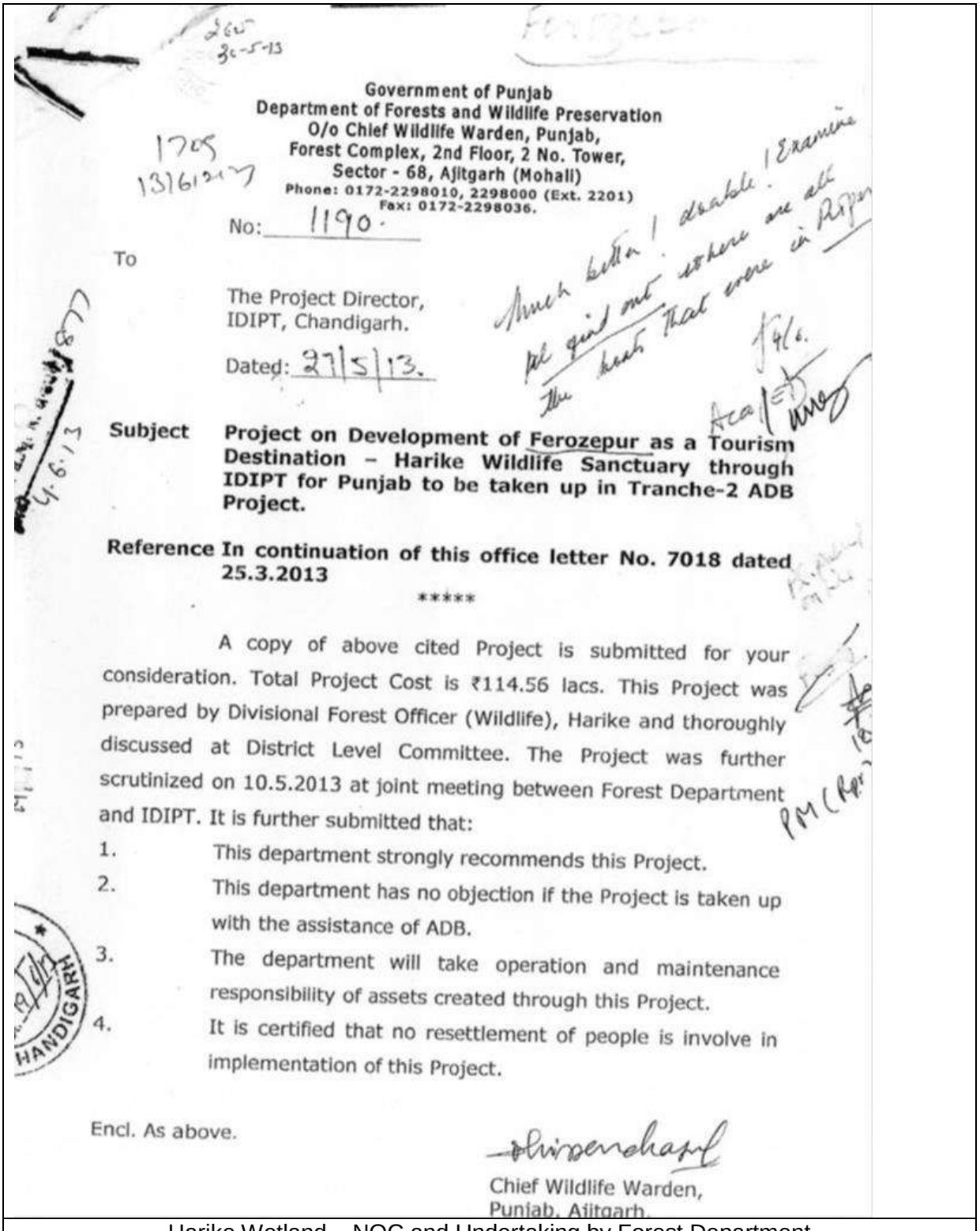
1) The Proposed project Area/Building /Land (Ropar Wet Land Wildlife Sanctuary) is under the ownership of Punjab Forest Department and presently under the possession of Department of Forest and Wildlife Preservation .
2) The Proposed Project Area /Building/Land is free from all encumbrances (Legal/Circumstantial)
3) There is no Resettlement / Displacement / Rehabilitation of people involved in the above proposed project Area/Building /Land
4) The Proposed Project Area /Building/Land is not Partially / Fully part of any other project funded under State Govt/GoI/External funding schemes
5) This Department will taken operation and maintenance of the assets created as a result of the development /execution of the proposed project under the IDIPT.

DFO WL Ropar

Chief Wildlife Warden Punjab

Head of the department
(Name of the department)

Ropar Wetland – NOC and Undertaking by Forest Department



Government of Punjab
Department of Forests and Wildlife Preservation
O/o Chief Wildlife Warden, Punjab,
Forest Complex, 2nd Floor, 2 No. Tower,
Sector - 68, Ajitgarh (Mohali)
Phone: 0172-2298010, 2298000 (Ext. 2201)
Fax: 0172-2298036.

No: 1190.

To

The Project Director,
IDIPT, Chandigarh.

Dated: 27/5/13.

Subject **Project on Development of Ferozepur as a Tourism Destination – Harike Wildlife Sanctuary through IDIPT for Punjab to be taken up in Tranche-2 ADB Project.**

Reference **In continuation of this office letter No. 7018 dated 25.3.2013**

*****

A copy of above cited Project is submitted for your consideration. Total Project Cost is ₹114.56 lacs. This Project was prepared by Divisional Forest Officer (Wildlife), Harike and thoroughly discussed at District Level Committee. The Project was further scrutinized on 10.5.2013 at joint meeting between Forest Department and IDIPT. It is further submitted that:

1. This department strongly recommends this Project.
2. This department has no objection if the Project is taken up with the assistance of ADB.
3. The department will take operation and maintenance responsibility of assets created through this Project.
4. It is certified that no resettlement of people is involve in implementation of this Project.

Encl. As above.

Chief Wildlife Warden,
Punjab, Ajitgarh.

Harike Wetland – NOC and Undertaking by Forest Department

DATE: MAY 23, 2013

NO OBJECTION CERTIFICATE & UNDERTAKINGS

I do hereby certify that the Department of Forests and Wildlife Preservation, Punjab has no objection in recommending the proposed project to be taken under IDIPT-PB, PHTPB for execution and development as per the guidelines laid by GoI and ADB for loan funded projects for the State of Punjab.

I hereby certify that;

- ☐ The Proposed Project Area/ Building/ Land (Harike Wildlife Sanctuary) is under the ownership of Punjab Forest Department and presently under the possession of Department of Forests and Wildlife Preservation.
- ☐ The Proposed Project Area/ Building/ Land is free from all encumbrances (Legal/Circumstantial).
- ☐ There is no Resettlement/ Displacement/ Rehabilitation of people involved in the above Proposed Project Area/ Building/ Land
- ☐ The Proposed Project Area/ Building/ Land is not Partially/ Fully part of any other project funded under State Govt/GoI/External funding schemes.
- ☐ This department will take operation and maintenance of the assets created as a result of the development/execution of the proposed project under the IDIPT.

Head of the department
(Name of the department)

Harike Wetland – NOC and Undertaking by Forest Department

Appendix 3: Sample Outline of Spoil Management Plan (SMP)

1.0 Purpose and application:

SMP is to describe how the project will manage the spoil generated and reuse related to design and construction works. This is an integral part of EMP. The objective of SMP is to reuse of spoil from works in accordance with the spoil management hierarchy outlined in this document.

2.0 Objectives of SMP:

The objectives of SMP are:

- To minimize spoil generation where possible
- Maximize beneficial reuse of spoil from construction works in accordance with spoil management hierarchy
- Mange onsite spoil handling to minimize environmental impacts on resident and other receivers
- Minimize any further site contamination of land, water, soil
- Manage the transportation of spoil with consideration of traffic impacts and transport related emissions

3.0 Structure of SMP:

Section 1: Introduction of SMP
Section 2: Legal and other requirements
Section 3: Roles and responsibilities
Section 4: Identification and assessment of spoil aspects and impacts
Section 5: Spoil volumes, characteristics and minimization
Section 6: Spoil reuses opportunities, identification and assessment
Section 7: On site spoil management approach
Section 8: Spoil transportation methodology
Section 9: Monitoring, Reporting, Review, and Improvements

4.0 Aspects and Potential Impacts

The key aspects of potential impacts in relation to SMP are listed in table below

Aspects	Potential Impacts
Air Quality	Potential for high winds generating airborne dust from the stock piles
Sedimentation	Potential for sediment laden site runoff from spoil stockpiles and potential for spillage of spoil from truck on roads
Surface and Groundwater	Contamination of water (surface and ground water)
Noise	Associated with spoil handling and haulage and storage
Traffic	Impacts associated with spoil haulage
Land Use	Potential for spoil to be transported to a receivable site that doesn't have permission for storage/disposal
Design specifications	Limitations on opportunities to minimize spoil generation
Sustainability	Limited sites for storage, reuse opportunities

5.0 Spoil volumes, characteristics and minimization

5.1 Spoil volume calculations: Estimate the volumes of spoils produced from each of the construction sites.

5.2 Characterization of spoil: Based on the type of spoil; characterization is done (sand stone, mud mix materials, reusable materials

5.3 Adopt Spoil Reduce, Reuse Opportunities

- An overview of the assessment methodology to be used is mentioned below.
- Consideration of likely spoil characteristics
- Identification of possible reuse sites
- Screening of possible reuse opportunities

5.4 Identification of possible safe disposal sites for spoil: Those spoils which can't be reuse shall be properly disposed in designated areas, such disposal areas should be identified in project locations. Such disposal areas should be safe from environmental aspects and there should be any legal and resettlement related issues. Such areas need to be identified and prior cliental approval should be obtained to use it as spoil disposal area. The local administration must be consulted and if required permission should be obtained from them.

5.5 Storage and stock piling

5.6 Transportation and haulage route

6.0 Based on the above, the contractor will prepare a SMP as an integral part of EMP and submit it to the PIU/DSC for their review and approval.

Appendix 4: Sample Traffic Management Plan (TMP)

A. Principles

1. One of the prime objectives of this TMP is to ensure the safety of all the road users along the work zone, and to address the following issues:

- the safety of pedestrians, bicyclists, and motorists travelling through the construction zone;
- protection of work crews from hazards associated with moving traffic;
- mitigation of the adverse impact on road capacity and delays to the road users;
- maintenance of access to adjoining properties
- Avoid hazards in
- addressing issues that may delay the project.

B. Operating Policies for TMP

2. The following principles will help promote safe and efficient movement for all road users (motorists, bicyclists, and pedestrians, including persons with disabilities) through and around work zones while reasonably protecting workers and equipment.

- Make traffic safety and temporary traffic control an integral and high-priority element of every project from planning through design, construction, and maintenance.
- Inhibit traffic movement as little as possible.
- Provide clear and positive guidance to drivers, bicyclists, and pedestrians as they approach and travel through the temporary traffic control zone.
- Inspect traffic control elements routinely, both day and night, and make modifications when necessary.
- Pay increased attention to roadside safety in the vicinity of temporary traffic control zones.
- Train all persons that select, place, and maintain temporary traffic control devices.
- Keep the public well informed.
- Make appropriate accommodation for abutting property owners, residents, businesses, emergency services, railroads, commercial vehicles, and transit operations.

C. Analyze the impact due to street closure, if required

3. Apart from the capacity analysis, a final decision to close a particular street and divert the traffic should involve the following steps:

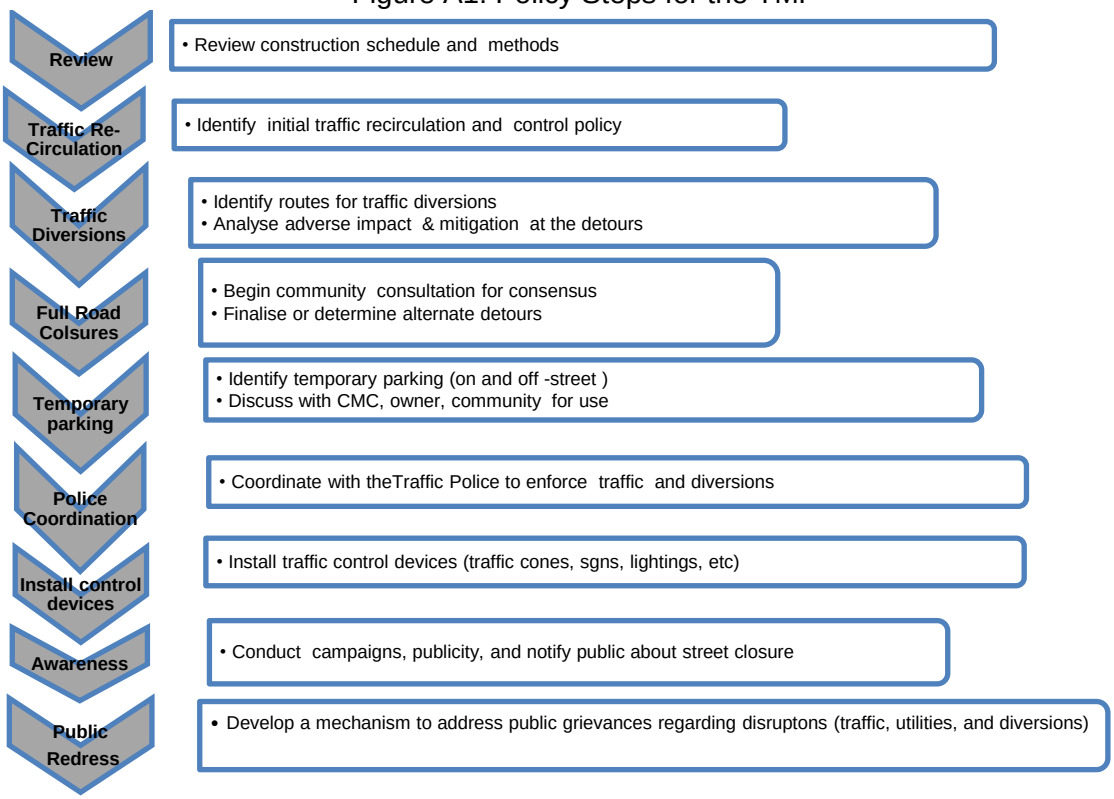
- approval from the PIU, local administration to use the local streets as detours;
- consultation with businesses, community members, traffic police, PWD, etc, regarding the mitigation measures necessary at the detours where the road is diverted during the construction;
- determining of the maximum number of days allowed for road closure, and incorporation of such provisions into the contract documents;
- determining if additional traffic control or temporary improvements are needed along the detour route;
- considering how access will be provided to the worksite;
- contacting emergency service, school officials, and transit authorities to determine if

there are impacts to their operations; and

- developing a notification program to the public so that the closure is not a surprise. As part of this program, the public should be advised of alternate routes that commuters can take or will have to take as result of the traffic diversion.

4. If full road-closure of certain streets within the area is not feasible due to inadequate capacity of the Detour Street or public opposition, the full closure can be restricted to weekends with the construction commencing on Saturday night and ending on Monday morning prior to the morning peak period.

Figure A1: Policy Steps for the TMP



D. Public awareness and notifications

5. As per discussions in the previous sections, there will be travel delays during the constructions, as is the case with most construction projects, albeit on a reduced scale if utilities and traffic management are properly coordinated. There are additional grounds for travel delays in the area, as most of the streets lack sufficient capacity to accommodate additional traffic from diverted traffic as a result of street closures to accommodate the works.

6. The awareness campaign and the prior notification for the public will be a continuous activity which the project will carry out to compensate for the above delays and minimize public claims as result of these problems. These activities will take place sufficiently in advance of the time when the roadblocks or traffic diversions take place at the particular streets. The reason for this is to allow sufficient time for the public and residents to understand the changes to their

travel plans. The project will notify the public about the roadblocks and traffic diversion through public notices, ward level meetings and city level meeting with the elected representatives.

7. The PIU will also conduct an awareness campaign to educate the public about the following issues:

(i) Traffic control devices in place at the work zones (signs, traffic cones, barriers, etc.);
(ii) Defensive driving behaviour along the work zones; and
(iii) Reduced speeds enforced at the work zones and traffic diversions.

8. It may be necessary to conduct the awareness programs/campaigns on road safety during construction.

9. The campaign will cater to all types of target groups i.e. children, adults, and drivers. Therefore, these campaigns will be conducted in schools and community centers. In addition, the project will publish a brochure for public information. These brochures will be widely circulated around the area and will also be available at the PIU, and the contractor's site office. The text of the brochure should be concise to be effective, with a lot of graphics. It will serve the following purpose:

(i) explain why the brochure was prepared, along with a brief description of the project;
(ii) advise the public to expect the unexpected;
(iii) educate the public about the various traffic control devices and safety measures adopted at the work zones;
(iv) educate the public about the safe road user behaviour to emulate at the work zones;
(v) tell the public how to stay informed or where to inquire about road safety issues at the work zones (name, telephone, mobile number of the contact person; and
(vi) indicate the office hours of relevant offices.

E. Vehicle Maintenance and Safety

10. A vehicle maintenance and safety program shall be implemented by the construction contractor. The contractor should ensure that all the vehicles are in proper running condition and it comply with roadworthy and meet certification standards of GoN. All vehicles to be used at STWSSP shall be in perfect condition meeting pollution standards of GoN. The vehicle operator requires a pre state of shift checklist. Additional safety precautions will include the requirement for:

- Driver will follow the special code of conduct and road safety rules of Government of Nepal.
- Drivers to ensure that all loads are covered and secured drivers to ensure operation equipment can’t leak materials hauled
- Vehicles will be cleaned and maintained in designed places.

F. Install traffic control devices at the work zones and traffic diversion routes

10. The purpose of installing traffic control devices at the work zones is to delineate these areas to warn, inform, and direct the road users about a hazard ahead, and to protect them as well as the workers. As proper delineation is a key to achieve the above objective, it is important to install good traffic signs at the work zones. The following traffic control devices are used in work zones:

- Signs
- Pavement Markings
- Channelizing Devices
- Arrow Panels
- Warning Lights

11. Procedures for installing traffic control devices at any work zone vary, depending on road configuration, location of the work, construction activity, duration, traffic speed and volume, and pedestrian traffic. Work will take place along major roads, and the minor internal roads. As such, the traffic volume and road geometry vary. The main roads carry considerable traffic; internal roads in the new city areas are wide but in old city roads very narrow and carry considerable traffic. However, regardless of where the construction takes place, all the work zones should be cordoned off, and traffic shifted away at least with traffic cones, barricades, and temporary signs (temporary “STOP” and “GO”).

12. The work zone should take into consideration the space required for a buffer zone between the workers and the traffic (lateral and longitudinal) and the transition space required for delineation, as applicable. For the works, a 30 cm clearance between the traffic and the temporary STOP and GO signs should be provided. In addition, at least 60 cm is necessary to install the temporary traffic signs and cones.

13. Traffic police should regulate traffic away from the work zone and enforce the traffic diversion result from full street closure in certain areas during construction. Flaggers/ personnel should be equipped with reflective jackets at all times and have traffic control batons (preferably the LED type) for regulating the traffic during night time.

14 In addition to the delineation devices, all the construction workers should wear fluorescent safety vests and helmets in order to be visible to the motorists at all times. There should be provision for lighting beacons and illumination for night constructions.

15. The PIU and contractor will coordinate with the local administration and traffic police regarding the traffic signs, detour, and any other matters related to traffic. The contractor will prepare the traffic management plan in detail and submit it along with the EMP for the final approval.

Appendix 5: Public Consultations

Public Consultations shall be done during detailed design phase and included in final IEE report

S.No.	Place	Date	Number of participants	Participants	Issues discussed
1.	Chandigarh	December 2013	10	Officials of Tourism Department and other line departments (including Revenue Department, Forest Department, PWD etc.,)	Finalization of project components, environment and social safeguard requirements
2.	Rupnagar	December 2013	12	Officials of forest department, tourism department, and revenue department	Proposed design elements, clearance requirements, environment and social policies of ADB.
3.	Rupnagar	December 2013	7	Representatives of village panchayat committee and Tourists/ NGO's	Discussion on the project components, Infrastructure requirement. Land availability, environmental issues and other tourism issues
4.	Chandigarh	December 2013	6	Officials of PWD Dept / Irrigation Dept Forest Department/ Punjab Pollution Control Board	Proposed design elements, Land availability, NOC/ clearance requirements, environment and social policies of ADB.
5.	Chandigarh	December 2013	11	Officials of Tourism Department and line departments	Role of Environmental and Social safeguard and the necessity of IEE in the project implementation and methodology adopted

Date: 27th December 2013

Objective: This exercise was undertaken to access the acceptance of our proposed scope of work by the Forest Officers/ local community/visitors. The outcome of this consultation would enable us to modify and finalize the SCR and help us in the preparation of the relevant docs for SAR/DDR/DPR and other round of consultations during the various phases of Project implementation.

Procedure: An informal FGD/Individual interviews were done with various stakeholders at that site.

Line agency departments/ community members: All DFOs, Wildlife Wardens, local community members are all in favour of the project. All line agency departments and officers have agreed to provide NOCs and undertakings and give their full support in the implementation of the project and maintenance of the assets.

Vendors/Visitors: There are no vendors/ hawkers at the site. There are tourists / community members visiting the sites seasonally.

Major Problems: Tourists especially women are facing problems due to poor toilet/ sanitation facilities and defecate in open forest area only, which further creates nuisance for officers at site. Further, tourists/ school children/ local community groups are not able to appreciate the flora and fauna due to poor interpretation/ informative facilities/ signages.

Recommendations from the stakeholders: All Stakeholders/ line agency department officers have provided recommendations for project components and the same will be incorporated to design the SARs and DPR documents of the project. Tourists/ women groups have recommended providing better sanitation/ toilet facilities for the tourists especially women, who face problems in defecating in open. School children from locality have suggested better interpretative/ signages on the sites to appreciate the ecological wealth of the wetland, as this will promote Eco tourism in the long run. Local community/ village Panchayat members have expressed their desire for training in livelihood generation trainings.

Photographs of public consultation at site

Appendix 6: Sample Grievance Redress Form

(To be available in Local Language and English)

The _____Project welcomes complaints, suggestions, queries and comments regarding project implementation. We encourage persons with grievance to provide their name and contact information to enable us to get in touch with you for clarification and feedback. Should you choose to include your personal details but want that information to remain confidential, please inform us by writing/typing *(CONFIDENTIAL)* above your name. Thank you.

Date		**Place of registration**			
Contact Information/Personal Details					
Name		**Gender**	* Male * Female	**Age**	
Home Address					
Place					
Phone no.					
E-mail					
Complaint/Suggestion/Comment/Question Please provide the details (who, what, where and how) of your grievance below: If included as attachment/note/letter, please tick here:					
How do you want us to reach you for feedback or update on your comment/grievance?					

FOR OFFICIAL USE ONLY

Registered by: (Name of Official registering grievance)	
Mode of communication: Note/Letter E-mail Verbal/Telephonic	
Reviewed by: (Names/Positions of Official(s) reviewing grievance)	
Action Taken:	
Whether Action Taken Disclosed:	Yes No
Means of Disclosure:	

Appendix 7: Sample Semi-Annual Environmental Monitoring Report Template

This template must be included as an Appendix in the EIA/IEE that will be prepared for the project. It can be adapted to the specific project as necessary.

INTRODUCTION

- Overall project description and objectives
- Description of sub-projects
- Environmental category of the sub-projects
- Details of site personnel and/or consultants responsible for environmental monitoring
- Overall project and sub-project progress and status

No.	Sub-Project Name	Status of Sub-Project				List of Works	Progress of Works
		Design	Pre-Construction	Construction	Operational		
		☐	☐	☐	☐		
		☐	☐	☐	☐		
		☐	☐	☐	☐		

COMPLIANCE STATUS WITH NATIONAL/STATE/LOCAL STATUTORY ENVIRONMENTAL REQUIREMENTS

No.	Sub-Project Name	Statutory Environmental Requirements	Status of Compliance	Action Required

COMPLIANCE STATUS WITH ENVIRONMENTAL LOAN COVENANTS

No. (List schedule and paragraph number of Loan Agreement)	Covenant	Status of Compliance	Action Required

COMPLIANCE STATUS WITH THE ENVIRONMENTAL MANAGEMENT AND MONITORING PLAN

- Provide the monitoring results as per the parameters outlined in the EMP. Append supporting documents where applicable, including Environmental Site Inspection Reports.
- There should be Reporting on the following items which can be incorporated in the checklist of routine Environmental Site Inspection Report followed with a summary in the semi-annual Report send to ADB. Visual assessment and review of relevant site documentation during routine site inspection needs to note and record the following:
- What are the dust suppression techniques followed for site and if any dust was noted to escape the site boundaries;
- If muddy water was escaping site boundaries or muddy tracks were seen on adjacent roads;

- adequacy of type of erosion and sediment control measures installed on site, condition of erosion and sediment control measures including if these were intact following heavy rain;
- Are their designated areas for concrete works, and refuelling;
- Are their spill kits on site and if there are site procedure for handling emergencies;
- Is there any chemical stored on site and what is the storage condition?
- Is there any dewatering activities if yes, where is the water being discharged;
- How are the stockpiles being managed;
- How is solid and liquid waste being handled on site;
- Review of the complaint management system;
- Checking if there are any activities being under taken out of working hours and how that is being managed.

Summary Monitoring Table

Impacts (List from IEE)	Mitigation Measures (List from IEE)	Parameters Monitored (As a minimum those identified in the IEE should be monitored)	Method of Monitoring	Location of Monitoring	Date of Monitoring Conducted	Name of Person Who Conducted the Monitoring
Design Phase						
Pre-Construction Phase						
Construction Phase						
Operational Phase						

Overall Compliance with CEMP/EMP

No.	Sub-Project Name	EMP/CEMP Part of Contract Documents (Y/N)	CEMP/EMP Being Implemented (Y/N)	Status of Implementation (Excellent/ Satisfactory/ Partially Satisfactory/ Below Satisfactory)	Action Proposed & Additional Measures Required

APPROACH AND METHODOLOGY FOR ENVIRONMENTAL MONITORING OF THE PROJECT

- Brief description on the approach and methodology used for environmental monitoring of each sub-project

MONITORING OF ENVIRONMENTAL IMPACTS ON PROJECT SURROUNDINGS (AMBIENT AIR, WATER QUALITY AND NOISE LEVELS)

- Brief discussion on the basis for monitoring
- Indicate type and location of environmental parameters to be monitored
- Indicate the method of monitoring and equipment to be used
- Provide monitoring results and an analysis of results in relation to baseline data and statutory requirements

As a minimum the results should be presented as per the tables below.

Air Quality Results

Site No.	Date of Testing	Site Location	Parameters (Government Standards)		
			PM10 (µg/m3)	SO2 (µg/m3)	NO2 (µg/m3)

Site No.	Date of Testing	Site Location	Parameters (Monitoring Results)		
			PM10 (µg/m3)	SO2 (µg/m3)	NO2 (µg/m3)

Water Quality Results

Site No.	Date of Sampling	Site Location	Parameters (Government Standards)					
			pH	Conductivity (µS/cm)	BOD (mg/L)	TSS (mg/L	TN (mg/L)	TP (mg/L)

Site No.	Date of Sampling	Site Location	Parameters (Government Standards)					
			pH	Conductivity (µS/cm)	BOD (mg/L)	TSS (mg/L	TN (mg/L)	TP (mg/L)

Noise Quality Results

Site No.	Date of Testing	Site Location	LAeq (dBA) (Government Standard)	
			Day Time	Night Time

Site No.	Date of Testing	Site Location	LAeq (dBA) (Government Standard)	
			Day Time	Night Time

SUMMARY OF KEY ISSUES AND REMEDIAL ACTIONS

- Summary of follow up time-bound actions to be taken within a set timeframe.

Annexes

- Photos
- Summary of consultations
- Copies of environmental clearances and permits
- Sample of environmental site inspection Report
- Other

Appendix 8: Sample Environmental Site Inspection Report

Project Name
Contract Number

NAME:_____ DATE:_____
TITLE: _____ DMA: _____
LOCATION:_____ GROUP_____
WEATHER CONDITION:

INITIAL SITE CONDITION:

CONCLUDING SITE CONDITION:

Satisfactory _____ Unsatisfactory_____ Incident_____ Resolved _____Unresolved _____

INCIDENT:
Nature of incident:

Intervention Steps:

Incident Issues

Resolution

Project Activity Stage	Survey	
	Design	
	Implementation	
	Pre-Commissioning	
	Guarantee Period	

Inspection

Emissions	Waste Minimization
Air Quality	Reuse and Recycling
Noise pollution	Dust and Litter Control
Hazardous Substances	Trees and Vegetation

Site Restored to Original Condition Yes No

Signature

_____

_____ _____
Name Position