CHAPTER – 6

MITIGATION MEASURES

6.1 INTRODUCTION

The purpose of a mitigation programme is to manage the environmental effects resulting from implementation of the Project in a manner that minimizes adverse impacts and maximizes secondary benefits. It is a planning step that has evolved naturally from the process of identifying and assessing potential impacts. Considerations have been kept in view throughout the planning process, so that it is more effective for changes to be made at the least cost. The strategy for planning process, therefore, has involved overall siting decisions such as the avoidance of centres of human population as well as modifications in project design, construction and operation. As discussed in Chapter 3 and 4, planning of Patrind Hydropower Project has duly considered this approach by focusing on environmental and socio-economic parameters. Besides, the project operation will be required to maximize the power output keeping ecological disruption the minimum. In this context a broad overview of the mitigation measures for the Project is given in Table 6.2.

The mitigation measures are discussed in the following sections with reference to physical and biological environment of the project area. The mitigation measures for the socio-economic environment are discussed in Chapter 5 titled "Land Acquisition and Resettlement Plan".

6.2 PHYSICAL ENVIRONMENT

The issues regarding the physical environment of the project area requiring mitigation related to disposal of excavated material, variations of flow downstream of the weir, environmental pollution control and public health and safety of workers.

6.2.1 MITIGATION MEASURES FOR EXCAVATED MATERIAL

Table 6.1 shows quantities of excavated material and fill material for project implementation. It shows that for the Coffer Dams on Kunhar river, fill

requirements (21,767 m^3) are more than cut (11,014 m^3) obviating any requirement for disposal of surplus spoil in case of coffer dams. About 16,000 m^3 of the total 100,100 m^3 of the excavated material from Diversion Channel will be used for the coffer dams on Jhelum river. The rest of the excavated material will be stacked on the embankments of the diversion channel, thus there will be no need for any extra disposal site. The coffer dams will be removed after the completion of the required works and the material used in coffer dams and on the embankments of the diversion channel will be used for the reinstatement of the site to its original position after the construction of permanent bridge across Jhelum river. The surplus material on the weir side requiring disposal is 581,118 m^3 and surplus material requiring on the powerhouse side is 317,117 m^3.

Table 6.1: Quantities of Excavation Work and Fill Material for Project Implementation

Sr. #	Project Component	Excavation (m^3)			Fill (m^3)	
		Overburden	Rock Open Slope Cut	Rock Underground	Overburden	Rock
	Coffer Dam					
1.	Coffer Dam at Kunhar River	11,014			12,975	8,792
	Weir Side Structures					
2.	Diversion Tunnel		7,773	14,696		
3.	Weir Structure	160,586	225,193			8,370
4.	Headrace Intake and Sand Trap	44,878	220,249	2,262		63,680
	Sub Total (2+3+4)	**205,464**	**453,915**	**16,958**	**-**	**72,050**
	Powerhouse Side Structures					
5.	Headrace / Pressure Tunnel,	-	15,667	157,884	228	-

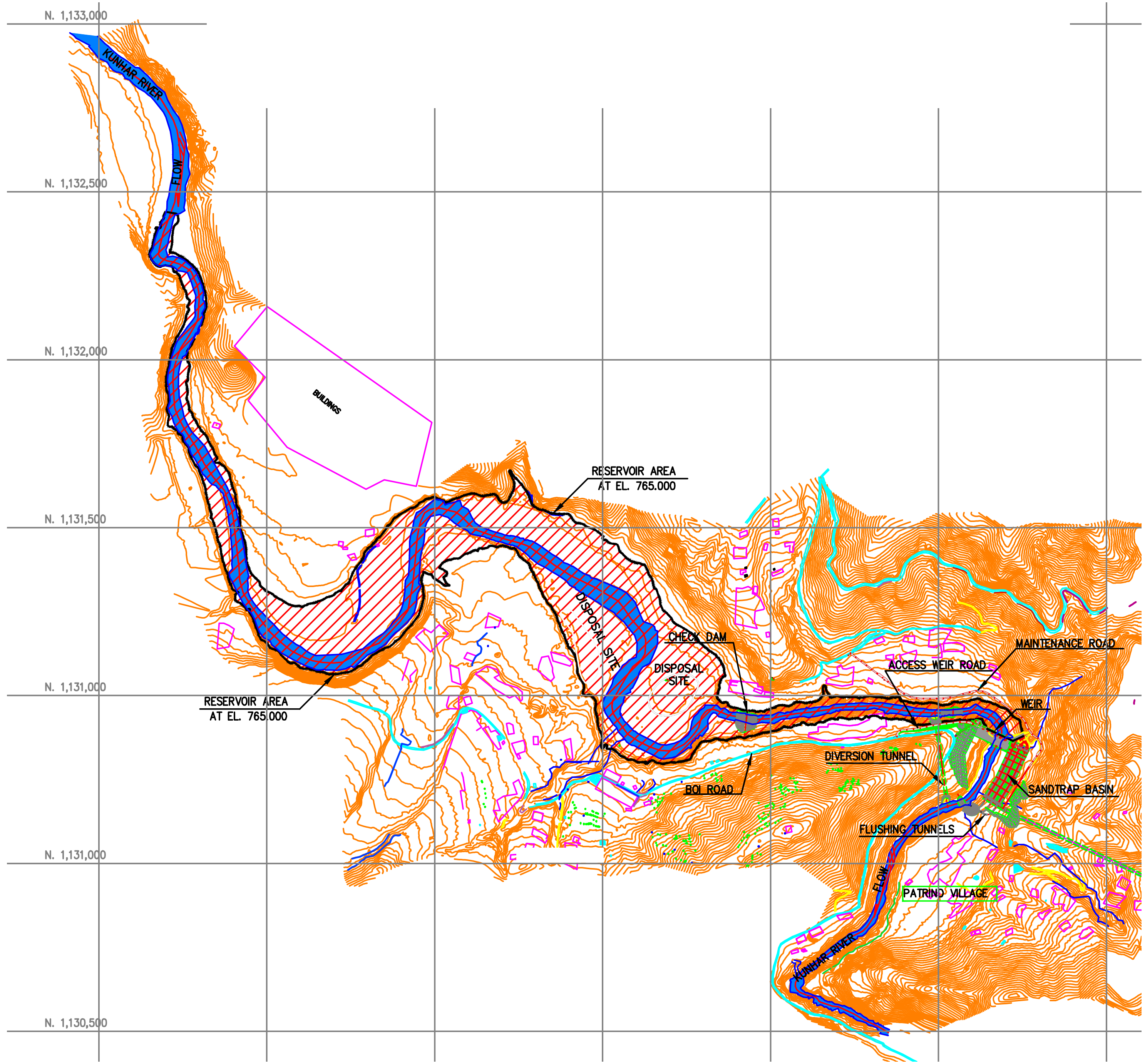


Figure 6.1 : Sites for Disposal of Excavated Material near Weir Site

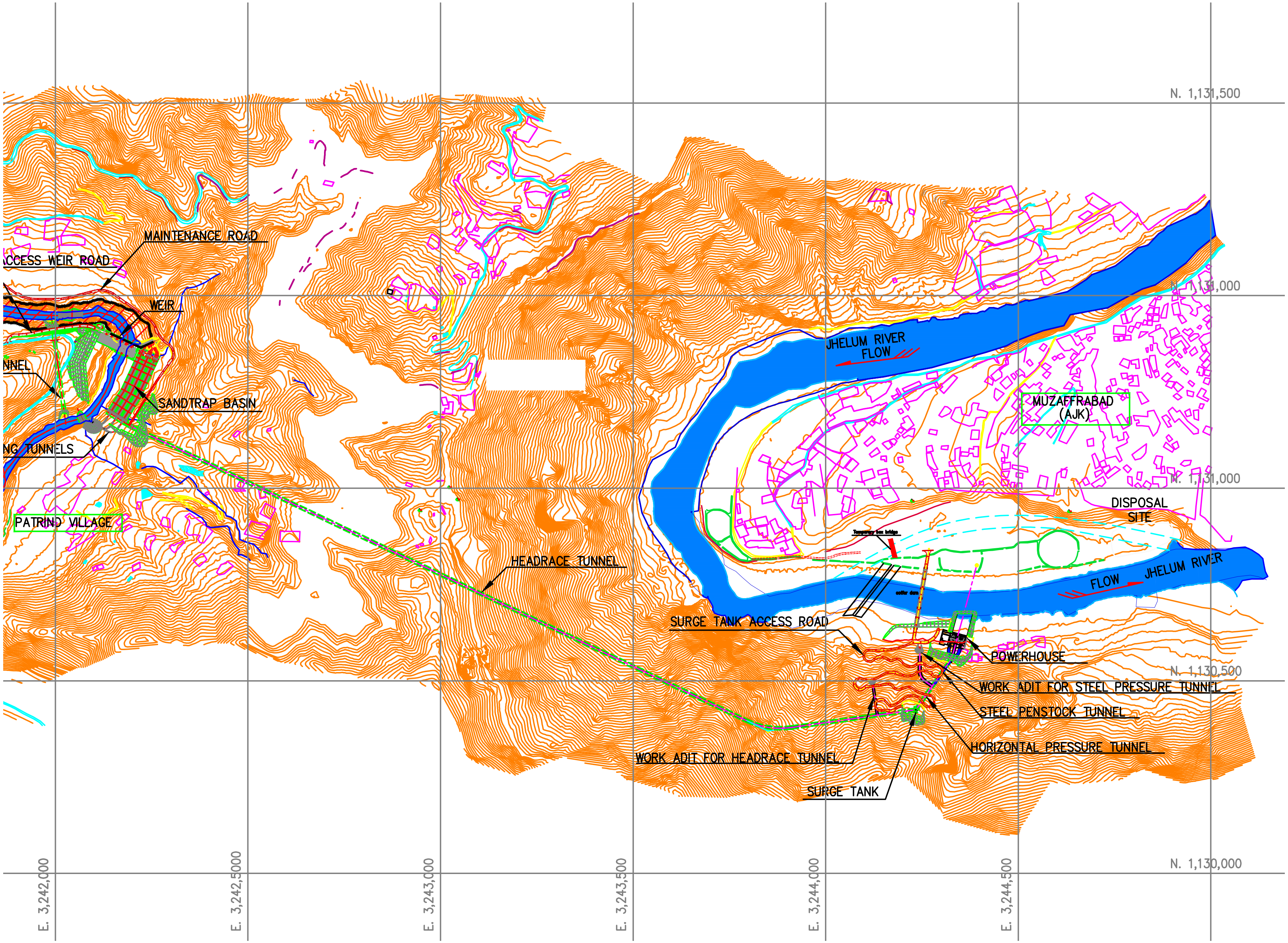


Figure 6.2 Sites for Disposal of Excavated Material near Power House Site

	Pressure Shaft and Surge Chamber					
6.	Power House	51,065	110,717	-	17,988	-
7.	Coffer Dam at Jhelum River				16,000	
8.	Diversion Channel		100,100			
	Sub Total (5+6)	**51,065**	**226,484**	**157,884**	**34,216**	**-**

Weir side surplus requiring disposal is thus 205,464 + 453,915 + 16,958 – 72,050 = 604,287 m^3 and powerhouse side surplus requiring disposal is thus 51,065 + 226,484 + 157,884 – 34,216 = 401,217 m^3 .

Disposal of surplus excavated material into any of the two rivers may cause a number of environmental problems and is, therefore, unacceptable. In order to facilitate and economise the transportation costs, the excavated material will be disposed off in the vicinity of its production. Locations for the disposal of surplus excavated material in the vicinity of weir and powerhouse site have been proposed. The proposed land area for disposal of excavated material has been estimated at 21 acres for weir side and 35 acres for powerhouse side. The land areas available in the vicinity of weir and powerhouse site are shown in Figures 6.1 and 6.2. The proposed disposal sites have easy access. The weir side area is a low lying area having requisite capacity to accommodate the surplus excavated material.

6.2.2 MITIGATION MEASURES FOR EROSION CONTROL

Considering the site conditions and the various erosion control methods like vegetation and forestation are the most effective and economical. These methods are recommended as the preferred options for erosion control. The affected areas should be planted with grass cover, tiny bushes and trees. Furthermore, land construction slope should be kept as flat as is reasonably possible. Methods such as slope rounding, terracing or contouring to minimize erosion and to promote plant growth will be adopted.

The commonly available erosion control processes are listed below:

- Grading

- Compaction
- Vegetation
- Surfacing and pitching
- Soil stabilization (chemical, stone surface pitching)
- Hydrographic modification (channelling, diversion, culverts, stream crossing)
- Retaining structures and terracing.

The mitigation plan for soil erosion during construction and in the post construction period must include the following principles;

- Plan the alignment and construction activities to fit the topography, soils, waterways and natural vegetation at the site.
- Expose the smallest area of the land for work over shortest possible time.
- Apply soil erosion control practices as first line of defence against the offsite damage.
- Maintenance programme after completion of construction.
- Protect and preserve forest and vegetation cover as much as possible through proper control and management of the site.
- Construction and maintaining temporary drainage channels around areas where major construction activity and construction spoils are located. The drainage system should preferably lead the water to a temporary pool or swamp before it is properly discharged in the river, to settle extra suspended material related to construction activity.

6.2.3 MITIGATION OF FLOW VARIATIONS DOWNSTREAM OF WEIR

It should be noted that the topography of Kunhar river valley downstream of weir is characterized by high banks with relatively deeper bed levels preventing use of Kunhar river for agricultural irrigation and drinking water supplies.

The operation of the project for hydropower generation will result in reduction of flow downstream of weir. Minimum 2 cumecs of water from the headpond will be released as ecological flow throughout the year. This flow (2 cumecs) is in addition to substantial flow which joins Kunhar river in the form of large and

small streams downstream of the weir thus providing mitigation measures for aquatic flora and fauna in the reach downstream of the weir.

6.2.4 ENVIRONMENTAL POLLUTION CONTROL

In order to offset the noise and dust pollution-related impacts during the construction period, the equipment that is expected to produce noise levels above NEQS/ WB Guidelines should preferably be operated during the day time and under confined conditions. This should be made part of the construction planning schedule. Although it is expected that noise levels may be violated but they can be minimized through effective management, monitoring and maintenance of construction equipment and vehicles.

Sprinkling of water to settle dust should be practiced frequently in areas where equipment like compressors, blowers, dumpers and excavators would be in use. All dust emitting activities should be sited at least 300 – 400 m away from residential areas and construction workers should be provided with necessary masks to protect them from any adverse health effects.

6.2.5 WATER SUPPLY, SANITATION AND SOLID WASTE MANAGEMENT

To meet the demand of the drinking water supply and sanitation during the construction period, it is recommended that proper water supply system should be provided at the site using water from springs. For proper sanitation facilities, pour flush type latrines with septic tanks are recommended. Also proper arrangements of solid waste management should be made in construction camps. All such facilities are to be provided by the EPC Contractors.

6.3 BIOLOGICAL ENVIRONMENT

6.3.1 TREE CUTTING

The project in no way affects the reserve forest areas as they occur in the far upper reaches. Trees would be cut which at present exist on the land designated for the headpond, powerhouse, construction and storage camps as well as those along the alignment of roads. The cutting of trees will affect the ecological balance of the area and enhance soil erosion and landslide potential. As a mitigation measure, it is recommended that only the smallest possible number of trees should be cut to clear the land for construction. In order to restore the ecological balance of the area, the EPC contractor/project sponsor

should plant as many trees as will be cut down during the project implementation. The agreement with the EPC Contractor should include specific provision for the same.

Access roads are proposed for weir, powerhouse and surge tank opening up areas which hitherto are inaccessible. Under this situation establishment of additional check posts by Departments of Forest and Wildlife at vulnerable points and more strict vigilance for loggers and poachers will help mitigate impacts on forests and wildlife.

6.3.2 TREE CUTTING/ SCENIC VALUE

The scenic beauty impaired by cutting of trees for the project implementation can be restored by landscaping and planting of trees at specific places of the project area. This will be achieved by making use of the annual tree plantation campaigns in which about 10,000 plants are planted annually by the Provincial Forest Departments free of cost.

6.3.3 MITIGATION MEASURES FOR WILDLIFE PROTECTION

- Disposal areas of surplus spoil on the weir side area should be covered with top soil. This will help vegetation growth which may ultimately result in the creation of new habitats for wildlife.
- Lubricants, waste oil and other chemical wastes should be collected and disposed off safely.
- Labour and supervisory staff associated with the project should be properly educated to protect wildlife.
- Any stray animal found may be handed over to Wildlife Department officials.
- Noise related to blasting and construction activity should be kept within levels prescribed in NEQS/ World Bank Guidelines values through necessary management and control measures.

6.3.4 MITIGATION MEASURES FOR LIVESTOCK

No mitigation is required for livestock. However, the villagers living near the inlet and outlet portals of the headrace tunnel should be informed well in advance when blasting work takes place to avoid any damage to livestock.

Drivers hauling the excavated material or using any other vehicle may ensure the safe road crossing of the livestock. Construction waste especially lubricants may be disposed away from range lands. Similarly airborne dust may be minimized by periodic sprinkling.

6.3.5 MITIGATION OF STRESS EFFECT ON RIVER ECOLOGY

There is no exact way of quantifying and mitigating this effect. Monitoring is thus the best alternative. The requisite water flow should be available in the affected reach as discussed under the topic "reserved flow" in Section 3.2.6.

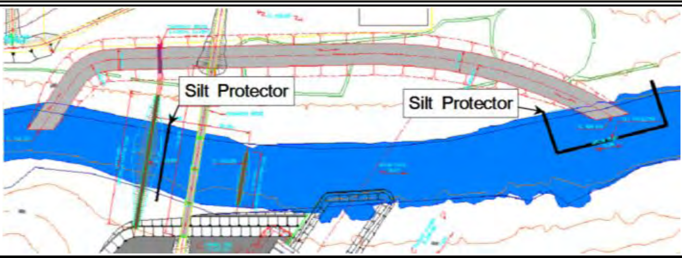
Pollution control measures for rivers by human activity should be promoted as much as possible by providing sanitation facilities to the people living in the areas of affected reach.

6.3.6 MITIGATION MEASURES FOR EROSION IN DIVERSION CHANNEL ALONG JHELUM RIVER

To control the erosion, water tight mat and gravel cover will be placed on the upstream coffer dam on the side facing the flow of the river and along the sides of the diversion channel. After the construction of bridge across Jhelum River the coffer dams will be removed and the spoil will be used for the reinstatement of the location of diversion channel to its original position.

6.3.7 MITIGATION MEASURES FOR ENVIRONMENTAL POLLUTION DURING CONSTRUCTION OF TEMPORARY DIVERSION CHANNEL

- Plans to reduce turbid water during construction of the cofferdams
  - Installation of the silt protector at the downstream during construction of the cofferdams in order to prevent water pollution caused by soil runoff.
  - Protection of the environment by preventing turbid water diffusion
  - Reducing turbid water generation by applying the diversion works during construction of the cofferdams

The Installation Position of the Silt Protector	An Example of the Silt Protector
	

Installation of the Silt Protector

Before Installation	After Installation
	

The Effect of the Silt Protector Installation

- Plans to reduce turbid water during construction of the diversion channel
  - Prevention of soil runoff by slope protection of the diversion channel using straw mat, vinyl cover and etc.
  - If oil spills, absorption fabric, oil fence and etc. will be installed quickly to prevent contamination.

6.4 PUBLIC HEALTH AND SAFETY OF WORKERS

The contractor shall provide on-site safety induction training for his personnel upon starting of construction work.

- The contractor shall provide personal protective equipment, including hard hats gloves, safety shoes, and such other equipment as required, and shall take all measures or actions for the protection and safety of contractor personnel.
- Non-metallic hard hats shall be worn at all times by all personnel at work site with the exception of those areas where the engineer has indicated it not necessary to do so.
- Safety glasses if required shall meet international standards and be

available for use and worn in specified worksites areas. As a minimum, safety glasses shall be worn for the following types of work, hammering, chipping, welding, grinding, use of electricity powered or pneumatic equipment, insulation handling, spray painting, working with solvents, and other jobs where the potential of an eye injury exists.

- Personnel shall not be permitted to work whilst wearing personal clothing or footwear likely to be hazardous to themselves or others.
- Hearing protection, including muffs, plugs or a combination thereof, shall be provided for all personnel operating in areas where the noise level exceeds 90 decibels.
- The contractor shall encourage employees to wear substantial work gloves whenever it is practical and is safe to do so.

6.4.1 COMMUNITY HEALTH, SAFETY AND SECURITY

Public health and safety measures will also be undertaken such as barriers and warning signs at required places. All safety, health, environmental and other safety notices and signs shall be clearly displayed and written in both Urdu and English.

6.5 SOCIO-ECONOMIC UPLIFT

The project implementation is expected to raise hopes of the project area population for their general welfare. It is therefore, necessary that EPC Contractor/Project Sponsor may provide facilities in the form of education and health to the people of the project area.

Table 6.2: Socio-Environmental Impacts and Mitigation Measures for Patrind Hydropower Project

Sr. #	Potential Impacts	Mitigating Measures	Mitigation Strategy for Patrind Hydropower Project
1.	Environmental effects of construction activity: air and water pollution from construction and waste disposal Soil erosion destruction of vegetation from construction camps	1. Measures to minimize impacts due to construction activity Air and water pollution control, careful location of camps, buildings, borrow pits, quarries, spoil and disposal sites Precautions to minimize erosion Plantation program	1. Measures to mitigate impacts due to construction activity Compliance with NEQS/ World Bank Guidelines for on-site waste treatment and disposal facilities Grading, compaction, pitching, retaining structures and terracing. Vegetation and reforestation and tree plantation under annual tree plantation campaigns of the provincial government
2.	Dislocation of people living in inundation zone.	2. Provision of compensation and employment opportunities.	2. Compensation in accordance with Asian Development Bank Policy Statement 2009/The World Bank Guidelines
3.	Loss of land (agricultural, forest, range, wetlands) by inundation to form reservoir.	3. Siting of dam to decrease losses; decrease size of dam and reservoir; protect equal areas in region to offset losses.	3. Weir instead of dam to decrease size of reservoir and minimize losses
4.	Loss of historic, cultural or aesthetic features by inundation.	4. Siting of dam or decrease of reservoir size to avoid loss; salvage or protection of cultural properties.	4. No cultural property affected
5.	Loss of wild lands and wildlife habitat.	5. Siting of dam or decrease of reservoir size to avoid/minimize loss; animal rescue and relocation.	'5. Weir instead of dam to decrease size of reservoir and minimize losses; animal rescue and relocation

6.	Proliferation of aquatic weeds in reservoir and downstream impairing dam discharge, irrigation systems, navigation and fisheries and increasing water loss through transpiration.	6.	Clearance of woody vegetation from inundation zone prior to flooding (nutrient removal); provide weed control measures; harvest of weeds for compost, fodder or biogas; regulation of water discharge and manipulation of water levels to discourage weed growth.	6.	No removal of nutrients which are needed for future development of fishery in the reservoir creating opportunities of income for local population
7.	Deterioration of water quality in reservoir.	7.	Clearance of woody vegetation from inundation zone prior to flooding. Control of land uses, wastewater discharges, and agricultural chemical use in watershed. Limit retention time of water in reservoir. Provision for multi-level releases to avoid discharge of anoxic water.	7.	Cutting of all trees in inundation zone Watershed monitoring and management for water pollution control by SHYDO. Reservoir operation to be coordinated with management of river discharges/ outflows for energy generation Under sluicing Provided
8.	Sedimentation of reservoir and loss of storage capacity.	8.	Control of land use in watershed (especially prevention of conversion of forests to agriculture). Reforestation and/or soil conservation activities in watersheds (limited affect). Hydraulic removal of sediments (flushing, sluicing, release of density currents).	8.	Watershed management to control deforestation Watershed management to promote reforestation and soil conservation activities Under sluicing provided
9.	Formation of sediment deposits at reservoir entrance creating backwater effect and flooding and water logging upstream.	9.	Sediment flushing, sluicing.	9.	Under sluicing provided
10.	Scouring of riverbed below dam.	10.	Design of trap efficiency and sediment release (e.g., sediment flushing, sluicing) to increase salt content of released water.	10.	Under sluicing provided
11.	Decrease in floodplain (recession) agriculture.	11.	Regulation of dam releases to partially replicate natural flooding regime.	11.	Reservoir operation to partially replicate flooding regime for cession agriculture

12.	Salinization of floodplain lands.	12.	Regulation of flow to minimize effect.	12.	Reservoir operation to minimize effect
13.	Salt water intrusion in estuary and upstream.	13.	Maintenance of at least minimum flow to prevent intrusion.	13.	The project area is inland territory far away from estuary/ coastline of the country.
14.	Disruption of riverine fisheries due to changes in flow, blocking of fish migration, and changes in water quality and limnology.	14.	Maintenance of at least minimum flow for fisheries; provision of fish ladders and other means of passage; provide protection of spawning grounds; aquaculture and development of reservoir fisheries in compensation.	14.	Existing fishery potential is not significant. Development of future reservoir fishery potential proposed for implementation by provincial department of fisheries
15.	Snagging of fishing nets in submerged vegetation in reservoir.	15.	Selective clearance of vegetation before flooding.	15.	At present no fishing activity exists.
16.	Increase of water-related diseases.	16.	Design and operation of dam to decrease habitat for Vector control. Disease prophylaxis and treatment.	16.	Vector control, disease prophylaxis and treatment discussed for a public health protection plan with NWFP Department of Health, Mansehra
17.	Conflicting demands for water use.	17.	Planning and management of dam in context of regional development plans; equitable allocations of water between large and small holders and between geographic regions of valley.	'17.	Sarhad Hydro-development Agency (SHYDO) planning and managing regional plans in NWFP.
18.	Social disruption and decrease in standard of living of resettled people.	18.	Maintenance of standard of living by ensuring access to resources at least equaling those lost; provision of health and social services.	18	On-site resettlement and compensation provided in the resettlement plan
19.	Environmental degradation from increased pressure on land.	19.	Choice of resettlement site to avoid surpassing carrying capacity of the land. Increase of productivity or improve management of land (agricultural, range, forestry improvements) to accommodate higher population.	19.	On-site resettlement and limited number of affected persons

20.	Disruption/destruction of tribal/indigenous groups.	20.	Avoid dislocation of people; where not possible, relocate in area allowing them to retain lifestyle and customs.	20.	On-site relocation of displace persons in area allowing them to retain lifestyle and custom
21.	Increase in humidity and fog locally, creating favorable habitat for insect disease vectors (mosquitoes, tsetse).	21.	Vector control.	21.	As in 16 above
22.	Uncontrolled migration of people into the area, made possible by access roads and transmission lines.	22.	Limitation of access, provision of rural development and health services to try to minimize impact.	22.	As discussed with Town Nazim Mansehra, uncontrolled migration of population due to the project implementation is not expected.
23.	Environmental problems arising from development made possible by dam (irrigated agriculture, industries, municipal growth).	23.	Basin-wide integrated planning to avoid overuse, misuse, and conflicting uses of water and land resources.	23.	Basin-wide integrated planning by Sarhad Hydel Development Organization (SHYDO).
24.	Poor land use practices in catchment areas above reservoir resulting in increased siltation and changes in water quality.	24	Land use planning efforts which include watershed areas above dam.	24.	Watershed monitoring and management by Sarhad Hydel Development Organization (SHYDO)
25.	Erosion in diversion channel	25	Water tight mat and gravel cover will be placed on the upstream coffer dam on the side facing the flow of the river and in the diversion channel.	25	Measures to mitigate impacts due to construction activity
					After the construction of Bridge across Jhelum River the Coffer Dams will be removed and the spoil will be used for the reinstatement of the location of diversion channel to its original position.

CHAPTER – 7

RESETTLEMENT BUDGET AND FINANCING

7.1 INTRODUCTION

The Land Acquisition and Resettlement Plan as in Chapter 5 has been developed keeping in view the Guidelines of ADB, safeguard policies, World Bank Guidelines OP/BP 4.12 (2004), Land Acquisition Act (1894), Draft National Resettlement Policy of Pakistan (2002) and Guidelines of World Commission on Dams (1997). This Chapter deals with resettlement budget and financing plan of Patrind Hydropower Project. The Company has to defray the actual costs incurred in carrying out resettlement/ environmental actions and to provide funds in a timely manner.

7.2 ASSETS SUBJECT TO SUBMERGENCE BY HEAD POND

Head pond Area

Figure 1.6 shows elevation-capacity-surface area curves for the head pond behind the weir at Patrind village. Figure 1.7 shows the head pond to be created behind the weir at elevation 765 m above mean sea level submerging an area of 141.37 acres which consists of privately-owned wasteland (61.2%), Kunhar river bed (24.2%) and privately-owned agricultural fields (14.6%). There are neither any human settlements nor any built-up property like residential houses which would be subject to submergence by the head pond.

Commercial Assets

Except for a small water mill, no commercial assets exist in the head pond area. The ownership and cost of the water mill is given in Table 7.4.

Infrastructure

No infrastructure requiring relocation like roads, village tracks, electrical transmission lines, telephone lines etc. exist in the head pond area.

Cultural Property

There are no graveyards, mosques, shrines or sites of archaeological importance in the area to be submerged by the head pond.

7.3 RESETTLEMENT/ ENVIRONMENTAL COSTS

The items constituting the environmental costs are as follows:

i. Land area subject to submergence by Head pond – Permanent Land Acquisition

ii. Land required for construction of Project Structure – Permanent Land Acquisition

iii. Land for Construction Camps, Storage Areas and Residential Colonies – Temporary Land Acquisition

iv. Land for Disposal of Excavated Material – Temporary Land Acquisition

v. Compensation for Houses and Commercial Assets

vi. Compensation for Economic Trees

Items (i), (ii) and (v) require permanent acquisition of land whereas items (iii) and (iv) require temporary land acquisition during construction phase which is estimated as 4 years.

7.3.1 PERMANENT LAND ACQUISITION

For Patrind Hydropower Project, permanent land acquisition cost is Rs. 122,345,000 of the resettlement/ environmental cost, which is the highest component at 63 % of the total.

Table 7.1: Cost of Permanent Land Acquisition

Sr. #	Owner Name	Type of Land/ Property Affected	Affected Area (Kanal)*	Rate / Kanal (Rs.)	Estimated Cost (Rs.)	Total Cost (Rs.)
Cost of Land to be Acquired for Headpond Impounding						
1	M. Ayoub s/o Pir Khan, Village Tercheela, Muzaffarabad	Farm Land	7	240,000	1,680,000	3,760,000
		River bed	-	-	-	
		Waste Land	26	80,000	2,080,000	
2	M. Yousuf s/o Sher Zaman, Village Tercheela, Muzaffarabad	Farm Land	5	240,000	1,200,000	2,160,000
		River bed	-	-	-	
		Waste Land	12	80,000	960,000	
3	Noor Zaman s/o Sikander Khan, Village Tercheela, Muzaffarabad	Farm Land	25	240,000	6,000,000	7,760,000
		River bed	-	-	-	
		Waste Land	22	80,000	1,760,000	
4	M. Bashir s/o Faqir	Farm Land	6	240,000	1,440,000	4,000,000

Sr. #	Owner Name	Type of Land/ Property Affected	Affected Area (Kanal)*	Rate / Kanal (Rs.)	Estimated Cost (Rs.)	Total Cost (Rs.)
	Muhammad, Village Tercheela, Muzaffarabad	River bed	-	-	-	
		Waste Land	32	80,000	2,560,000	
5	M. Rafiq s/o Pir Khan, Village Tercheela, Muzaffarabad	Farm Land	3	240,000	720,000	2,640,000
		River bed	-	-	-	
		Waste Land	24	80,000	1,920,000	
6	M. Ali s/o Ghulam Hassan, Village Tercheela, Muzaffarabad	Farm Land	8	240,000	1,920,000	3,600,000
		River bed	-	-	-	
		Waste Land	21	80,000	1,680,000	
7	Muzafar Hussain s/o Bahadur Ali, Village Tercheela, Muzaffarabad	Farm Land	6	240,000	1,440,000	2,400,000
		River bed	-	-	-	
		Waste Land	12	80,000	960,000	
8	M. Ishtiaq s/o Ali Zaman, Village Tercheela, Muzaffarabad	Farm Land	4	240,000	960,000	2,480,000
		River bed	-	-	-	
		Waste Land	19	80,000	1,520,000	
9	M. Sharif s/o Nadir Ali, Village Tercheela, Muzaffarabad	Farm Land	3	240,000	720,000	2,080,000
		River bed	-	-	-	
		Waste Land	17	80,000	1,360,000	
10	Malik Rafiq s/o Abdul Rehman, Village Tercheela, Muzaffarabad	Farm Land	20	240,000	4,800,000	7,360,000
		River bed	-	-	-	
		Waste Land	32	80,000	2,560,000	
11	M. Zaman s/o Abdul Rehman, Village Tercheela, Muzaffarabad	Farm Land	20	40,000	4,800,000	6,000,000
		River bed	-	-	-	
		Waste Land	15	80,000	1,200,000	
12	M. Farid s/o Gul Zaman, Village Tercheela, Muzaffarabad	Farm Land	6	240,000	1,440,000	2,480,000
		River bed	-	-	-	
		Waste Land	13	80,000	1,040,000	
13	Ali Zaman s/o Kale Khan, Village Tercheela, Muzaffarabad	Farm Land	12	240,000	2,880,000	3,520,000
		River bed	-	-	-	
		Waste Land	8	80,000	640,000	
14	Khalil Rehman s/o Kale Khan, Village Tercheela, Muzaffarabad	Farm Land	12	240,000	2,880,000	4,480,000
		River bed	-	-	-	
		Waste Land	20	80,000	1,600,000	
15	Nazeer Ahmed s/o Sher	Farm Land	3	240,000	720,000	2,320,000

Sr. #	Owner Name	Type of Land/ Property Affected	Affected Area (Kanal)*	Rate / Kanal (Rs.)	Estimated Cost (Rs.)	Total Cost (Rs.)
	Zaman, Village Tercheela, Muzaffarabad	River bed	-	-	-	
		Waste Land	20	80,000	1,600,000	
16	Settlers of Village Tercheela, Muzaffarabad	Farm Land	19	240,000	4,560,000	4,560,000
		River bed	-	-	-	
		Waste Land	-	-	-	
17	Mir Afzal s/o Abdullah, Village Tercheela, Muzaffarabad	Farm Land	-	-	-	1,840,000
		River bed	-	-	-	
		Waste Land	23	80,000	1,840,000	
18	Naimat Jan s/o Mir Muhammad, Village Tercheela, Muzaffarabad	Farm Land	-	-	-	1,360,000
		River bed	-	-	-	
		Waste Land	17	80,000	1,360,000	
19	M. Mushtaq s/o Ali Zaman, Village Tercheela, Muzaffarabad	Farm Land	-	-	-	2,480,000
		River bed	-	-	-	
		Waste Land	31	80,000	2,480,000	
20	M. Jan s/o Bahadur, Village Tercheela, Muzaffarabad	Farm Land	-	-	-	1,200,000
		River bed	-	-	-	
		Waste Land	15	80,000	1,200,000	
21	Haider Zaman s/o Qalander Khan, Village Tercheela, Muzaffarabad	Farm Land	-	-	-	1,440,000
		River bed	-	-	-	
		Waste Land	18	80,000	1,440,000	
22	M. Nasir s/o Sher Zaman, Village Tercheela, Muzaffarabad	Farm Land	-	-	-	1,280,000
		River bed	-	-	-	
		Waste Land	16	80,000	1,280,000	
23	M. Murad s/o Ghulam Jan, Village Tercheela, Muzaffarabad	Farm Land	-	-	-	1,440,000
		River bed	-	-	-	
		Waste Land	18	80,000	1,440,000	
24	Riazat Khan s/o M. Sharif, Village Tercheela, Muzaffarabad	Farm Land	-	-	-	960,000
		River bed	-	-	-	
		Waste Land	12	80,000	960,000	
25	M. Shafiq s/o M. Maskin, Village Tercheela, Muzaffarabad	Farm Land	-	-	-	1,440,000
		River bed	-	-	-	
		Waste Land	18	80,000	1,440,000	
26	GulZaman s/o Faqir	Farm Land	2	240,000	480,000	2,000,000

Sr. #	Owner Name	Type of Land/ Property Affected	Affected Area (Kanal)*	Rate / Kanal (Rs.)	Estimated Cost (Rs.)	Total Cost (Rs.)
	Muhammad, Village Deedal Meera, Abbottabad	River bed	-	-	-	
		Waste Land	19	80,000	1,520,000	
27	Ali Murad s/o Hassan Ali, Village Deedal Meera, Abbottabad	Farm Land	1	240,000	240,000	2,000,000
		River bed	-	-	-	
		Waste Land	22	80,000	1760,000	
28	Abdul Qayyum s/o Sher Zaman, Village Deedal Meera, Abbottabad	Farm Land	2	240,000	480,000	2,080,000
		River bed	-	-	-	
		Waste Land	20	80,000	1,600,000	
29	M. Mohsin s/o Hashim Ali, Village Deedal Meera, Abbottabad	Farm Land	1	240,000	240,000	1,600,000
		River bed	-	-	-	
		Waste Land	17	80,000	1,360,000	
30	Roshan Ali s/o Hashim Ali, Village Deedal Meera, Abbottabad	Farm Land	1	240,000	240,000	1,520,000
		River bed	-	-	-	
		Waste Land	16	80,000	1,280,000	
31	Azizur Rehman s/o Hashim Al, Village Deedal Meera, Abbottabad	Farm Land	1	240,000	240,000	1,520,000
		River bed	-	-	-	
		Waste Land	16	80,000	1,280,000	
32	M. Sadiq s/o Waris Ali, Village Deedal Meera, Abbottabad	Farm Land	4	240,000	960,000	2,400,000
		River bed	-	-	-	
		Waste Land	18	80,000	1,440,000	
33	Gohar Rehman s/o Waris , Village Deedal Meera, Abbottabad	Farm Land	4	240,000	960,000	2,240,000
		River bed	-	-	-	
		Waste Land	16	80,000	1,280,000	
34	Suleman s/o Hadayat Ali, Village Deedal Meera, Abbottabad	Farm Land	8	240,000	1,920,000	3,440,000
		River bed	-	-	-	
		Waste Land	19	80,000	1,520,000	
35	State Owned Land	Farm Land	-	-	-	16,200,000
		River bed	324	50,000	16,200,000	
		Waste Land	-	-	-	
	Sub Total					**110,040,000**
	Cost of Land to be Acquired at Power House Site					
1	M. Ayoub s/o Moosa Khan	Farm Land	-	-	-	400,000
		River bed	-	-	-	
		Waste Land	5	80,000	400,000	

Sr. #	Owner Name	Type of Land/ Property Affected	Affected Area (Kanal)*	Rate / Kanal (Rs.)	Estimated Cost (Rs.)	Total Cost (Rs.)
2	M. Arif s/oFadi Khan	Farm Land River bed Waste Land	- - 10	- - 80,000	- - 800,000	800,000
3	M. Yunus Khan s/o Moosa Khan	Farm Land River bed Waste Land	- - 5	- - 80,000	- - 400,000	400,000
4	Khalil-ur-Rehman s/o Faqir	Farm Land River bed Waste Land	- - 10	- - 80,000	- - 800,000	800,000
5	Abdul Qayyum s/o Meher Wali	Farm Land River bed Waste Land	- - 18	- - 80,000	- - 1,440,000	1,440,000
6	Ali Zaman s/o Gohar Ali	Farm Land River bed Waste Land	- - 2	- - 80,000	- - 160,000	160,000
7	Mehr Ali s/o Gohar Ali	Farm Land River bed Waste Land	- - 19	- - 80,000	- - 1,520,000	1,520,000
8	Noor Zaman s/o Gohar Ali	Farm Land River bed Waste Land	- - 11	- - 80,000	- - 880,000	880,000
9	Sail Ali s/o Kalu Khan	Farm Land River bed Waste Land	- - 8	- - 80,000	- - 640,000	640,000
10	M. Iqbal s/o Kalu Khan	Farm Land River bed Waste Land	- - 8	- - 80,000	- - 640,000	640,000

Sr. #	Owner Name	Type of Land/ Property Affected	Affected Area (Kanal)*	Rate / Kanal (Rs.)	Estimated Cost (Rs.)	Total Cost (Rs.)
11	M. Pervez s/o M. Faqir	Farm Land	-	-	-	
		River bed	-	-	-	
		Waste Land	12	80,000	960,000	960,000
	Sub Total					**8,640,000**
	Cost of Land to be Acquired for Weir Structures					
1.	Aziz ur Rehman, M. Saleem	Farm Land	2	240,000	480,000	1,085,000
		River bed	5.7	50,000	285,000	
		Waste Land	4	80,000	320,000	
	Sub Total					**1,085,000**
	Cost of Land to be Acquired for Surface Surge Chamber					
1	State Owned Land	Farm Land		-	-	
		River bed		-	-	
		Waste Land	0.75	80,000	60,000	60,000
	Sub Total					**60,000**
	Cost of Land to be Acquired for Access/ Maintenance Roads					
1.	Aziz-ur-Rehman, M. Saleem and Ghulam Ali	Farm Land	3.3	240,000	792,000	792,000
		River bed	-	-	-	
		Waste Land	-	-	-	
2.	Malak Awan s/o Gulzaman	Farm Land	1.0	240,000	240,000	240,000
		River	-	-	-	
		Water Land	-	-	-	
3.	Hameed s/o Gulzaman	Farm Land	1.0	240,000	240,000	240,000
		River	-	-	-	
		Water Land	-	-	-	
4.	Farid s/o Gulzaman	Farm Land	1.0	240,000	240,000	240,000
		River	-	-	-	
		Water Land	-	-	-	

Sr. #	Owner Name	Type of Land/ Property Affected	Affected Area (Kanal)*	Rate / Kanal (Rs.)	Estimated Cost (Rs.)	Total Cost (Rs.)
5.	Sain s/o Gohar Ali	Farm Land River Water Land	0.5 - -	240,000 - -	120,000 - -	120,000
6.	Noor Zaman s/o Sikandar	Farm Land River Water Land	0.4 - -	240,000 - -	96,000 - -	96,000
7.	Sarwar s/o Gohar Ali	Farm Land River Water Land	0.4 - -	240,000 - -	96,000 - -	96,000
8.	Yousif s/o Sherzaman	Farm Land River Water Land	0.2 - -	240,000 - -	48,000 - -	48,000
9.	Gulab s/o Gulzaman	Farm Land River Water Land	0.5 - -	240,000 - -	120,000 - -	120,000
10.	Pir Khan s/o Muhammad Khan	Farm Land River Water Land	0.5 - -	240,000 - -	120,000 - -	120,000
11.	Ali Rehman s/o Muhammad Zaman	Farm Land River Water Land	0.3 - -	240,000 - -	72,000 - -	72,000
12.	Aurangzaib s/o Jumma Khan	Farm Land River Water Land	0.2 - -	240,000 - -	48,000 - -	48,000
13.	Ismail s/o Alyas	Farm Land River Water Land	0.3 - -	240,000 - -	72,000 - -	72,000

Sr. #	Owner Name	Type of Land/ Property Affected	Affected Area (Kanal)*	Rate / Kanal (Rs.)	Estimated Cost (Rs.)	Total Cost (Rs.)
14.	Ashraf s/o Khairullah	Farm Land River Water Land	0.4 - -	240,000 - -	96,000 - -	96,000
15.	Naseem s/o Gulzaman	Farm Land River Water Land	0.5 - -	240,000 - -	120,000 - -	120,000
	Sub Total					**2,520,000**
	Total Permanent Land Acquisition Cost (Rs.)					**122,345,000**

*** 1 Ha = 10,000 m2 = 2.471 Acre = 8 Kanal**

7.3.2 COST OF AFFECTED HOUSES

As a result of project implementation, a total of 14 houses will be affected. The compensation shall be given to the owners on prevailing market prices. The detail is given in Table 7.2 below.

Table 7.2: Cost of Affected Houses

Sr. No.	Owner's Name	No. of Houses	No. of Rooms			No. of Kitchen	No. of Bathroom	Total Cost (Rs.)
			Type B	Type C	Type D			
Cost of Affected Houses at Powerhouse Site								
1	Sarfraz Khan s/o Issa Khan	1	5	7	2	3	3	6,000,000
2	M. Imran s/o M. Maskeen	1	-	2	-	1	-	1,100,000
3	Mrs. Raisham Jan w/o M. Maskeen	1	-	-	2	1	1	1,000,000
4	M. Pervez s/o M. Sulaiman	1	-	1	-	1	-	1,000,000
5	M. Ashraf s/o Ghulam Ali	1	5	-	-	1	1	2,500,000
6	M. Akbar s/o Mehar Wali	1	1	-	-	-	1	1,300,000
7	M. Farooq	1	-	7	-	1	1	1,500,000

Sr. No.	Owner's Name	No. of Houses	No. of Rooms			No. of Kitchen	No. of Bathroom	Total Cost (Rs.)
			Type B	Type C	Type D			
8	Abdul Qayyum s/o Mehar Wali	1	4	3	2	1	2	4,200,000
9	M. Aslam s/o Samandar Khan	1	2	-	-	1	1	1,500,000
10	M. Nawaz s/o Samander Khan	1	-	-	2	1	1	1,000,000
11	Mahar Wali s/o Faqir Muhammad	1	2	3	2	1	2	3,700,000
12	M. Maskeen s/o Saif Ali	1	6	-	-	1	2	4,000,000
13	Tanveer Ahmad s/o Abdul Rashid	1	2	5	-	1	1	3,300,000
Cost of Houses at Diversion Tunnel Weir Site								
14	Aziz ur Rehman, M. Saleem, Ghulam Ali s/o Hassan Ali	1	-	7	-	1	1	4,100,000
Total Cost of Affected Houses (Rs.)								**36,200,000**

7.3.3 COST OF ECONOMIC TREES

A total of 624 trees will be affected by the project implementation. The trees are generally of younger age, between 3 – 16 years. It is estimated that a single tree on an average would yield about 70 cu. ft. of wood. According to local market the cost of Kiker, Beence, Shahtoot is Rs. 260. per cu.ft., Walnet, Tali, Deodar, Cheer at Rs. 900 per cu.ft. and the remaining trees like Dhraik, Daraba, Nim, Balkald, Kau, Pipel, Phulai, Phagwar, Sherol at Rs 100 per cu.ft. The fruit trees like Angeer is rated at Rs. 10,000 per tree whereas apricot and pear @ Rs. 12,000 per tree each. Accordingly the total cost of 624 trees to be cut due to project implementation is estimated at Rs. 7,462,300 for compensation as detailed in Table 7.3.

Table 7.3: Cost of Trees

Name of Trees	Type of Trees	Numbers	Cu. ft.	Rs./Cu. ft.	Total Cost (Rs.)
Trees in Reservoir Impounding					
Sherol	Firewood	30	70	100	210,000
Shahtoot	Fruit	22	70	260	400,400
Dhraik	Firewood	16	70	100	112,000
Wallnut	Fruit	4	70	900	252,000
Daraba	Firewood	14	70	100	98,000
Fig	Fruit	16	-	10000/Tree	160,000
Nim	Firewood	6	70	100	42,000
Balkald	Firewood	25	70	100	175,000
Kau	Firewood	23	70	100	161,000
Cheer	Timber	14	70	900	882,000
Tali	Timber	6	70	350	147,000
Pipal	Firewood	8	70	100	56,000
Kikar	Firewood	6	70	260	109,200
Phulai	Firewood	7	70	100	49,000
Beence	Firewood	6	70	260	109,200
Deodar	Timber	11	70	900	693,000
Phagwar	Firewood	8	70	100	56,000
Sub Total		**222**			**3,711,800**
Trees at Power House Site					
Sherol	Firewood	200	70	100	1,400,000
Phagwar	Firewood	19	70	100	133,000
Wallnut	Fruit	9	70	900	567,000
Mixed Fruit Trees	Fruit	35	0	10000	350,000
Sub Total		**263**			**2,450,000**

Name of Trees	Type of Trees	Numbers	Cu. ft.	Rs./Cu. ft.	Total Cost (Rs.)
Trees at Construction Camp at Weir Site					
Apricot	Fruit	34		12000	408,000
Pear	Fruit	16		12000	192,000
Sub Total		**50**			**600,000**
Trees at Storage Camp at Weir Site					
Dhraik	Firewood	20	70	100	140,000
Phagwar	Firewood	10	70	100	70,000
Dravia	Firewood	14	70	100	98,000
Apricoat	Fruit	12	0	12000	144,000
Sub Total		**56**			**452,000**
Trees at Maintenance Road					
Dhraik	Firewood	6	70	100	42,000
Tali	Timber	1	70	350	24,500
Bhala	Firewood	6	70	100	42,000
Sherol	Firewood	6	70	100	42,000
Phagwar	Firewood	2	70	100	14,000
Sub Total		**21**			**164,500**
Trees at Access Road					
Sherol	Firewood	7	70	100	49,000
Phagwar	Firewood	5	70	100	35,000
Sub Total		**12**			**84,000**
Total Cost of Trees (Rs.)		**624**			**7,462,300**

7.3.4 TEMPORARY LAND ACQUISITION

An estimated area of 68 acres would be needed for temporary acquisition for a period of four years during project implementation as given in Table 5.3. Out of which 22 acres (Farmland = 8.6 acres and state owned land 13.4 acres) would

be required for construction of storage camps and worker camps, and 46 acres of land for disposal of excavated material from construction of powerhouse, diversion tunnel, headrace tunnel, power shaft and surge chamber and 10 Acres (State Owned) land will be required for the construction of temporary diversion channel for a period of about 4 months. Cost of temporary land acquisition is given in Table 7.4.

7.3.5 RESETTLEMENT / ENVIRONMENTAL COSTS

Table 7.4 below summarises resettlement / environmental costs of Patrind Hydropower Project.

Table 7.4: Resettlement and Environmental Cost Estimate

Sr. #	Item	Unit	Land Area (Acres)	Rate Rs./Unit	Estimated Cost Rs.
1.	**Permanent Land Acquisition**	Acre			
	• Reservoir Impounding				
	- Cultivated Land		22.875	1,920,000	43,920,000
	- Waste Land		78.0	640,000	49,920,000
	- State Owned / River Bed Land		40.5	400,000	16,200,000
	• Project Structures	Acre			
	i) Weir Structures				
	- Cultivated Land		0.25	1,920,000	480,000
	- Waste Land		0.5	640,000	320,000
	- State Owned / River Bed Land		0.7	400,000	280,000
	ii) Power House and Surge Chamber	Acre			
	- Waste Land		13.6	640,000	8,704,000
	iii) Access Road at Weir Site	Acre			
	- Cultivated Land		0.41	1,920,000	787,200
	iv) Access Road to Powerhouse Site	Acre			
	- State Land		0.1	400,000	40,000

Sr. #	Item	Unit	Land Area (Acres)	Rate Rs./Unit	Estimated Cost Rs.
	v) Maintenance Road at Weir Site	Acre			
	- Cultivated Land		0.9	1,920,000	1,728,000
	Sub-Total	**Rs.**			**122,379,200**
2.	**Cost of Houses**				
	Houses	No.	14	Variable	36,200,000
	Sub Total	**Rs.**			**36,200,000**
3.	**Cost of Commercial Assets**	**No.**			
	Small Water Mill		1	400,000	**400,000**
4.	**Cost of Trees**	**No.**			
	Firewood Trees		445	Variable	3,242,400
	Timber Trees		31	Variable	1,746,500
	Mixed Fruit Trees		148	Variable	2,473,400
	Sub Total		**624**		**7,462,300**
5.	**Temporary Land Acquisition**				
	i. Workers and Storage Camps at Weir Site	Acre			
	- Cultivated Land		8.6	Rs. 15,000/ Acre/Year	580,500
	ii. Workers and Storage Camps at Power House Site	Acre			
	- State Owned / River Bed Land		13.45	400,000	24,210,000
	iii. Diversion Channel at Powerhouse Site	Acre			
	- State Owned		10.0	Rs. 200,000	2,000,000
	iv. Dumping Sites near Weir	Acer			
	- Waste Land		21.0	Rs. 5,000/ Acre/Year	472,500
	v. Dumping Sites near Power	Acre			

Sr. #	Item	Unit	Land Area (Acres)	Rate Rs./Unit	Estimated Cost Rs.
	House - Waste Land		25.0	Rs. 5,000/ Acre/Year	562,500
	Sub Total				**27,825,500**
				Total Resettlement and Environmental Cost Rs.	**194,267,000**
				US$	**2,312,702.38***

*Conversion Factor 1US$ = Rs. 84.0

The total environmental costs add up to Rs. 194,267,000 (US$ 2,312,702.38). The cost of permanent land acquisition Rs. 122,379,200 (63%) is the largest component of the environmental costs followed by Rs. 36,200,000 (19 %) for cost of houses, Rs. 27,825,500 (14 %) for cost of temporary land and Rs. 7,462,300 (4 %) for economic trees existing in the project area.

7.4 RESETTLEMENT FINANCING

The outlay of resettlement budget as given above amounts to Rs. 194,267,000 (US$ 2,312,702.38) The Company is committed to provide funding for the estimated amount of Rs. 194.3 million (US$ 2.3 million). The Company will assure that the amounts of money assessed and finally approved for compensation and financial assistance are paid to the genuine persons losing land, houses and other economic assets well in advance of actual possession of land/assets and also well in advance from the start of the construction.

CHAPTER – 8

ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

8.1 MANAGEMENT AND MONITORING

The environmental analysis of Patrind Hydropower Project has identified and assessed a number of environmental and socio-economic impacts related to planning, design, construction and operation phases. A plan to mitigate them has been presented. Some areas, however, will require monitoring which provides effective guarantees of the Company's commitment to safeguard and enhance the social, environmental and economic quality of the affected area. Monitoring involves measurement and recording of environmental, social and economic variables associated with project impacts providing information on characteristics and functions of variables in time and space. Monitoring can improve project management. It can also be used as an early warning to identify adverse trends in the project area before it is too late to take mitigation measures. Monitoring can also provide a reliable data base which can be used in mediation between interested parties.

Patrind Hydropower Project is located in the administrative domain of Khyber Pakhtunkhwa (KP) and the state of Azad Jammu and Kashmir (AJK). It is proposed that one representative each of AJK Hydroelectric Board (AJK HEB), Provincial Environmental Protection Agency Khyber Pakhtunkhwa and DG Environment AJK may look over the performance of the key players in the implementation of the management and monitoring strategy. The key players, of course, are the Company, EPC Contractor and Supervisory Consultant (SC). The SC to be selected by ADB on behalf of the Company will undertake on quarterly basis independent assessment/ evaluation till the end of the project. SC will review the status of implementation in the light of targets, budget and duration laid down in the schedule of resettlement plan.

8.2 ENVIRONMENTAL MANGEMENT PLAN

Chapter 6 deals with measures to mitigate potential negative impacts during construction and operation stages of the project. Chapters 5 along with relevant

provisions in the tender documents provide the basis of environmental management and monitoring plan. Details of the contractor's obligations to be incorporated in the tender documents will include compliance with regulations, public health and safety requirements.

Details of specific provisions to be included in the contract document to mandate the adoption of formal health and safety measures to minimize accidents and avoid fatalities during the construction activities fall into the following categories:

- Proper management and disposal of construction waste
- Control measures for waste, fuel oil, lubricants and smoke
- Reduction of noise and dust levels
- Rehabilitation of areas used for roads for access/ maintenance and sites for temporary storage of construction materials/ equipments.
- Usage and proper maintenance of equipment with appropriate noise and smoke abatement controls.

It is therefore recommended that following provisions should be made in the contract document to be signed with the EPC Contractor.

The EPC Contractor shall:

- Draw up and submit a site plan, plan of works clearly defining the facilities to be created both on and off-site for project implementation.
- Ensure that Contractor's work plan minimizes the disturbance to the environment.
- Execute site restoration upon completion of work according to the site restoration plan. This plan shall include photographs, preferably a recorded video tape, showing the pre-project stage of all the sites used during the construction phase.

Special attention of the EPC Contractor shall be drawn towards contract specifications to:

- Save and protect the trees during stock piling of materials.
- Restore the site environment at Contractor's own expense before submission

of the completion report.

- Facilitate the supervisor to compile and submit a report certifying that such site restoration work has been completed satisfactorily.
- Employ local unskilled labour.

8.3 MONITORING

8.3.1 WATER RESOURCES

The effect of sewage effluents on the quality of the river water is insignificant at present because the volume of domestic sewage which presently flows into the river is very small. In time, however, when the population of the project area increases and river discharge is reduced during the operation of the project, the condition of the river water is likely to deteriorate. This will require regular quantitative and qualitative monitoring of domestic sewage entering into the river water. Provincial EPA may depute staff for this assignment. The program should be carried out especially during the low-flow periods for the entire working life of the project. The following must be monitored periodically to assess the environmental impact due to reduced water discharge in the river.

- Suspended solids (sediment) analysis of the river water during and after the project construction
- Biochemical Oxygen Demand (BOD)
- Bacterial count: E-coli Test
- Other surface water quality parameters which need to be monitored are pH, total suspended and dissolved solids and sulphate.

8.3.2 BIOLOGICAL RESOURCES

Due to the scarcity of base line data on the ecology of the area including its terrestrial and aquatic ecosystem and bio-diversity, a composite monitoring plan for wildlife, fisheries and bio-diversity is recommended. It is suggested that this should be done for a period of 4 years after commencement of the project operation. The personnel required for this task will include a biologist (Forestry or Wildlife) and a chemist. The chemist will be responsible for

chemical analysis of water resources while the biologist will collect local data on animal and plant life including data on the distribution pattern, age distribution, feeding and breeding areas, parasites and pests.

8.3.3 MONITORING PARAMETERS

A comprehensive list of the factors to be monitored is reproduced below. The relevant provincial departments may take up their monitoring according to the availability of physical facilities and manpower.

- Rainfall
- Stored water volume in the head pond
- Annual volume of sediment transported into head pond
- Water quality at weir site and at various points along the river. The parameters may include salinity, pH, temperature, electrical conductivity, turbidity, dissolved oxygen, suspended solids, phosphates, nitrates and biochemical oxygen demand
- Limnological sampling of microflora, microfauna, aquatic weeds and benthic organisms
- Wildlife (species, distribution, numbers)
- Vegetation changes (cover, species composition, growth rates, biomass, etc.) in the upper watershed, head pond drawdown zone, and downstream areas
- Increases in erosion in the watershed
- Impacts on wildlands, species or plant communities of special ecological significance
- Public health and disease vectors
- In- and out-migration of people with respect to the project area
- Changes in economic and social status of people in the project area
- In order to develop fisheries potential of the head pond, the provincial fisheries department may monitor the growth of fish after introducing selected type of fish fingerlings at the appropriate time

8.4 ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

Table 8.1 given below has been drawn up in terms of Environmental Management and Monitoring of Patrind Hydropower Project. The Table indicates the roles of the Company, Supervisory Consultant (SC), Provincial Environmental Protection Agency (EPA) Khyber Pakhtunkhwa and EPA of Azad Jammu and Kashmir.

Table 8.1: Environmental and Social Management Plan for Patrind Hydropower Project

Sr. #	Resources/ Institutions/ Livelihood	Project Phase	Impacts	Mitigation		Management and Monitoring
				Measures	Responsibility	
1.	Land Acquisition	Construction	Permanent Land Acquisition for: • Reservoir impounding 57.2 Ha • Construction of weir structure 0.59 Ha • Powerhouse Complex 5.46 Ha • Access/ Maintenance Roads 0.53 Ha • Surge Tank 0.04 Ha • Small water mill Temporary Land Acquisition for: • Construction camps at weir and powerhouse site 5.11 Ha • Storage camps at weir and powerhouse site 3.82 Ha • Dumping area for excavated material 18.6 Ha • Diversion Channel for a period of about 4	Payment of compensation for acquisition of land areas - Timely payment to affectees before start of construction work - Job opportunities to affectees and locals - Contractor's plan for disposal of excavated material - Contractor to follow requirements of contract agreement - Contractor's plan for traffic management - Establishing appropriate environmental management and safety control systems through specifications for construction contractor(s) - Training of contractor's staff on standards and skills regarding environmental protection - Controlled blasting and excavation and orderly dumping of excavated material under cover of moisture. - Contractor's plan for disposal of	Star Hydropower	EPAs of KP and AJK Star Hydropower and Supervisory Consultant

Sr. #	Resources/ Institutions/ Livelihood	Project Phase	Impacts	Mitigation		Management and Monitoring
				Measures	Responsibility	
			months 4.04 Ha	excavated material - An independent/ stand-alone Resettlement Action Plan to be prepared		
2.	Resettlement	Construction	• Loss of houses 14 Nos.	- An independent/ stand-alone Resettlement Action Plan to be prepared	Star Hydropower, Provincial Revenue Department	EPAs, Star Hydropower and Supervisory Consultant
3.	Water Resources	Construction	• River pollution by chemicals, lubricants, fuel oil etc. and by construction camps wastes	- Sound construction management to avoid river pollution and compliance with NEQS	Contractor	EPAs, Star Hydropower and Supervisory Consultant
4.	Safety, health and social situation	Construction	• Transportation of heavy equipment/ machinery and labour • Communicable diseases brought by outside construction workers	- Contractor's traffic management plan - Data on water-borne diseases to be collected on regular basis. Collection of baseline data on malaria conditions	- Contractor Record of accidents and development of guidelines - Local Health Department in association with Contractor Baseline data on water-borne diseases and malaria compiled by local Health Department	- Construction contractor - Local Health Department

5.	Noise	Construction	• Impacts on people and wildlife by heavy machinery and vehicles	- Avoiding use of second hand machinery - Ensuring maintenance of machinery to conform to standard noise levels - Ensuring blasting during daytime - Any blasting during night time (2200 – 070 hrs.) to be prohibited within a distance of 200 m from houses and settlements	- Contractor Enforcement of noise standards by construction contractor	- Construction contractor

Table 8.1: Environmental and Social Management Plan for Patrind Hydropower Project

Sr. #	Resources/ Institutions/ Livelihood	Project Phase	Impacts	Mitigation		Management and Monitoring
				Measures	Responsibility	
6.	Flora and Fauna	Construction	Loss of economic trees • Reservoir Impounding No. of tees 222 • Powerhouse site No. of trees 263 • Construction camp at weir and powerhouse site No. of trees 106 • Access/Maintenance roads No. of trees 33	- Fair/ negotiated compensation to tree owners - Planting of trees as part of annual tree plantation campaigns of the government department	- Star Hydropower - Provincial Forestry Departments	EPAs, Star Hydropower and Supervisory Consultant
7.	Water Resources	Operation	• Diversion of Kunhar river flow into headrace tunnel • Inflow of sewage from human settlements along Kunhar river	- Water releases into Kunhar river downstream of weir to meet minimal ecological requirements - Provision of proper sewage treatment facility in human settlements along Kunhar river to comply with NEQS.	- Start Hydropower - Provincial Public Health Engineering Department	Star Hydropower Star Hydropower

CHAPTER – 9

CONCLUSIONS AND RECOMMENDATIONS

9.1 INTRODUCTION

The Environmental Impact Assessment (EIA) study has been conducted in line with the relevant guidelines of Asian Development Bank (ADB), World Bank (WB), International Finance Company (IFC) as well as Pakistan Environmental Protection Act 1997. The objective of the study is to identify and assess the potential environmental and social impacts of the Patrind Hydropower Project. The Report also includes Public Consultation with the communities in the project area in order to apprise them of the project activities and to obtain their views and concerns. This Chapter presents the conclusions/ key findings and recommendations for further actions.

9.2 CONCLUSIONS

The major conclusions of the EIAare;

- During the Project implementation, environmental and social impacts are experienced primarily during the construction phase. The operation phase will have mostly insignificant impacts on the social, physical and biological environment of the area. This has been confirmed during field surveys for the environmental and social assessment as part of this report.
- The potential impacts during the construction phase of the project include land acquisition (resulting in loss of cultivated land, houses and economic trees), soil erosion, water pollution, effect on ambient air quality caused by vehicle exhaust and kicked-up dust, noise pollution, safety hazards and public health concerns for the nearby communities.
- The key environmental issues during the operation phase of the project include downstream flow variations, waste disposal, safety hazards for the plant staff.
- All the recommended mitigation measures are contained in the Environmental Management and Monitoring Plan (EMMP), which will need to be made part of the EPC Contract. The plan provides for the requisite

structure of the organization during the project implementation, defining roles and responsibilities of key players. The plan defines the mitigation actions, and monitoring agencies.

- A Resettlement Plan (RP) has also been developed and made part of the report to provide framework to address the involuntary resettlement issues and to guide through the compensation assessment and disbursement process. The relevant provisions of RP will also be made part of the EPC Contract.
- The proposed mitigation measures adequately address all the concerns raised by the stakeholders.
- The project is unlikely to cause any significant, lasting impact on the social, physical and biological environment of the area.
- The overall findings of the environmental impact assessment and resettlement plan shows that the project is environmentally and socially viable provided that the proposed activities are carried out as mentioned in this report, and the mitigation measures are completely and effectively implemented.

9.3 RECOMMENDATIONS

On the basis of the environmental and social impact assessment and the conclusions as discussed above it is recommended that:

- The Environmental and Social Management Plan should be made a part of the EPC Contract awarded by the Company for implementation of the project.
- The Company should follow the RP for addressing the involuntary resettlement issues primarily pertaining to land acquisition and compensation for houses and other economic assets.
- The Company should ensure adherence to the environmental legislation and regulations.
- Company and its contractor(s) should employ local labour as for as possible.

ANNEXURES

ANNEXURE 1

LIST OF REFERENCES

ANNEXURE 1

REFERENCES

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ANNEXURE 2

PAKISTAN ENVIRONMENTAL PROTECTION ACT 1997

The Gazette of Pakistan

EXTRAORDINARY
PUBLISHED BY AUTHORITY

ISLAMABAD, SATURDAY, DECEMBER 6,1997

PART I

Acts, Ordinances, President's Orders and Regulations

SENATE SECRETARIAT

Islamabad, the 6th December 1997

No. F. 9(46)/97-Legis.- The following Acts of Majlis-e-Shoora (Parliament) received the assent of the Acting President on 3rd December, 1997 are hereby published for general information :-

Act No. XXXIV of 1997

An Act to provide for the protection, conservation, rehabilitation and improvement of the environment, for the prevention and control of pollution, and promotion of sustainable development

WHEREAS it is expedient to provide for the protection, conservation, rehabilitation and improvement of the environment, prevention and control of pollution, promotion of sustainable development, and for matters connected therewith and incidental thereto;

1. Short title, extent and commencement.---(1) This Act, shall be called the Pakistan Environmental Protection Act, 1997

(2) It extends to the whole of Pakistan.

(3) It shall come into force at once.

2. Definitions.—In this Act, unless there is anything repugnant in the subject or context,—

(i) "adverse environmental effect" means impairment of, or damage to, the environment and includes—

(a) impairment of, or damage to, human health and safety or to biodiversity or property;

(b) pollution; and

(c) any adverse environmental effect as may be specified in the regulations;

(ii) "agricultural waste" means waste from farm and agricultural activities including poultry, cattle farming, animal husbandry residues from the use of fertilizers, pesticides and other farm . chemicals;

(iii) "air pollutant" means any substance that causes pollution of air and includes soot, smoke, dust particles, odour, light, electro-magnetic, radiation, heat, fumes, combustion exhaust, exhaust gases, noxious gases, hazardous substances and radioactive substances;

(iv) "biodiversity" or "biological diversity" means the variability among living organisms from all sources, including inter alia terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part, including diversity within species, between species and of ecosystems;

(v) "Council" means the Pakistan Environmental Protection Council established under section 3;

(vi) "discharge" includes spilling, leaking, pumping, depositing, seeping, releasing, flowing out, pouring, emitting, emptying or dumping;

(vii) "ecosystem" means a dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit;

(viii) "effluent" means any material in solid, liquid or gaseous form or combination thereof being discharged from industrial activity or any other source and includes a slurry, suspension or vapour;

(ix) "emission standards" means the permissible standards established by the Federal Agency or a Provincial Agency for emission of air pollutants and noise and for discharge of effluent and waste;

(x) "environment" means—

(a) air, water and land;

(b) all layers of the atmosphere;

(c) all organic and inorganic matter and living organisms;

(d) the ecosystem and ecological relationships;

(e) buildings, structures, roads, facilities and works;

(f) all social and economic conditions affecting community life; and

(g) the inter-relationships between any of the factors specified in sub-clauses (a) to (f);

(xi) "environmental impact assessment" means an environmental study comprising collection of data, prediction of qualitative and quantitative impacts, comparison of alternatives, evaluation of preventive, mitigatory and compensatory measures, formulation of environmental management and training plans and monitoring arrangements, and framing of recommendations and such other components as may be prescribed;

(xii) "Environmental Magistrate" means the Magistrate of the First Class appointed under Section 24 ;

(xiii) "Environmental Tribunal" means the Environmental Tribunal constituted under section 20 ;

(xiv) "Exclusive Economic Zone" shall have the same meaning as in the Territorial Waters and Maritime Zones Act, 1976 (LXXXII of 1976);

(xv) "factory" means any premises in which industrial activity is being undertaken;

(xvi) "Federal Agency" means the Pakistan Environmental Protection Agency established under section 5, or any Government Agency, local council or local authority exercising the powers and functions of the Federal Agency;

(xvii) "Government Agency" includes—

(a) a division, department, attached department, bureau, section, commission, board, office or unit of the Federal Government or a Provincial Government;

(b) a developmental or a local authority, company or corporation established or controlled by the Federal Government or Provincial Government; and

(c) a Provincial Environmental Protection Agency. ; and

(d) any other body defined and listed in the Rules of Business of the Federal Government or a Provincial Government.

(xviii) "hazardous substance" means—

(a) a substance or mixture of substances, other than a pesticide as defined in the Agricultural Pesticides Ordinance, 1971 (II of 1971), which, by reason of its chemical activity or toxic, explosive, flammable, corrosive, radioactive or other characteristics,

causes, or is likely to cause, directly or in combination with other matters an adverse environmental effect; and

(b) any substance which may be prescribed as a hazardous substance;

(xix) "hazardous waste" means waste which is or which contains a hazardous substance or which may be prescribed as hazardous waste and includes hospital waste and nuclear waste;

(xx) "historic waters" means such limits of the waters adjacent to the land territory of Pakistan as may be specified by notification under section 7 of the Territorial Waters and Maritime Zones Act, 1976 (LXXXII of 1976);

(xxi) "hospital waste" includes waste medical supplies and materials of all kinds, and waste blood, tissue, organs and other parts of the human and animal bodies, from hospitals, clinics and laboratories;

(xxii) "industrial activity" means any operation or process for manufacturing, making, formulating, synthesising, altering, repairing, ornamenting, finishing, packing or otherwise treating any article or substance with a view to its use, sale, transport, delivery or disposal, or for mining, for oil and gas exploration and development, or for pumping water or sewage, or for generating, transforming or transmitting power or for any other industrial or commercial purpose;

(xxiii) "industrial waste" means waste resulting from an industrial activity;

(xxiv) "initial environmental examination" means a preliminary environmental review of the reasonably foreseeable qualitative and quantitative impacts on the environment of a proposed project to determine whether it is likely to cause an adverse environmental effect for requiring preparation of an environmental impact assessment;

(xxv) "local authority" means any agency set up or designated by the Federal Government or a Provincial Government, by notification in the official Gazette, to be a local authority for the purposes of this Ordinance;

(xxvi) "local council" means a local council constituted or established under a law relating to local government;

(xxvii) "motor vehicle" means any mechanically propelled vehicle adapted for use upon land whether its power of propulsion is transmitted thereto from an external or internal source, and includes a chassis to which a body has not been attached, and a trailer, but does not include a vehicle running upon fixed rails;

(xxviii) "municipal waste" includes sewage, refuse, garbage, waste from abattoirs, sludge and human excreta and the like;

(xxix) "National Environmental Quality Standards" means standards established by the Federal Agency under clause (e) of sub-section (1) of section 6 and approved by the Council under clause (c) of sub-section (1) of section 4;

(xxx) "noise" means the intensity, duration and character of sounds from all sources, and includes vibration;

(xxxi) "nuclear waste" means waste from any nuclear reactor or nuclear plant or other nuclear energy system, whether or not such waste is radioactive;

(xxxii) "person" means any natural person or legal entity and includes an individual, firm, association, partnership, society, group, company, corporation, co-operative society, Government Agency, non-governmental organization, community-based organization, village organization, local council or local authority and, in the case of a vessel, the master or other person having for the time being the charge or control of the vessel;

(xxxiii) "pollution" means the contamination of air, land or water by the discharge or emission of effluent or wastes or air pollutants or noise or other matter which either directly or indirectly or in combination with other discharges or substances alters unfavourably the chemical, physical, biological, radiational, thermal or radiological or aesthetic properties of the air, land or water or which may, or is likely to make the air, land or water unclean, noxious or impure or injurious, disagreeable or detrimental to the health, safety, welfare or property of persons or harmful to biodiversity;

(xxxiv) "prescribed" means prescribed by rules made under this Act;

(xxxv) "project" means any activity, plan, scheme, proposal or undertaking involving any change in the environment and includes—

(a) construction or use of buildings or other works;

(b) construction or use of roads or other transport systems;

(c) construction or operation of factories or other installations;

(d) mineral prospecting, mining, quarrying, stone-crushing, drilling and the like;

(e) any change of land use or water use; and

(f) alteration, expansion, repair, decommissioning or abandonment of existing buildings or other works, roads or other transport systems, factories or other installations;

(xxxvi) "proponent" means the person who proposes or intends to undertake a project;

(xxxvii) "Provincial Agency" means a Provincial Environmental Protection Agency established under section 8;

(xxxviii) "regulations" means regulations made under this Act;

(xix) "rules" means rules made under this Act;

(xl) "sewage" means liquid or semi-solid wastes and sludge from sanitary conveniences, kitchens, laundries, washing and similar activities and from any sewerage system or sewage disposal works;

(xli) "standards" means qualitative and quantitative standards for discharge of effluent and wastes and for emission of air pollutants and noise either for general applicability or for a particular area, or from a particular production process, or for a particular product, and includes the National Environmental Quality Standards, emission standards and other standards established under this Act and the rules and regulations;

(xlii) "sustainable development" means development that meets the needs of the present generation without compromising the ability of future generations to meet their needs;

(xliii) "territorial waters" shall have the same meaning as in the Territorial Waters and Maritime Zones Act, 1976 (LXXXII of 1976);

(xliv) "vessel" includes anything made for the conveyance by water of human beings or of goods; and

(xlv) "waste" means any substance or object which has been, is being or is intended to be, discarded or disposed of, and includes liquid waste, solid waste, waste gases, suspended waste, industrial waste, agricultural waste, nuclear waste, municipal waste, hospital waste, used polyethylene bags and residues from the incineration of all types of waste.

3. Establishment of the Pakistan Environmental Protection Council.— (1) The Federal Government shall, by notification in the official Gazette, establish a Council to be known as the Pakistan Environmental Protection Council consisting of—

(i) Prime Minister or such other person as the Prime Minister may nominate in this behalf.	Chairperson
(ii) Minister incharge of the Ministry or Division dealing with the subject of environment.	Vice Chairperson
(iii) Chief Ministers of the Provinces.	Members
(iii) Ministers Incharge of the subject of environment in the Provinces.	Members
(iv) Such other persons not exceedingthirty-five as the federal Government may appoint, of which at least	Members

twenty shall be non-officials including five representatives of the Chambers of Commerce and Industry and industrial associations and one or more representatives of the Chambers of Agriculture, the medical and legal professions, trade unions, and non-governmental organizations concerned with the environment and development, and scientists, technical experts and educationists

(v) Secretary to the Government of Pakistan, incharge of the Ministry or Division dealing with the subject of environment — Member/ Secretary

(2) The Members of the Council, other than ex-officio members, shall be appointed in accordance with the prescribed procedure and shall hold office for a term of two years.

(3) The Council shall frame its own rules of procedure.

(4) The Council shall hold meetings, as and when necessary, but not less than two meetings, shall be held in a year.

(5) The Council may constitute committees of its members and entrust them with such functions as it may deem fit, and the recommendations of the committees shall be submitted to the Council for approval.

(6) The Council, or any of its committees, may invite any technical expert or representative of any Government Agency or non-governmental organization or other person possessing specialized knowledge of any subject for assistance in performance of its functions.

4. Functions and powers of the Council.—(1) The Council shall—

(a) co-ordinate and supervise enforcement of the provisions of this Act; and

(b) approve comprehensive national environmental policies and ensure their implementation within the framework of a national conservation strategy as may be approved by the Federal Government from time to time;

(c) approve the National Environmental Quality Standards;

(d) provide guidelines for the protection and conservation of species, habitats, and biodiversity in general, and for the conservation of renewable and non-renewable resources.

(e) co-ordinate integration of the principles and concerns of sustainable development into national development plans and policies;

(f) consider the National Environment Report and give appropriate directions thereon;

(2) The Council may, either itself or on the request of any person or organization, direct the Federal Agency or any Government Agency to prepare, submit, promote or implement projects for the protection, conservation, rehabilitation and improvement of the environment, the prevention and control of pollution, and the sustainable development of resources or to undertake research in any aspect of environment.

5. Establishment of the Pakistan Environmental Protection Agency.----(1) The Federal Government shall, by notification in the official Gazette, establish the Pakistan Environmental Protection Agency to exercise the powers and perform the functions assigned to it under this Act and the rules and regulations made thereunder.

(2) The Federal Agency shall be headed by a Director-General who shall be appointed by the Federal Government on such terms and conditions as it may determine.

(3) The Federal Agency shall have such administrative, technical and legal staff, as the Federal Government may specify, to be appointed in accordance with such procedure as may be prescribed.

(4) The powers and functions of the Federal Agency shall be exercised and performed by the Director-General.

(5) The Director-General may, by general or special order, delegate any of the powers and functions to staff appointed under sub-section (3).

(6) For assisting the Federal Agency in the discharge of its functions the Federal Government shall establish Advisory Committees for various sectors and appoint as members thereof eminent representatives of the relevant sector, educational institutions, research institutes and non-governmental organizations.

6. Functions of the Federal Agency.—(1) The Federal Agency shall—

(a) administer and implement this Act and the rules and regulations made;

(b) prepare, in co-ordination with the appropriate Government Agency and in consultation with the concerned sectoral Advisory Committees, national environmental policies for approval by the Council;

(c) take all necessary measures for the implementation of the national environmental policies approved by the Council;

(d) prepare and publish an annual National Environment Report on the state of the environment;

(e) prepare, establish and revise the National Environmental Quality Standards with approval of the Council:

Provided that before seeking approval of the Council, the Federal Agency shall publish the proposed National Environmental Quality Standards for public opinion in accordance with the prescribed procedure; and

(f) ensure enforcement of the National Environmental Quality Standards;

(g) establish standards for the quality of the ambient air, water and land, by notification in the official Gazette in consultation with the Provincial Agency concerned:

Provided that—

(i) different standards for discharge or emission from different sources and for different areas and conditions may be specified;

(ii) where standards are less stringent than the National Environmental Quality Standards prior approval of the Council shall be obtained;

(iii) certain areas, with the approval of the Council, may exclude from carrying out specific activities, projects from the application of such standards;

(h) co-ordinate environmental policies and programmes nationally and internationally;

(i) establish systems and procedures for surveys, surveillance, monitoring, measurement, examination, investigation, research, inspection and audit to prevent and control pollution, and to estimate the costs of cleaning up pollution and rehabilitating the environment in various sectors;

(j) take measures to promote research and the development of science and technology which may contribute to the prevention of pollution, protection of the environment, and sustainable development;

(k) certify one or more laboratories as approved laboratories for conducting tests and analysis and one or more research institutes as environmental research institutes for conducting research and investigation for the purposes of this Act.

(l) identify the needs for and initiate legislation in various sectors of the environment;

(m) render advice and assistance in environmental matters including such information and data available with it as may be required for carrying out the purposes of this Act:

Provided that the disclosure of such information shall be subject to the restrictions contained in the proviso to sub-section (3) of section 12;

(n) assist the local councils, local authorities, Government Agencies and other persons to implement schemes for the proper disposal of wastes so as to ensure compliance with the standards established by it;

(o) provide information and guidance to the public on environmental matters;

(p) recommend environmental courses, topics, literature and books for incorporation in the curricula and syllabi of educational institutions;

(q) promote public education and awareness of environmental issues through mass media and other means including seminars and workshops;

(r) specify safeguards for the prevention of accidents and disasters which may cause pollution, collaborate with the concerned person in the preparation of contingency plans for control of such accidents and disasters, and co-ordinate implementation of such plans;

(s) encourage the formation and working of non-governmental organizations, community organizations and village organizations to prevent and control pollution and promote sustainable development;

(t) take or cause to be taken all necessary measures for the protection, conservation, rehabilitation and improvement of the environment, prevention and control of pollution and promotion of sustainable development; and

(u) perform any function which the Council may assign to it.

(2) The Federal Agency may—

(a) undertake inquiries or investigation into environmental issues, either of its own accord or upon complaint from any person or organization;

(b) request any person to furnish any information or data relevant to its functions;

(c) initiate with the approval of the Federal Government, requests for foreign assistance in support of the purposes of this Act and enter into arrangements with foreign agencies or organizations for the exchange of material or information and participate in international seminars or meetings;

(d) recommend to the Federal Government the adoption of financial and fiscal programmes, schemes or measures for achieving environmental objectives and goals and the purposes of this Act, including—

(i) incentives, prizes awards, subsidies, tax exemptions, rebates and depreciation allowances; and

(ii) taxes, duties, cesses and other levies;

(e) establish and maintain laboratories to help in the performance of its functions under this Act and to conduct research in various aspects of the environment and provide or arrange necessary assistance for establishment of similar laboratories in the private sector; and

(f) provide or arrange, in accordance with such procedure as may be prescribed, financial assistance for projects designed to facilitate the discharge of its functions.

7. Powers of the Federal Agency.—Subject to the provisions of this Act, the Federal Agency may—

(a) lease, purchase, acquire, own, hold, improve, use or otherwise deal in and with any property both moveable and immovable;

(b) sell, convey, mortgage, pledge, exchange or otherwise dispose of its property and assets;

(c) fix and realize fees, rates and charges for rendering any service or providing any facility, information or data under this Act or the rules and regulations;

(d) enter into contracts, execute instruments, incur liabilities and do all acts or things necessary for proper management and conduct of its business;

(e) appoint with the approval of the Federal Government and in accordance with such procedures as may be prescribed, such advisers, experts and consultants as it considers necessary for the efficient performance of its functions on such terms and conditions as it may deem fit;

(f) summon and enforce the attendance of any person and require him to supply any information or document needed for the conduct of any enquiry or investigation into any environmental issue;

(g) enter and inspect and under the authority of a search warrant issued by the Environmental Court or Environmental Magistrate, search at any reasonable time, any land, building, premises, vehicle or vessel or other place where or in which. there are reasonable grounds to believe that an offence under this Act has been, or is being, committed;

(h) take samples of any materials, products, articles or substances or of the effluent, wastes or air pollutants being discharged or emitted or of air, water or land in the vicinity of the discharge or emission;

(i) arrange for test and analysis of the samples at a certified laboratory;

(j) confiscate any article used in the commission of the offence where the offender is not known or cannot be found within a reasonable time:

Provided that the power under clauses (f), (h), (I) and (j) shall be exercised in accordance with the provisions of the Code of Criminal Procedure, 1898 (Act V of 1898). or the rules made under this Act and under the direction of the Environmental Court or Environmental Magistrate; and

(k) establish a National Environmental Co-ordination Committee comprising the Director-General as its chairman and the Director Generals of the Provincial Environmental Protection Agencies and such other persons as the Federal Government may appoint as its members to exercise such powers and perform such functions as may be delegated or assigned to it by the Federal Government for carrying out the purposes of this Act and for ensuring inter provincial co-ordination in environmental policies.

8. Establishment, powers and functions of the Provincial Environmental Protection Agencies.—(1) Every Provincial Government shall, by notification in the official Gazette, establish an Environmental Protection Agency, to exercise such powers and perform such functions as may be delegated to it by the Provincial Government under sub-section (2) of section 26.

(2) The Provincial Agency shall be headed by a Director-General who shall be appointed by the Provincial Government on such terms and conditions as it may determine.

(3) The Provincial Agency shall have such administrative, technical and legal staff as the Provincial Government may specify, to be appointed in accordance with such procedure as may be prescribed.

(4) The powers and functions of the Provincial Agency shall be exercised and performed by the Director-General.

(5) The Director General may, by general or special order, delegate any of the powers and functions to staff appointed under sub-section (3).

(6) For assistance of the Provincial Agency in the discharge of its functions, the Provincial Government shall establish Sectoral Advisory Committees for various sectors and appoint members from amongst eminent representatives of the relevant sector, educational institutions, research institutes and non-governmental organizations.

9. Establishment of the Provincial Sustainable Development Funds.— (1) There shall be established in each Province a Sustainable Development Fund.

(2) The Provincial Sustainable Development Fund shall be derived from the following sources, namely:—

(a) grants made or loans advanced by the Federal Government or the Provincial Governments;

(b) aid and assistance, grants, advances, donations and other non-obligatory funds received from foreign governments, national or international agencies, and non-governmental organizations; and

(c) contributions from private organizations and other persons.

(3) The Provincial Sustainable Development Fund shall be utilized in accordance with such procedure as may be prescribed for—

(a) providing financial assistance to the projects designed for the protection, conservation, rehabilitation and improvement of the environment, the prevention and control of pollution, the sustainable development of resources and for research in any aspect of environment; and

(b) any other purpose which in the opinion of the Board shall help achieve environmental objectives and the purposes of this Act.

10. Management of the Provincial Sustainable Development Fund.—(1) The Provincial Sustainable Development Fund shall be managed by a Board known as the Provincial Sustainable Development Fund Board consisting of—

(i) Chairman, Planning and Development Board/Additional Chief Secretary Planning and Development Department	Chairperson
(ii) such officers of the Provincial Governments, not exceeding six, as the Provincial Government may appoint including Secretaries incharge of the Finance, Industries and Environment Departments	Members
(iii) such non-official persons not exceeding ten as the Provincial Government may appoint including representatives of the Provincial Chamber of Commerce and Industry, non governmental organizations, and major donors.	Members
(iv) Director-General of the Provincial Agency	Member/Secretary

(2) In accordance with such procedure and such criteria as may be prescribed, the Board shall have the power to—

(a) sanction financial assistance for eligible projects;

(b) invest moneys held in the Provincial Sustainable Development Fund in such profit-bearing Government bonds, savings schemes and securities as it may deem suitable; and

(c) take such measures and exercise such powers as may be necessary for utilization of the Provincial Sustainable Development Fund for the purposes specified in sub-section (3) of section 9.

(3) The Board shall constitute committees of its members to undertake regular monitoring of projects financed from the Provincial Sustainable Development Fund and to submit progress reports to the Board which shall publish an Annual Report incorporating its annual audited accounts and performance evaluation based on the progress reports.

11. Prohibition of certain discharges or emissions.—(1) Subject to the provisions of this Act and the rules and regulations no person shall discharge or emit or allow the discharge or emission of any effluent or waste or air pollutant or noise in an amount, concentration or level which is in excess of the National Environmental Quality Standards or, where applicable, the standards established under sub-clause (I) of clause (g) of sub-section (1) of section 6.

(2) The Federal Government may levy a pollution charge on any person who contravenes or fails to comply with the provisions of sub-section (1), to be calculated at such rate, and collected in accordance with such procedure as may be prescribed.

(3) Any person who pays the pollution charge levied under sub-section (2) shall not be charged with an offence with respect to that contravention or failure.

(4) The provisions of sub-section (3) shall not apply to projects which commenced industrial activity on or after the thirtieth day of June, 1994.

12. Initial environmental examination and environmental impact assessment.—(1) No proponent of a project shall commence construction or operation unless he has filed with the Government Agency designated by Federal Environmental Protection Agency or Provincial Environmental Protection Agencies, as the case may be, or, where the project is likely to cause an adverse environmental effects an environmental impact assessment, and has obtained from the Government Agency approval in respect thereof.

(2) The Government Agency shall subject to standards fixed by the Federal Environmental Protection Agency—

(a) review the initial environmental examination and accord its approval, or require submission of an environmental impact assessment by the proponent; or

(b) review the environmental impact assessment and accord its approval subject to such conditions as it may deem fit to impose, require that the environmental impact assessment be re-submitted after such modifications as may be stipulated or reject the project as being contrary to environmental objectives.

(3) Every review of an environmental impact assessment shall be carried out with public participation and no information will be disclosed during the course of such public participation which relates to—

(i) trade, manufacturing or business activities, processes or techniques of a proprietary nature, or financial, commercial, scientific or technical matters which the proponent has requested should remain confidential, unless for reasons to be recorded in writing, the Director General of the Federal Agency is of the opinion that the request for confidentiality is not well-founded or the public interest in the disclosure outweighs the possible prejudice to the competitive position of the project or its proponent; or

(ii) international relations, national security or maintenance of law and order, except with the consent of the Federal Government; or

(iii) matters covered by legal professional privilege.

(4) The Government Agency shall communicate its approval or otherwise within a period of four months from the date the initial environmental examination or environmental impact assessment is filed complete in all respects in accordance with the prescribed procedure, failing which the initial environmental examination or, as the case may be, the environmental impact assessment shall be deemed to have been approved, to the extent to which it does not contravene the provisions of this Act and the rules and regulations.

(5) Subject to sub-section (4) the appropriate Government may in a particular case extend the aforementioned period of four months if the nature of the project so warrants.

(6) The provisions of sub-sections (1), (2), (3), (4) and (5) shall apply to such categories of projects and in such manner as may be prescribed.

(7) The Government Agency shall maintain separate registers for initial environmental examination and environmental impact assessment projects, which shall contain brief particulars of each project and a summary of decisions taken thereon, and which shall be open to inspection by the public at all reasonable hours and the disclosure of information in such registers shall be subject to the restrictions specified in sub-section (3).

13. Prohibition of import of hazardous waste.—No person shall import hazardous waste into Pakistan and its territorial waters, Exclusive economic Zone and historic waters.

14. Handling of hazardous substances.—Subject to the provisions of this Act, no person shall generate, collect, consign, transport, treat, dispose of, store, handle or import any hazardous substance except—

(a) under a licence issued by the Federal Agency and in such manner as may be prescribed; or

(b) in accordance with the provisions of any other law for the time being in force, or of any international treaty, convention, protocol, code, standard, agreement or other instrument to which Pakistan is a party.

15. Regulation of motor vehicles.—(l) Subject to the provisions of this Act, and the rules and regulations, no person shall operate a motor vehicle from which air pollutants or noise are being emitted in an amount, concentration or level which is in excess of the National Environmental Quality Standards, or where applicable the standards established under clause (g) of sub-section (I) of section 6.

(2) For ensuring compliance with the standards mentioned in sub-section (1), the Federal Agency may direct that any motor vehicle or class of vehicles shall install such pollution-control devices or other equipment or use such fuels or undergo such maintenance or testing as may be prescribed.

(3) Where a direction has been issued by the Government Agency under subsection (2) in respect of any motor vehicles or class of motor vehicles, no person shall operate any such vehicle till such direction has been complied with.

16. Environmental protection order.—(1) Where the Federal Agency or a Provincial Agency is satisfied that the discharge or emission of any effluent, waste, air pollutant or noise, or the disposal of waste, or the handling of hazardous substances, or any other act or omission is likely to occur, or is occurring, or has occurred, in violation of the provisions of this Act, rules or regulations or of the conditions of a licence, and is likely to cause, or is causing or has caused an adverse environmental effect, the Federal Agency or, as the case may be, the Provincial Agency may, after giving the person responsible for such discharge, emission, disposal, handling, act or omission an opportunity of being heard, by order direct such person to take such measures that the Federal Agency or Provincial Agency may consider necessary within such period as may be specified in the order.

(2) In particular and without prejudice to the generality of the foregoing power, such measures may include—

(a) immediate stoppage, preventing, lessening or controlling the discharge, emission, disposal, handling, act or omission, or to minimize or remedy the adverse environmental effect;

(b) installation, replacement or alteration of any equipment or thing to eliminate, control or abate on a permanent or temporary basis, such discharge, emission, disposal, handling, act or omission;

(c) action to remove or otherwise dispose of the effluent, waste, air pollutant, noise, or hazardous substances; and

(d) action to restore the environment to the condition existing prior to such discharge, disposal, handling, act or omission, or as close to sucb condition as may be reasonable in the circumstances, to the satisfaction of the Federal Agency or, Provincial Agency.

(3) Where the person, to whom directions under sub-section (1) are given, does not comply therewith, the Federal Agency or Provincial Agency may, in addition to the proceedings initiated against him under this Act, the rules and regulations, itself take or cause to be taken such measures specified in the order as it may deem necessary and may recover the reasonable costs of taking such measures from such person as arrears of land revenue.

17. Penalties.—(1) Whoever contravenes or fails to comply with the provisions of sections 11, 12, 13 or section 16 or any order issued thereunder shall be punishable with fine which may extend to one million rupees, and in the case of a continuing contravention or failure, with an additional fine which may extend to one hundred thousand rupees for every day during which such contravention or failure continues:

Provided that if contravention of the provisions of section 11 also constitutes contravention of the provisions of section 15, such contravention shall be punishable under sub-section (2) only.

(2) Whoever contravenes or fails to comply with the provisions of section 14 or 15 or any rule or regulation or conditions of any licence, any order or direction, issued by the Council or the Federal Agency or Provincial Agency, shall be punishable with fine which may extend to one hundred thousand rupees, and in case of continuing contravention or failure with an additional fine which extend to one thousand rupees for every day during which such contravention continues.

(3) Where an accused has been convicted of an offence under sub-sections (1) and (2), the Environmental Court and Environmental Magistrate, as the case may be, shall, in passing sentence, take into account the extent and duration of the contravention or failure constituting the offence and the attendant circumstances.

(4) Where an accused has been convicted of an offence under sub-section (1) and the Environmental Court is satisfied that as a result of the commission of the offence

monetary benefits have accrued to the offender, the Environmental Court may order the offender to pay, in addition to the fines under sub-section (1), further additional fine commensurate with the amount of the monetary benefits.

(5) Where a person convicted under sub-sections (1) or sub-section (2) had been previously convicted for any contravention under this Act, the Environmental Court or, as the case may be, Environmental Magistrate may, in addition to the punishment awarded thereunder—

(a) endorse a copy of the order of conviction to the concerned trade or industrial association, if any, or the concerned Provincial Chamber of Commerce and Industry or the Federation of Pakistan Chambers of Commerce and Industry;

(b) sentence him to imprisonment for a term which may extend to two years;

(c) order the closure of the factory;

(d) order confiscation of the factory, machinery, and equipment, vehicle, material or substance, record or document or other object used or involved in contravention of the provisions of the Act:

Provided that for a period of three years from the date of commencement of this Act the sentence of imprisonment shall be passed only in respect of persons who have been previously convicted for more than once for any contravention of sections 11, 13, 14 or 16 involving hazardous waste;

(e) order such person to restore the environment at his own cost, to the conditions existing prior to such contravention or as close to such conditions as may be reasonable in the circumstances to the satisfaction of the Federal Agency or, as the case may be, Provincial Agency; and

(f) order that such sum be paid to any person as compensation for any loss, bodily injury, damage to his health or property suffered by such contravention.

(6) The Director-General of the Federal Agency or of a Provincial Agency or an officer generally or specially authorised by him in this behalf may, on the application of the accused compound an offence under this Act with the permission of the Environmental Tribunals or Environmental Magistrate in accordance with such proceedure as may be prescribed.

(7) Where the Director-General of the Federal Agency or of a Provincial Agency is of the opinion that a person has contravened any provision of Act he may, subject to the rules, by notice in writing to that person require him to pay to the Federal Agency or, as the case may be, Provincial Agency an administrative penalty in the amount set out in the notice for each day the contravention continues; and a person who pays an administrative

penalty for a contravention shall not be charged under this Act with an offence in respect of such contravention.

(8) The provisions of sub-sections (6) and (7) shall not apply to a person who has been previously convicted of offence or who has compounded an offence under this Act who has paid an administrative penalty for a contravention of any provision of this Act.

18. Offences by bodies corporate.— Where any contravention of this Act has been committed by a body corporate, and it is proved that such offence has been committed with the consent or connivance of, or is attributed to any negligence on the part of, any director, partner, manager, secretary or other Officer of the body corporate, such director, partner, manager, secretary or other officer of the body corporate, shall be deemed guilty of such contravention along with the body corporate and shall be punished accordingly:

Provided that in the case of a company as defined under the Companies Ordinance, 1984 (XLVII of 1984), only the Chief Executive as defined in the said Ordinance shall be liable under this section.

Explanation.— For the purposes of this section, "body corporate" includes a firm, association of persons and a society registered under the Societies Registration Act, 1860 (XXI of 1860), or under the Co-operative Societies Act, 1925 (VII of 1925).

19. Offences by Government Agencies, local authorities or local councils.—Where any contravention of this Act has been committed by any Government Agency, local authority or local council, and it is proved that such contravention has been committed with the consent or connivance of, or is attributable to any negligence on the part of, the Head or any other officer of the Government Agency, local authority or local council, such Head or other officer shall also be deemed guilty of such contravention along with the Government Agency, local authority or local council and shall be liable to be proceeded against and punished accordingly.

20. Environmental Tribunals.—(1) The Federal Government may, by notification in the official gazette, establish as many Environmental Tribunals as it consider necessary and, where it establishes more than one Environmental Tribunals, it shall specify territorial limits within which, or the class of cases in respect of which, each one of them shall exercise jurisdiction under this Act.

(2) An Environmental Tribunal shall consist of a Chairperson who is, or has been, or is qualified for appointment as, a judge of the High Court to be appointed after consultation with the Chief Justice of the High Court and two members to be appointed by the Federal Government of which at least one shall be a technical member with suitable professional qualifications and experience; in the environmental field as may be prescribed.

(3) For every sitting of the Environ mental Tribunal, the presence of the Chairperson and not less than one Member shall be necessary.

(4) A decision of an Environmental Tribunal shall be expressed in terms of the opinion of the majority of its members, including ;the Chairperson, or if the case has been decided by the Chairperson and only one of the members and a there is a difference of opinion between them, the ;decision of the Environmental Tribunal shall be expressed in terms of the opinion of the Chairperson.

(5) An environmental Tribunal shall not, merely be reason of a change in its composition, or the absence of any member from any sitting, be bound to recall and rehear any witness who has given evidence, and may act on the evidence already ;recorded by, or produced, before it.

(6) An Environmental Tribunal may hold its sittings at such places within its territorial jurisdiction as the Chairperson may decide.

(7) No act or proceeding of an Environmental Tribunal shall be invalid by reason only of the existence of a a vacancy in, or defect in the constitution, of, the Environmental Tribunal.

(8) The terms and conditions of service of the Chairperson and members of the Environmental Tribunal shall be such as may be prescribed.

21. Jurisdiction and powers of Environmental Tribunals.—(1) An Environmental Tribunal shall exercise such powers and perform such functions as are, or may be, conferred upon or assigned to it by or under this Act or the rules and regulations made thereunder.

(2) All contravention punishable under sub-section (1) of section 17 shall exclusively be triable by an Environmental Tribunal.

(3) An Environmental Tribunal shall not take cognizance of any offence triable under sub-section (2) except on a complaint in writing by--

(a) the Federal Agency or any Government Agency or local council; and

(b) any aggrieved person, who has given notice of not less than thirty days to the Federal Agency, or the Provincial Agency concerned, of the alleged contravention and of his intention to make a complaint to the Environment Tribunal.

(4) In exercise of its criminal jurisdiction, the Environmental Tribunals shall have the same powers as are vested in Court of Session under the Code of Criminal Procedure, 1898 (Act V of 1898).

(5) In exercise of the appellate jurisdiction under section 22 the Environmental Tribunals shall have the same powers and shall follow the same procedure as an appellate court in the Code of Civil Procedure, 1908 (Act V of 1908).

(6) In all matters with respect to which no procedure has been provided for in this Act, the Environmental Tribunal shall follow the procedure laid down in the Code of Civil Procedure, 1908 (Act V of 1908).

(7) An Environmental Tribunal may, on application filed by any officer duly authorised in this behalf by the Director-General of the Federal Agency or of Provincial Agency, issue bailable warrant for the arrest of any person against whom reasonable suspicion exist, of his having been involved in contravention punishable under sub-section (1) of Section 17:

Provided that such warrant shall be applied for, issued, and executed in accordance with the provisions of the Code of Criminal Procedure, 1898 (Act V of 1898):

Provided further that if the person arrested executes a bond with sufficient sureties in accordance with the endorsement on the warrant he shall be released from custody, failing which he shall be taken or sent without delay to the officer in-charge of the nearest police station.

(8) All proceedings before the Environmental Tribunal shall be deemed to be judicial proceedings within the meaning of section 193 and 228 of the Pakistan Penal Code (Act XLV of 1860), and the Environ mental Tribbunal shall be deemed to be a court for the purpose of section 480 and 482 of the Code of Criminal Procedure, 1898 (Act V of 1898).

(9) No court other than an Environmental Tribunal shall have or exercise any jurisdiction with respect to any matter to which the jurisdiction of an Environmental Tribunal extends under this Act, the rules and regulations made thereunder.

(10) Where the Environmental Tribunal is satisfied that a complaint made to it under sub-section (3) is false and vexatious to the knowledge of the complainant, it may, by an order, direct the complainant to pay to the person complained against such compensatory costs which may extend to one hundred thousand rupees.

22. Appeals to the Environmental Tribunal.—(1) Any person aggrieved by any order or direction of the Federal Agency or any Provincial Agency under any provision of this Act, and rules or regulations may prefer an appeal with the Environmental Tribunal within thirty days of the date of communication of the impugned order or direction to such person.

(2) An appeal to the Environmental Tribunal shall be in such form, contain such particulars and be accompanied by such fees as may be prescribed.

23. Appeals from orders of the Environmental Tribunal.—(l) Any person aggrieved by any final order or by any sentence of the Environmental Tribunal passed under this Act may, within thirty days of communication of such order or sentence, prefer an appeal to the High Court.

(2) An appeal under sub-section (l) shall be heard by a Bench of not less than two Judges.

24. Jurisdiction of Environmental Magistrates.—(l) Notwithstanding anything contained in the Code of Criminal Procedure, 1898 (Act V of 1898), or any other law for the time being in force, but subject to the provisions of this Act, all contravention punishable under sub-section (2) of section 17 shall exclusively be triable by a judicial Magistrate of the first class as Environmental Magistrate especially empowered in this behalf by the High Court.

(2) An Environmental Magistrate shall be competent to impose any punishment specified in sub-sections (2) and (4) of section 17.

(3) An Environmental Magistrate shall not take cognizance of an offence triable under sub-section (I) except on a complaint in writing by—

(a) the Federal Agency, Provincial Agency, or Government Agency or a local council; and

(b) any aggrieved person.

25. Appeals from orders of Environmental Magistrates.—Any person convicted of any contravention of this Act or the rules or regulations by an Environmental Magistrate may, within thirty days from the date of his conviction, appeal to the Court of Sessions whose decision thereon shall be final.

26. Power to delegate.—(1) The Federal Government may, by notification in the official Gazette, delegate any of its or of the Federal Agency's powers and functions under this Act and the rules and regulations to any Provincial Government, any Government Agency, local council or local authority.

(2) The Provincial Government may, by notification in the official Gazette, delegate any of its or of the Provincial Agency's powers or functions under this Act and the rules and regulations to any Government Agency of such Provincial Government or any local council or local authority in the Province.

27. Power to give directions.—In the performance of their functions under this Act-

(a) the Federal Agency and Provincial Agencies shall be bound by the directions given to them in writing by the Federal Government; and

(b) a Provincial Agency shall be bound by the directions given to it in writing by the Provincial Government.

28. Indemnity.—No suit, prosecution or other legal proceedings shall lie against the Federal or Provincial Governments, the Council, the Federal Agency or Provincial Agencies, the Director-Generals of the Federal Agency and the Provincial Agency, members, officers, employees, experts, advisers, committees or consultants of the Federal or Provincial Agencies or the Environmental Tribunal or Environmental Magistrates or any other person for anything which is in good faith done or intended to be done under this Act or the rules or regulations made thereunder.

29. Dues recoverable as arrears of land revenue.—Any dues recoverable by the Federal Agency or Provincial Agency under this Act, or the rules or regulations shall be recoverable as arrears of land revenue.

30. Act to override other laws.—The provisions of this Act shall have effect notwithstanding anything inconsistent therewith contained in any other law for the time being in force.

31. Power to make rules.—The Federal Government may, by notification in the official Gazette, make rules for carrying out the purposes of this Act including rules for implementing the provisions of the international environmental Agreements, specified in the Schedule to this Act.

32. Power to amend the Schedule.__The Federal Government may, by notification in the official Gazette, amend the Schedule so as to add any entry thereato or modify or omit any entry therein.

33. Power to make regulations.---(1) For carrying out the purposes of this Act, the Federal Agency may, by notification in the official Gazette and with the approval of the Federal Government, make regulations not inconsistent with the provisions of this Act or the rules made thereunder.

(2) In particular and without prejudice to the generality of the foregoing power, such regulations may provide for—

(a) submission of periodical reports, data or information by any Government agency, local authority or local council in respect of environmental matters;

(b) preparation of emergency contingency plans for coping with environmental hazards and pollution caused by accidents, natural disasters and calamities;

(c) appointment of officers, advisers, experts, consultants and employees;

(d) levy of fees, rates and charges in respect of services rendered, actions taken and schemes implemented;

(e) monitoring and measurement of discharges and emissions;

(f) categorization of projects to which, and the manner in which, section 12 applies;

(g) laying down of guidelines for preparation of initial environmental examination and environmental impact assessment and Development of procedures for their filing, review and approval;

(h) providing procedures for handling hazardous substances; and

(i) installation of devices in, use of fuels by, and maintenance and testing of motor vehicles for control of air and noise pollution.

34. Repeal, savings and succession.—(1) The Pakistan Environmental Protection Ordinance 1983 (XXXVII of 1983) is hereby repealed.

(2) Notwithstanding the repeal of the Pakistan Environmental Protection Ordinance, 1983 (XXVII of 1983), any rules or regulations or appointments made, orders passed, notifications issued, powers delegated, contracts entered into, proceedings commenced, rights acquired liabilities incurred, penalties, rates, fees or charges levied, things done or action taken under any provisions of that Ordinance shall, so far as they are not inconsistent with the provisions of this Act be deemed to have been made, passed, issued, delegated, entered into, commenced, acquired, incurred, levied, done or taken under this Act.

(3) On the establishment of the Federal Agency and Provincial Agencies under this Act, all properties, assets and liabilities pertaining to the Federal Agency and Provincial Agencies established under that Ordinance shall vest in and be the properties, assets and liabilities, as the case may be, of the Federal Agency and Provincial Agency established under this Act.

SCHEDULE

(See section 31)

1. International Plant Protection Convention, Rome, 1951.

2. Plant Protection Agreement for the South-East Asia and Pacific Region (as amended), Rome, 1956.

3. Agreement for the Establishment of a Commission for Controlling the Desert Locust in the Eastern Region of its Distribution Area in South-West Asia (as amended), Rome, 1963.

4. Convention on Wetlands of International Importance Especially as Waterfowl Habitat, Ramsar, 1971 and its amending Protocol, Paris, 1982.

5. Convention Concerning the Protection of World Cultural and Natural Heritage (World Heritage Convention), 1972.

6. Convention on International Trade in Endangered Species of Wild Funa and Flora (CITES), Washington, 1973.

7. Convention on the Conservation of Migratory Species of Wild Animals, Bonn, 1979.

8. Convention on the Law of the Sea, Montego Bay, 1982.

9. Vienna Convention for the Protection of the Ozone Layer, Vienna, 1985.

10. Montreal Protocol on Substances that Deplete the Ozone Layer, Montreal, 1987 and amendments thereto.

11. Agreement on the Network of Agriculture Centres in Asia and the Pacific, Bangkok, 1988.

12. Convention on the Control of Transboundary Movements of Hazardous Waste and Their Disposal, Basel, 1989.

13. Convention on Biological Diversity, Rio de Janeiro, 1992.

14. United Nations Framework Convention on Climate Change, Rio De Janeiro, 1992.

ANNEXURE 3

NATIONAL ENVIRONMENTAL QUALITY STANDARDS (NEQS) FOR MUNICIPAL AND INDUSTRIAL LIQUID EFFLUENTS AND GASEOUS EMISSIONS.

REGISTERED NO. M. 302 / L. 7646

The Gazette of Pakistan

EXTRAODINARY
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ISLAMABAD, THURSDAY AUGUST 10, 2000

Part II

Statutory Notifications (S.R.O.)

Government of Pakistan

MINISTRY OF ENVIRONMENT, LOCAL GOVERNMENT AND RURAL DEVELOPMENT

NOTIFICATION

Islamabad, the 8th August, 2000

S.R.O. 549 (1)/2000-in exercise of the powers conferred under came (c) of sub-section (1) of section 6 of the Pakistan Environmental Protection Act, 1997 (XXXIV of 1997), The Pakistan Environmental Protection Agency, with the prior approval of the Pakistan Environmental Protection Council, is pleased to direct that the following further amendments shall be made in its Notification No S. R. O. 742 (1)/93. Dated the 24 th August, 1993, namely :..

In the aforesaid notification, in paragraph 2,....

Price : Rs. 5.00

[4138 (2000)/Ex. Gaz.]

(1) for Annex I. The following shall be substituted, namely.....

NATIONAL ENVIRONMENTAL QUALITY STANDARDS FOR MUNICIPAL AND LIQUID INDUSTRIAL EFFLUENTS (mg/l, UNLESS OTHERWISE DEFINED)

S. No.	Parameter	Existing Standards	Revised Standards: Into Inland Waters	Into Sewage Treatment(b)	Into Sea(b)
1	2 3	4		5	6
1.	Temperature or Temperature Increase	40°C	=<3°C	=<3°C	=<3°C
2.	pH value	6-10	6-9	6-9	6-9
3.	Biochemical Oxygen Demand (BOD), at 20°c(¹)	80	80	250	80*
4.	Chemical Oxygen Demand (COD)(1)	150	150	400	400
5.	Total suspended solids (TSS)	150	200	400	200
6.	Total dissolved solids (TDS).	3500	3500	3500	3500
7.	Grease and oil	10	10	10	10
8.	phenolic compounds (as phenol)	0.1	0.1	0.3	0.3
9.	Chloride (as Cl')	1000	1000	1000	SC***
10.	Fluoride (as F')	20	10	10	10
11.	Cyanide (as CN') total	2	1.0	1.0	1.0
12.	An-ionic detergents (as MB As) ()	20	20	20	20
13.	Sulphate (SO)'⁴	600	600	1000	SC***
14.	Sulphide (S)'²	1.0	1.0	1.0	1.0
15.	Ammonia (NH,)	40	40	40	40

1	2	3	4	5	6
16.	Pesticides(3)	0.15	0.15	0.15	0.15
17.	Cadmium(1)	0.1	0.1	0.1	0.1
18.	Chromium trivalent and hexavalent(1)	1.0	1.0	1.0	1.0
19.	Copper(1)	1.0	1.0	1.0	1.0
20.	Lead(1)	0.5	0.5	0.5	0.5
21.	Mercury(4)	0.01	0.01	0.01	0.01
22.	Selenium(1)	0.5	0.5	0.5	0.5
23.	Nickel(1)	1.0	1.0	1.0	1.0
24.	Silver(4)	1.0	1.0	1.0	1.0
25.	Total Toxic metals	2.0	2.0	2.0	2.0
26.	Zinc	5.0	5.0	5.0	5.0
27.	Arsenic(1)	1.0	1.0	1.0	1.0
28.	Barium(1)	1.5	1.5	1.5	1.5
29.	Iron	2.0	8.0	8.0	8.0
30.	Manganese	1.5	1.5	1.5	1.5
31.	Boron(1)	6.0	6.0	6.0	6.0
32.	Chlorine	1.0	1.0	1.0	1.0

Explanations :

1. Assuming minimum dilution 1 : 10 on discharge, lower ratio would attract progressively stringent standards to be determined by the Federal Environmental Protection Agency. By 1 : 10 Dilution means, for example that for each one cubic meter of treated effluent, the recipient water body should have 10 cubic meter of water for dilution of this effluent.
2. Modified Benzene Alkyl Sulphate : assuming surfacetant as biodegradable.
3. Pesticides include herbicides, fungicides, and insecticides.
4. Subject to total toxic metal discharge should not exceed level given at S. No. 25.
5. Applicable only when and where sewage treatment is operational and BOD_5 =80 mg/l is achieved by the sewage treatment system.

6. Provided discharge is not at shore and not within 10 miles of mangrove or other important estuaries.

* The effluent should not result in temperature increase of more than 30C at the edge of the zone where initial mixing and dilution take place in the receiving body. In case zone is not defined, use 100 meters from the point of discharge.

** The value for industry is 200 mg/l.

*** Discharge concentration at or below sea concentration (SC).

Note :....1. Dilution of liquid effluents to bring them to the NEQS limiting values is not permissible through fresh water mixing with the effluents before discharging into the environment.

2. The concentration of pollutants in water being used will be substracted from the effluent for calculating the NEQS limits"

and

(2) for Annex II. The following shall be substituted, namely : -

" NATIONAL ENVIRONMENTAL QUALITY STANDARDS FOR INDUSTRIAL GASEOUS EMISSION (mg/Nm³, UNLESS OTHER-WISE DEFINED).

S. No.	Parameter	Source of emission	Existing Standards	Revised Standards
1	2	3	4	5
1.	Smoke	Smoke opacity not to exceed	40% or 2 Ringlemann Scale	40% or 2 Ringlemann Scale or equivalent Smoke number.
	Noise	85 db(A)	Sound meter	at 7.5m from source
2.	Particulate matter(*)	(a) Boilers and furnaces :	300	300
		(i) Oil fired	500	500
		(ii) Coal fired	200	300
		(iii) Cement kilns		
		(b) Grinding crushing clinker coolers and related processes, metallurgical processes,] converters, blast furnaces and cupolas.	500	500
3.	Hydrogen Chloride	Any	400	400
4.	Chlorine	Any	150	150
5.	Hydrogen fluoride	Any	150	150
6.	Hydrogen sulphide	Any	10	10

1	2	3	4	5
7.	Sulphur Oxides(³)(⁴)	Sulfuricacid / Sulphonic acid plants	400	5000
		Other Plants except power plants operating on oil and coal	400	1700
8.	Carbon monoxide	Any	800	800
9.	lead	Any	50	50
10.	Mercury	Any	10	10
11.	Cadmium	Any	20	20
12.	Arsenic	Any	20	20
13.	Copper	Any	50	50
14.	Antimony	Any	20	20
15.	Zinc	Any	200	200
16.	Oxides of Nitrogen(³)	Nitricacid manufacturing unit	400	3000
		other plants except power plants operating on oil or coal :		
		Gas fired	400	400
		Oil fired	_	600
		Coal fired	_	1200

Explanations :

1 .Based on the assumption that the size of the particulate is 10 micron or more.

2 .Based on I per cent sulphur content in fuel oil. Higher content of sulphur will cause standards to be pro-rated.

3 .In respect of emissions of sulphur dioxide and nitrogen oxides, the power plants operating on oil and coal as fuel shall in addition to National Environmental Quality Standards (NEQS) specified above. Comply with the following standards:-

A . Sulphur dioxide

Sulphur dioxide Background levels Micro-gram per cubic.meter ug/m3).			Standards	
Background Air Quality (SO_2 Basis)	Annual Average	Max. 24-hours Interval	Criterion I Max. So, Emission (Tons per Day per plant)	Criterion II Max allowable ground level increment to ambient (ug/m3)

Unpolluted	< 50	< 200	500	50
Moderately Polluted*				
Low	50	200	500	50
High	100	400	100	10
Very Polluted**	> 100	> 400	100	10

* For intermediate values between 50 and 100 ug/m3 linear interpolations should be true.

** No projects with sulphur dioxide emissions will be recommended."

B. Nitrogen Oxide

Ambient air concentrations of nitrogen oxides, expressed as NO, should not be exceed the following :-

Annual Arithmetic Mean 100ug/m3 (0.05 ppm)

Emission levels for stationary source discharges, before mixing with the atmosphere, should be maintained as follows :-

10^{-9} gm

For fuel fired steam generators, as Nanogram (10- 9ram) per joule of heat input :

Liquid fossil fuel	:	:	130
Solid fossil fuel	:	:	300
Lignite fossil fuel	:	:	260

Note :- Dilution of gaseous emissions to bring them to the NEQS limiting value is not permissible through excess air mixing, blowing before emitting into the environment"

[File No. 14 (3)/98-TO-PEPC.]

HAFIZ ABDULLAH AWAN,
Deputy Secretary (admn.)

ANNEXURE 4

WORLD BANK AMBIENT NOISE LEVELS

THE WORLD BANK AMBIENT NOISE LEVELS

Ambient Noise:
Noise abatement measures should achieve either the levels given below or a maximum increase in background levels of 3 decibels (measures on the a scale A) [dB (A)]. Measurements are to be taken at noise receptors located outside the project property boundary.

	Maximum allowable log Equivalent (hourly measurement), in dB (A)	
	Day (07:00 – 22:00)	Night (22:00 – 07:00)
Residential Institutional Educational,	55	45
Industrial, Commercial.	70	70

Reference: Pollution Prevention and Abatement Handbook 1998

The World Bank Group in Collaboration with the UNEP and UNIDO Washington, D.C. USA.

ANNEXURE 5

PUBLIC CONSULTATIONS

ANNEXURE 5

PUBLIC CONSULTATIONS

Sr. No.	Date	Name of Participants	Professions	Topics Discussed
Deedal Meera Village, Abbottabad				
1.	31-03-2010	Mr. Muhammad Kabir s/o M. Bashir	Student	▪ Project Benefits in the area ▪ Awareness of the people about the project ▪ Identification of Assets affected ▪ Redress mechanism ▪ Procedure for Land Acquisition ▪ Prevailing prices of land/ trees in the area ▪ Social values of the area ▪ Existing infrastructure in the area ▪ Utility services in the area
2.		Mr. Muhammad Sabir s/o Abdul rashid	Mason Worker	
3.		Hagi Gul Zaman s/o M. Faqeer	Farmer	
4.		Mr.Muhammad Bashir s/o M. Yasin	Mason Worker	
5.		M. Shafi s/o M. Maskeen	Tailor	
6.		M.Khan vaiz s/o M. Gul Zaman	Driver	
7.		M. Nazir s/o Waris Ali	Cook	
8.		M Akseer s/o Waris Ali	Shopkeeper	
9.		M. Suleman s/o Matwali	Farmer	
10.		M. Nazakat s/o Ameer Rehman	Shopkeeper	
11.		M. Pervez s/o M. Maskeen	Farmer	
12.		Rafiat Hussain s/o Amir Khan	Student	
13.		Shah Mohammad s/o Hyder	farmer	
14.		M.Tanveer s/o M. Bashir	Farmer	

ANNEXURE 5

Sr. No.	Date	Name of Participants	Professions	Topics Discussed
Boi Village, Abbottabad				
1.	31-03-2010	Mr. Fayyaz Ahmed s/o Ali Khan	Shopkeeper	▪ Project Benefits in the area ▪ Awareness of the people about the project ▪ Identification of Assets affected ▪ Redress mechanism ▪ Procedure for Land Acquisition ▪ Prevailing prices of land / trees in the area ▪ Social values of the area ▪ Existing infrastructure in the area ▪ Utility services in the area
2.		Mr. Barkat Nawaz s/o M. Akber	Medical Store	
3.		M. Shafeer s/o Aziz ur Rehman	Shopkeeper	
4.		Dayar Khan s/o Qutbuddin	Rtd. Lineman WAPDA	
5.		M, Irshad s/o Lal Khan	Hotel	
6.		Khan Awais s/o Gul Zai	Farmer	
7.		Juma Khan s/o Faqir Muhammad	Farmer	
8.		M Siraj s/o M Sadiq	Farmer	
9.		Jamil ur Rehman s/o Khalil ur Rehman	Driver	
Patrind Village, Muzzaffarabad				
1.	1-04-2010	Mr. Gul Hassan s/o Nadir Ali	Farmer	▪ Project Benefits in the area ▪ Awareness of the people about the project ▪ Identification of Assets affected ▪ Redress mechanism ▪ Procedure for Land Acquisition ▪ Prevailing prices of land / trees in the area ▪ Social values of the area ▪ Existing infrastructure in the area ▪ Utility services in the area
2.		Mr. Abdul Aziz s/o Fateh Ali	Farmer	
3.		Mr. Abdul Rashid s/o Faqir Mohammad	Farmer	
4.		Mr. Ali Rehman s/o M. Zaman	Farmer	
5.		Mr. M Hassan s/o Qalander Khan	Farmer	
6.		Mr. Shabir s/o Ali Zaman	Farmer	
7.		Mr. Pir Khan s/o M. Khan	Farmer	
8.		Mr. Ali Khan s/o M. Khan	Farmer	
9.		M. Abdul Razaq s/o M. Khan	Farmer	
10.		Mr. M. Azeem s/o Khairullah	Farmer	
11.		M. Jan s/o Abdul Ghafoor	Farmer	

ANNEXURE 5

Sr. No.	Date	Name of Participants	Professions	Topics Discussed
12.		Mr.M.Yusuf s/o Zafar Ali	Farmer	
Tarcheela Village, Muzzaffarabad				
1.	01-04-2010	Noor Zaman s/o Sikander Khan	Ex.Member Union Council	▪ Project Benefits in the area ▪ Awareness of the people about the project ▪ Identification of Assets affected ▪ Redress mechanism ▪ Procedure for Land Acquisition ▪ Prevailing prices of land / trees in the area ▪ Social values of the area ▪ Existing infrastructure in the area ▪ Utility services in the area
2.		Mr. Muhammad Riaz s/o Gul Zaman	Farmer	
3.		Mr. M. Ghulab s/o Gul Zaman	Farmer	
4.		M. Yousuf s/o Sher Zaman	Farmer	
5.		M. Ayoub s/o Pir Khan	Farmer	
6.		Mr. Ashraf s/o Gohar Rehman	Farmer	
7.		Mr. M Javaid s/o M. Suleman	Farmer	
8.		Mr. M. Zaman s/o Ali Zaman	Farmer	
9.		Mr. Haroon s/o Gohar Zaman	Farmer	
10.		Mr. qadir Ahmed s/o Noor Amer	Farmer	
11.		Mr. Malik Awan s/o Gul Zaman	Farmer	
12.		Hameed s/o Gul Zaman	Farmer	
13.		Mr. Anwar s/o Ali Zaman	Farmer	
Alora Village, Muzzaffarabad				
1.	02-04-2010	Mr.M. Farooq	Govt. Employee	▪ Project Benefits in the area

ANNEXURE 5

Sr. No.	Date	Name of Participants	Professions	Topics Discussed
2.		Mr.Sadaqat Saleem s/o M. Saleem	Govt. Employee	▪ Awareness of the people about the project ▪ Identification of Assets affected ▪ Redress mechanism ▪ Procedure for Land Acquisition ▪ Prevailing prices of land / trees in the area ▪ Social values of the area ▪ Existing infrastructure in the area ▪ Utility services in the area
3.		Mr. M. Aslam s/o Samandur Khan	Govt. Employee	
4.		Mrs. Raisham Jan w/o M Maskin	House Wife	
5.		Mr. M. Pervez s/o M. Suleman	Govt. Employee	
6.		Mr. M. Ashraf s/o Ghulam Ali	Buisness	
7.		Mr. M. Akber s/o Mehar Ali	Buisness	
8.		Mr. Abdul Qayyum s/o Mehar Ali	Govt. Employee	
9.		Mr. M. Nawaz s/o Samunder Khan	Govt. Employee	
10.		Mr. Sarfaraz Khan s/o Essa Khan	Revenue clerk	
11.		Mr. M. Maskin s/o Saif Ali	Buisness	
12.		Mr. Tanveer Ahmad s/o Abdul Rashid	Buisness	
13.		Mr, Mahwali s/o Faqir Muhammad	Govt. Employee	

ANNEXURE 6

RECORDS OF MEETINGS WITH LINE DEPARTMENTS

ANNEXURE - 6

RECORDS OF MEETINGS WITH LINE DEPARTMENTS

Date	Place	Organisation/ Person Consulted Position	Reason for visit Topics discussed
03-06-06	Muzaffarbad	Wildlife and Fisheries Division Shiekh Altaf Fisheries Development Officer	General situation of wildlife in the project area, minimal ecological flow, Fisheries in the project area
03-06-06	Muzaffarabad	Wildlife and Fisheries Department Syed Rashid Hussain Assistant Director Fisheries	General situation of wildlife in the project area, minimal ecological flow, Fisheries in the project area
04-06-06	Muzaffarabad	Protected Areas Management Project, Machiara National Park Naeem Iftikhar Dar Project Manager	Protected areas, Wildlife in Project Area, Wildlife protection measures
03-03-10	Abbottabad	NGO- SUNGI M. Arshad Community Facilitator Mrs. Tahira Awan Community Fcilitator	Community awareness about development projects Possible role of SUNGI in Patrind HPP
05-06-06	Abbottabad	Hazara Wildlife Division M. Hussain Khan District Forest Officer M. Abdullah Range Forest Officer	Wildlife in Project Area Wildlife protection measures Forest types / trees
05-06-06	Abbottabad	Hazara Forest Division Rustam Khan District Forest Officer	Forest types / trees Location of forests / pastures Sustainable use of forests by community
06-06-06	Muzaffarabad	Local Govt. and Rural Development Department Babar Minhas Assistant Director Environment	Environmental issues, Guidelines etc.
06-06-06	Muzaffarabad	P&D Building Secretariate Bashir Qureshi Director General Dr. Syed Asif Shah Secretary P&D and Environment	Legal Framework of AJK Guidelines of AJK
02-03-10	Muzaffarabad	Revenue Department Nisar Shah & Gulbaz Revenue Clerk	Role of District Revenue Officer in land acquisition and payment of compensation Redress procedures

ANNEXURE 7

SOCIO-ECONOMIC SURVEY PROFORMAS

ANNEXURE 7

PATRIND HYDROPOWER PROJECT

1. **Site Name**

   Elevation **Co-ordinates**

2. **Location**

3. **River Name**

4. **Population Upstream of Weir Site within 2 Km**

   Village Names

   Populations

5. **Population Downstream of Weir Site within 2 Km**

   Village Names

   Populations

6. **Groundwater/Surface Water Quality**

   Depth

   Quality (Saline etc.)

7. **Climate**

   Met Data from Nearest Met Station

8. **Water Use Downstream of Weir**

9. **Biological Environment**

   Flora

   - Natural Vegetation
   - Forest Type/ Acreage
   - Endangered Species

   Agriculture

   - Crops
   - Vegetables
   - Fruits

Fauna

- Rare and Endangered Species
- Species which Require Management
- Species of Economic Significance
- Species of Special Interest to Local Population or Tourists
- Aquatic Fauna of Commercial/ Recreational Value and Migratory Fish Species Alongwith Their Spawning Ground.
- Migratory Route of Terrestrial, Aquatic as well as avi - Fauna

Livestock

Fisheries

10. Economy

Employment Classes

Occupations

Income

11. Civic Amenities

Housing (Class, Pucca, Kutcha Houses)

Water Supply and Sanitation

Health (Hospitals, Clinics, Dispensaries)

Education (Schools).

12. Culture

Archaeological Sites

Mosques, Shrines

Education of Women

13. Assets Submergence by Weir Reservoir

Submergence of Total Land Area (Acres)

Private Land

State Owned Land

Agricultural Area (Cost/Acre):

- Irrigated

- Rainfed

- Wasteland

Residential Area (Cost/Acre)

Name of Villages

No. of Villages

No. of Houses (Cost/House)

Population (No. of People Displaced and Needing Resettlement)

No. of Trees

14. Archaeological Sites

Shrines

Mosques

15. Infrastructure

Existing (Nearest Major Road)

Required (For project construction**, including equipment transportation)**

16. Using PRA, Interviews of Locals

ANNEXURE 8

SOCIO-ECONOMIC SURVEY PROFORMAS

(URDU VERSION)

Annexure-8

پٹرینڈ بجلی گھر پراجیکٹ

سوالنامہ برائے معاشرتی ومعاشی کوائف

1. علاقہ بند/بجلی گھر ____________________
2. گاؤں کا نام ____________________
3. جواب دینے والا ____________________
4. پیشہ ____________________
5. ذرائع آبپاشی ____________________
6. پینے کے پانی کے ذرائع ____________________
7. ذاتی جائیداد ____________________
8. مدنی سہولیات ____________________
9. کب سے مقیم ہیں ____________________
10. گھر سے کتنے فاصلے پر ہے ____________________
11. گھر کی تفصیلات ____________________
12. کیا آپ کو پٹرینڈ پراجیکٹ کے بارے میں علم ہے

ہاں ☐ نہیں ☐

13. اس پراجیکٹ کے کیا فوائد ہیں
- نوکریاں
- بجلی پیدا کرنا
- علاقے میں ترقی ہونا
- فیکٹریاں وغیرہ لگنا
- یا کوئی اور

14. اس پراجیکٹ کے کیا نقصانات ہیں

- کوئی نہیں
- زمین زیرآب آجائے گی
- زراعت تباہ ہوجائیں گے

15. اگرآپکواپنی جگہ چھوڑنی پڑے تو آپ کیا کریں گے

16. اگرآپکی زمین خریدلی جائے تو آپ کیا کوئی نیا پیشہ اختیار کریں گے

17. آپ زمین کے عوض کیا چاہتے ہیں

18. اگر پراجیکٹ میں نوکری مل جائے تو کیا آپ کام کریں گے

19. کوئی تجویز دینا چاہیں

20.

	آپکی زمین کتنی ہے	پراجیکٹ شروع ہونے سے پہلے	پراجیکٹ ختم ہونے کے بعد میں
-	زرعی		
-	ٹیوب ویل		
-	دریائی		
-	بارانی		

21. آپ کا کیا خیال ہے آپ کو فائدہ ہے یا نقصان؟

فائدہ ہے تو کتنے کا______________ نقصان ہے تو کتنے کا______________

وجہ بتائیں____

____

22. پراجیکٹ مکمل ہونے کے بعد زمین کی قیمت

مختلف قسم کی زمین کی قیمت روپوں میں

رہائشی

تجارتی

نہری

دریائی

بارانی

23. مال مویشی

بھینسیں

بکری/بھیڑ

مرغیاں

اور کوئی

24. فصلوں کا ہیر پھیر

فصل	فی الحال (ایکڑوں میں)	بعد میں (ایکڑوں میں)
مکئی		
گندم		
کوئی اور		

Annexure-8

معلومات برائے پٹرنڈ ہائیڈرو پاور پراجیکٹ

جگہ کا نام　　　　　　　　　　　　محل وقوع کا تعین

1 سطح سمندر سے اونچائی

2 مقام کا تعین

3 دریا کا نام

4 بند کے اوپر 2 کلومیٹر تک لوگوں کی تعداد

- گاؤں کے نام

- گاؤں کی آبادی

5 بند کے نیچے 2 کلومیٹر تک لوگوں کی تعداد

- گاؤں کے نام

- گاؤں کی آبادی

6 زیر زمین و سطح زمین پر پانی کی کیفیت

- سطح زمین سے پانی کی گہرائی

- خصوصیات (نمکین وغیرہ)

7 موسمی حالات

- قریبی دفتر موسمیات کی معلومات

8 بند سے نیچے پانی کا استعمال

9 حیاتیاتی ماحول

- نباتات

- قدرتی نباتات

- درختوں کی اقسام/ پھیلاؤ (ایکڑوں میں)

- خطرے سے دوچار انواع (اقسام)

9.1 زراعت

- فصلات
- سبزیات
- پھل

9.2 حیوانات

- کم یاب اور خطرے سے دوچار انواع (اقسام)
- انواع جنکے لئے بندوبست درکار ہے
- انواع جنکی معاشی اہمیت ہو
- انواع جن میں مقامی لوگوں اور سیاحوں کی دلچسپی ہو

9.3 معاشی اور تفریحی اہمیت کے آبی جانور اور نقل مکانی کرنے والی مچھلیوں کی اقسام مع انکے تخم ریزی کی جگہیں

9.4 ارضی و آبی جانوروں اور پرندوں کے نقل مکانی کے راستے

10 پالتو جانور

11 مچھلیاں

12 معاشیات

- ملازمین کی درجہ بندی
- پیشے
- آمدن

13 مدنی (شہری) سہولتیں

- تعمیرات (پکے۔ کچے)
- پانی اور صحت وصفائی کا انتظام

14 تعلیم (سکول)

15 ثقافت

- آثار قدیمہ

- مساجد
- دربار
- قبرستان
- تعلیم نسوان

16 بند کی وجہ سے غرقاب اثاثے

- کل رقبہ جو زیر آب آئے گا (ایکڑوں میں)
- ذاتی زمین
- سرکاری زمین

17 زرعی اراضی (قیمت کا تخمینہ فی ایکٹر)

- نہری
- بارانی
- بنجر زمین

18 رہائشی رقبہ (قیمت کا تخمینہ)

- گاؤں کے نام
- کل گھر (قیمت)

19 کل افراد (جو کہ بے گھر ہونگے یا جنکو تصفیہ کی ضرورت ہوگی)

20 کل درخت (قیمت کا تخمینہ)

21 بنیادی ڈھانچے

- قریبی سڑک جو کہ پروجیکٹ کے سامان کی نقل وحمل کر سکے

22 لوگوں کے ساتھ گفت وشنید

- پروجیکٹ کے بارے میں انکے تحفظات

2006 & 2010

PHOTOGRAPHS OF PROJECT AREA,

FIELD VISITS

AND

SCOPING SESSIONS

Downstream Flow of Kunhar River Showing Deeper Bed and high Banks - 2010

An Other Downstream veiw of Kunhar River showing Deeper bed and high Banks - 2010

Downstream Flow of Kunhar River near Boi Village Showing Deeper Bed and high Banks of the River - 2010

Downstream Veiw of Kunhar River Showing Deeper bed and high banks - 2010

A Stream Joins Kunhar River about 2km Downstream of Weir Site - 2010

Piryali Nullah Enters Kunhar River about 1.5 km Downstream of Weir Site - 2010

Boi da Katha Nullah Joins Kunhar River about 4km Downstream of Weir Site - 2010

Another view of Site for Construction Camp in Village Tarcheela at Weir Site - 2010

A katcha Track where Maintenance Road is to be Constructed - 2010

House to be Affected due to Diversion Tunnel at Weir Site -2010

Local Consultation at Weir Site - 2010

A Meeting with Locals of the Boi Village Downstream of Weir Site - 2010

Sociologist is Collecting Social Data in a Meeting with Locals of Village Patrind - 2010

Environmental Team is in Consultation with the Owners of Storage Camp at Weir Site in Patrind Village - 2010

A Process of Consultation in Tarcheela Village - 2010

Local Consultation in Deedal Meera Village - 2010

A Meeting with Locals in Alora Village at Powerhouse Site - 2010

Scoping Session in Deedal Meera Village - 2010

View of Powerhouse Site - 2010

View of Weir Site on Kunhar River - 2010

Site for Temporary Storage and Construction Camps near Powerhouse Site on Right Hand Side of Jhelum RIver - 2010

Site for Construction Camp in Village Tarcheela at Weir Site - 2010

A katcha Track where Maintenance Road is to be Constructed - 2010

Location of Storage Camp at Wier Site in Patrind Village showing Standing wheat Crop - 2010

Environmental Team in discussion with Geologists at Weir site - 2006

View of Kunhar River at Weir site near Patrind village - 2006

View of Kunhar River at Weir site near Patrind village - 2006

View of Weir site along Boi road and Patrind village showing natural vegetation - 2006

Powerhouse site along Jhelum River - 2006

Tunnel Outlet - 2006

Consultation with locals in
Thori village - 2006

Downstream view of Jhelum River - 2006

Gauge at powerhouse site - 2006

Gauge location at powerhouse site - 2006

Gauge location at powerhouse
site - 2006

Gauge location at powerhouse site - 2006

Gauge location at powerhouse site - 2006

Drilling in process at Powerhouse site - 2006

View of Jhelum River at Lower Chattar - 2006

Natural vegetation at Weir site - 2006

Participants of scoping session in Tarchela village - 2006

Land use in Reservoir area - 2006

Land use in Reservoir area - 2006

Grazing land in reservoir - 2006

Consultation with local people in Dedal Meera village - 2006

House on right bank of Kunhar River at Weir site - 2006

Cultivated land on right bank of Kunhar River at Weir site - 2006

Cable way on Kunhar River at weir site - 2006

Gauge Installed at Weir site - 2006

Gauge Installed at Weir site - 2006

Gauge Installed at Weir site - 2006

Drilling process at Weir site - 2006

Natural vegetation at weir site - 2006

Local consultation in Patrind village - 2006