

# Environmental and Social Monitoring Report

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Project Number: 44914-014  
Quarterly Report (July-September 2017)  
September 2017

## Pakistan: Patrind Hydropower Project

Prepared by Star Hydro Power Limited for the Asian Development Bank.

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# **147 MW PATRIND HYDRO POWER PROJECT**

## **Environmental & Social Monitoring Report July to September 2017**



**STAR HYDROPOWER  
LIMITED**

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## **Acronyms**

ADB	Asian Development Bank
AJK-EPA	Azad Jammu & Kashmir Environmental Protection Agency
KPK	Khyber Pakhtunkhwa
CDP	Community Development Plan
EH&S	Environmental Health & Safety
EPCC	Engineering Procurement Contracts Contractor
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
GRC	Grievance Redress Committee
IEE	Initial Environmental Examination
IDB	Islamic Development Bank
IFC	International Finance Corporation
ILO	International Labor Organization
KEXIM	Export Import Bank of Korea
NEQS	National Environmental Quality Standards
NTP	Notice to Proceed
PAPs	Project Affected Persons
PS	Performance Standard
RAP	Resettlement Action Plan
SHPL	Star Hydropower Limited

## INTRODUCTION

### **i. Background**

The Patrind Hydropower Project is run of river project located on the boundary of Khyber-Pakhtunkhwa and Azad Jammu & Kashmir. The purpose of the Project is to provide zero-emissions renewable electricity to the grid and also provide local and global environmental benefits as well as strong local socioeconomic benefits. The project has the total capacity of 147 MW. The project is being financed by multilaterals like IFC, ADB, IDB and KEXIM.

### **ii. Objectives:**

The purpose of this Quarterly Environmental & Social Performance Report is to describe EPC contractor's compliance with the environmental and social performance requirements of IFC/ADB (including implementation of the Environmental Management Plan) and to assess any corrective actions implemented/proposed. This includes:

- A description of all significant health, safety, environmental and social activities and events that occurred during the reporting period.
- Provision of additional information about activities (i.e., status of permits or other approvals, ongoing public consultation etc.).
- Quantitative performance monitoring data summaries in comparison to appropriate ADB and IFC policies, guidelines and national requirements.
- An explanation of any cases of non-compliance with lender's guidelines or applicable regulatory limits that have occurred, identifying the cause and the corresponding corrective measures planned or underway to prevent future occurrences.
- Resettlement Action Plan activities and progress on the implementation of project within the Sustainable Development Strategy Framework

## PROJECT NAME AND SUMMARY INFORMATION

**a) Project/Business Name**

Patrind Hydropower Project

**b) Status of Construction**

The Notice to Proceed (NTP) for main works was issued by the Company to EPC Contractor on December 26, 2012. Construction Works were completed 100% in March 2017 with remaining work of testing and commissioning.

**c) Location of project**

Village Patrind, District Muzaffarabad, Azad Jammu and Kashmir

**d) Nature**

Run of river Hydropower Project.

**e) Scale/size**

147 MW

**f) Date of construction/operation commencement**

Preliminary works commencement: September 2011

Main works start after issuance of NTP: December 2012

**g) Name, designation and signature of person responsible for preparing/ reviewing the report**

<p>Prepared By: </p> <p>Designation: Syed Atif Ali Shah Manager HSE</p>	<p>Reviewed By: </p> <p>Designation: No Hyuk Park Deputy Chief Executive Officer</p>
<p>Approved By: </p> <p>Designation: Waqar Ahmad Khan Chief Executive Officer</p>	

## RELEVANT ENVIRONMENTAL PERMITS OR COMPLIANCE CERTIFICATES

**a) Summary of permit conditions and media covered:**

Following conditions were imposed by EPA-AJK during the construction phase of the Project. The status of compliance with the conditions is presented in below table:

Condition	Status of compliance
Ensure compliance to NEQS and undertake mitigation measures suggested in the EIA report & EMP. Constitute Environmental/Post EIA Monitoring Committee and submit monitoring reports on quarterly basis and provide the copy of this approval and EIA report to the contractor for information and compliance activities.	Environmental Monitoring Unit was established and mobilized on site after the issuance of Notice to Proceed to the EPC Contractor. Quarterly E&S Monitoring reports are being submitted to the EPA AJ&K. Post EIA monitoring was undertaken by EPA AJK during the month of December 2016. Approval and EIA report is part of EPC contract.
Compensate PAPs for loss of agricultural land, crops, property, and usage right etc. in accordance with the rates that agreed upon and adopt appropriate mechanism for RAP grievance redress. Employ local peoples for all unskilled jobs and implement CDP sooner than later. Ensure all public utilities such as water supply pipes, power phone line be not disturbed by the execution of the project.	Owners have been compensated for the loss of agricultural land, trees and property as per the market rates/replacement cost. For unskilled jobs local workers from affected communities (Alda, Patrind, Tarcheela, Boi, Sarati Shoran and Deedal) are being employed and for skilled jobs locals are being hired on priority basis as per the requirement and the qualification. During civil works special care was being taken not to disturb any of the public utilities.
Ensure occupational and community health and safety backed by a comprehensive emergency response plan. Adopt controlled techniques in accordance with Pakistan explosive act and also make sure the safety & security of wild animals and their habitats at the project site and in its environs with the prior consultation and adhering to the guidelines of forestry and wild life departments strictly.	Emergency response procedures are in implementation. Provision of PPEs, education sessions, availability of medical facilities, installation of sign boards and close supervision by EPCC & OE HSE staff are ongoing activities to ensure Occupational health and safety on project sites. Blasting activities were carried out in accordance with Pakistan Explosive Act. Monitoring of Fish fauna and flora has been undertaken during quarter.
For compliance of regulation 13, 14, 17 & 18 of IEE/ EIA regulations 2000 which enunciate the conditions for approval. Confirmation of compliance, entry, inspection and monitoring of the proposed project. The site to install the asphalt plant and other machinery would be selected in consultation with the agency (AJK- EPA). The findings of quality analysis on regular basis should positively be shared. Also, the spoil should be dumped at pre identified location.	Quality monitoring reports are being shared with EPA- AJK. Spoil was always dumped on approved sites. Installation of batching plant has been undertaken with consultation of EPA-AJK.



Communicate any change in the approved project to AJK-EPA and that would be commenced after obtaining the approval. The approval shall stand null and void if the conditions mentioned herein before are not fully complied with. It does not absolve the proponent of the duty to obtain any other approval or clearance that may be required and can be withdrawn at any time with any prior notice if deemed necessary in the public interest.	For the changes in the design of the weir site layout and Addendum to the EIA report was submitted to both the EPAs i.e. EPA AJ&K and KP covering the changes to be made in the design which was subsequently approved by both the EPAs on November 19, 2014.
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Most of the conditions are common in both approvals with few exceptions of following issued by EPA KPK:

<b>Condition</b>	<b>Status of compliance</b>
Water in the pond created by construction of Patrind weir should be maintained at El.765m.amsl. Safety zone/adequate engineering measures should be provided to overcome fears of the residents regarding effects of pond to their houses. The level difference of 2 meter from 765m.amsl to 767m will act as safety zone so the owner of the land and housing structures falling within the zone should be compensated as per laid down procedure of compensation of the government.	The operation level of the Project is at 765 masl. The Company acquired the land at the level of 767 masl as per the condition of the EPA. The additional 2 meters shall act as safety zone and the owners were compensated as per the procedure.
The project management should contribute towards the repair of the road to be used during construction and operation activities of the project. The trees supposed to be submerged should be counted in the presence of all stake holders i.e. owners land collectors /patwari representing revenue department representative of EPA and forest/agriculture department. After the determination of exact number type and ownership of the trees be finalized and paid as per laid down procedure of the government	The owners have been compensated for the trees supposed to be acquired due to the land acquisition. The trees were counted in the presence of all stake holders i.e. owners land collectors /patwari representing revenue department representative of EPA and forest/agriculture department. 1.5Km length of the Boi road at Sarati village has been paved and the remaining patch of 3.5Km is being repaired. The maintenance of the access roads near the project area is part of Social uplift plan
Minimum flow of 2 cumecs in the downstream of weir in Kunhar River should be kept and provision for 10% extra of this amount of water for emergency in downstream should also be kept in plan. No extension would be permitted in the future in existing hydropower project without prior approval of the EPA /government of Khyber Pakhtunkhwa	Shall be applicable during the operation phase of the Project
Separate NOC is required for batching/crushing Plant	NOC was obtained from EPA KPK for installation of two batching plants near the weir site

**b) Relevant Government Agencies**

As the Project is located on the boundary of Khyber Pakhtunkhwa and Azad Jammu & Kashmir, Star Hydro Power Limited (the “Company”) had to seek approval of Environmental Impact Assessment (EIA) from following two Environmental Protection Agencies (EPAs).

- i. EPA Azad Jammu and Kashmir
- ii. EPA Khyber Pakhtunkhwa

**c) Issuance dates and duration of validity**

Issuing Authority	Issuance Date	Duration of Validity
EPA-AJK	10-08-2010	3 years
EPA-KPK	14-04-2011	Project construction phase

**d) Renewal Requirements:**

As per AJK-EPA review of IEE and EIA Regulations, 2009 “Once the Environmental Approval is accorded in favor of the proponent, shall be valid for the period of 3-years from the date of issuance. However, if construction is commenced during the 3-years period, the approval shall stand extended "automatically" for a further period of 3-years from the date of expiry of initially issued Approval”.

**INCIDENTS OF VIOLATIONS OR NON-COMPLIANCE**

HSE compliance monitoring has been undertaken regularly during the reporting quarter. To ensure implementation of recommended procedures, regular liaison was maintained with the EPC contractor, OE and subsequently with the site construction teams and sub-contractors. Additional efforts were made to ensure remedial and corrective actions highlighted by the Company and OE to mitigate HSE issues.

Incidents of violations and non-compliances by EPCC and its sub-contractors were included in daily, weekly and monthly reports. To prevent incident and mitigate risks, during the quarter, close supervision by HSE team has been carried out. Following non conformities were highlighted by OE through correspondence and during formal or informal meetings. Remedial measures and corrective actions have been undertaken mitigation measures:

On both sites grass pitching activity was taken to improve the look of an area. On lower site where there was local labor accommodation that area has been restored by pitching grass and planting trees same was done on upper site disposal area.



Waste collection on the Powerhouse site has done on the daily basis; Waste collectors of Daewoo collects the trash from the site, camp residencies and dispose of in the trash bins, after waste collection the waste is segregated then non recyclables are taken to the government approved landfill for proper disposal of waste.

Daewoo E&C is in contract with MCM for the collection of waste on tri-weekly basis. Recyclable waste i.e. card boards, tin packs, Plastic bottles which is collected from site were sent to the local scrap dealer.

**a) Un-safe Act & Un-safe Conditions**

To mitigate risks of accidents UA/UC Observation Card System is also in place to ensure maximum safety on site. To sensitize all staff/workers and to get information and feedback about site HSE issues, boxes holding UA/UC cards have been placed on prominent locations.

**b) Warning Letters for Non-compliances**

Warning letters have been issued depending on nature and severity of violation during reporting period. Verbal warning is given for the first time on minor violations. If any employee fails to abide by HSE policies after verbal warning a written warning letter is issued. No warning letters were issued during the reporting quarter.

**INCIDENTS OF ENVIRONMENTAL AND SAFETY ACCIDENTS**

**a. Environmental Accidents and Mitigation**

- No major environmental incident occurred during the reporting quarter on both the sites. However, minor soil contamination due to inappropriate handling of oil was observed.
- According to the nature of work inspections have continuously been carried out during the reporting period to reduce the risk of accidents and impacts on environment and for proper maintenance of machineries and other equipment's.

**b. Health and Safety Accidents and Mitigation**

Incidents are recorded for all workers/staff working for subcontractors and on rented vehicles/machinery.

Summary of health and safety incidents during quarter is in the table given below.

<b>Incident</b>	<b>Frequency</b>	<b>Description</b>	<b>Media or Community Reaction</b>
Fatality	None	None	None
Medical Treatment Case	0+0+0	None	None
Near Miss	0+0+0	None	None
First Aid	0+0+0	None	None
Fire Incident	0+0+0	None	None
Property damage/environmental incident	0+0+0	None	None
Medical Checkup / Examination / Treatment	0+0+0	None	None

#### EXTERNAL MONITORING /INSPECTION

Site HSE inspection has remained an ongoing activity. EPA AJK team visited the Project sites during the reporting quarter to ensure the compliance with the EIA approval and were very much satisfied with the status of compliance and subsequently issued the Compliance Certificate for the construction phase. Attached as **Annex-9**.

#### INTERNAL INSPECTIONS CONDUCTED DURING REPORTING PERIOD

To mitigate safety incidents, machinery, equipment and electrical appliances are being inspected to ensure fitness through color coding system. List of inspections done during the quarter are attached as **Annex- 1**.

According to the nature of work being carried out on construction sites, inspections have continuously been carried out during the reporting period to reduce the risk of accidents and impacts on environment and for proper maintenance of machineries and other equipment regularly.

Following inspections have been undertaken during quarter;

- Site Overall Inspection
- Fire Extinguisher Inspection
- Health and Hygiene Inspection
- Gaseous concentration Inspection



Inspections during 3<sup>rd</sup> Qtr, 2017

## MITIGATION MEASURES

To ensure health and safety of both staff and labor on project area, following were some of the prominent activities EPCC undertook during the quarter:

1. All the workers have been provided with necessary Personal Protective Equipment (PPE) comprising of helmets, safety shoes and safety jackets and ankle belts to prevent injuries.
2. Safety campaigns and awards are distributed to encourage and develop safe work behavior in labor and staff
3. To mitigate safety incidents, machinery, equipment and electrical appliances are being inspected to ensure fitness
4. Regular trainings/education sessions for staff and labor

### **Permit to work (PTW)**

Permit to work have been issued during the quarter for the following activities.

- 1- Welding/ Open Flame Work
- 2- Lifting
- 3- Work at height

## LABOR RELATIONS AND CONDITIONS

### **(i) Nature of labor dispute or grievance**

No labor dispute or conflict with local community was observed or reported during



quarter. Complaints box are positioned on each site on detectable location for the ease of labor in submitting complaints. Complaint log is attached as **Annex-7**.

**(ii) Legal requirements, Permit conditions and renewal requirements**

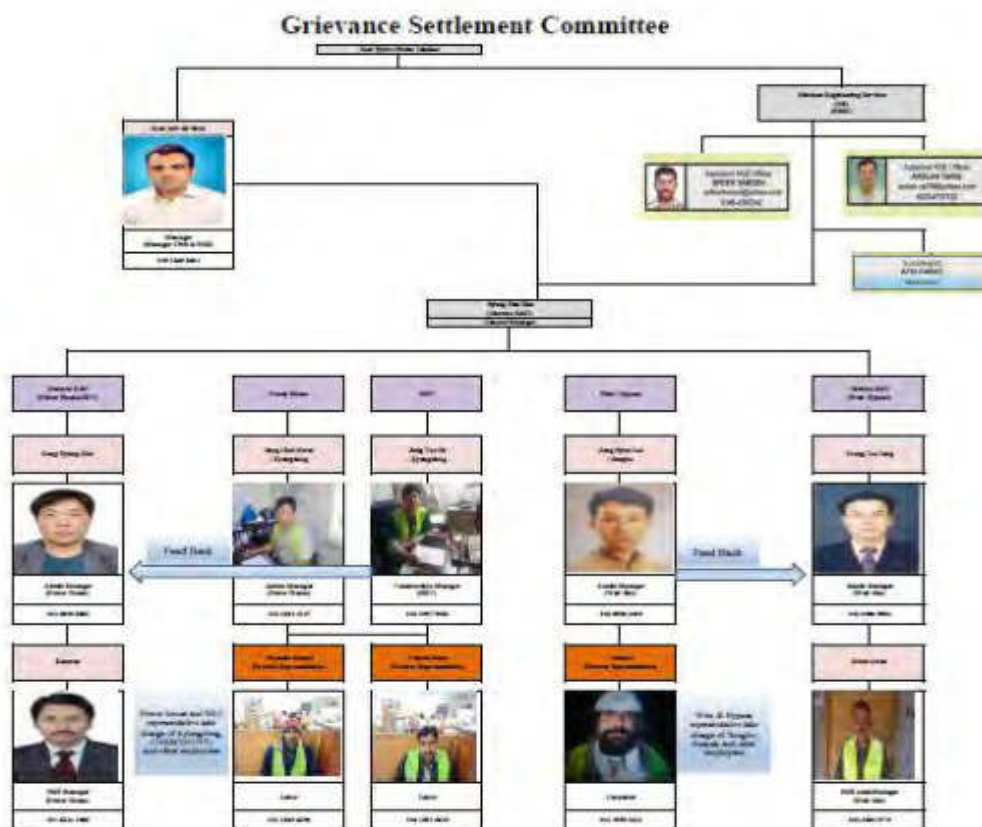
During the reporting period, requirements related to labor's contracts, permits and other conditions remained constant and no change was observed.

EPCC and sub-contractors are providing insurance coverage in case of accident and death. Furthermore, a deduction is being made from salaries for Employees Old Age Benefits Institution (EOBI) as social security on KPK side.

**(iii) Authorities in charge of investigation/recording**

In case of any labor incident, site Construction Manager and HSE staff is responsible to record, investigate and address it appropriately.

To address any dispute or work related complaint received from staff /workers. Internal Grievance Redress Committee (GRC) comprising four representatives from labor one from each subcontractor, Planning Manager, Admin Manager and HSE Manager is mandated to investigate the matter in an unbiased manner and resolve it amicably so that the concerned party or individual may be satisfied and a friendly / peaceful environment is reinstated at project site.



**(iv) Corrective actions, deadlines, identification of responsible parties.**

SHPL, OE and EPCC's HSE departments continuously indicates corrective actions for further compliance by construction team.

**(v) Labor relations and living conditions for construction labor force**

Safety measures such as fire extinguishers and emergency contact numbers have been placed on main locations. Fire alarm system has been installed on main campus lower site and will be installed on new accommodations as well. Ambulance drivers are aware of all accommodations to have prompt access in case of any emergency. Following standards are implemented for adherence of local Labor standards:

- Government of Pakistan Labor Policy 2010.
- Standards for labor health and safety are executed according to EPC Construction Contract.
- EPC has made all necessary arrangements for payment, housing & feeding.
- The living conditions are up to merit with all necessities.
- Prefer to hire unskilled /skilled staff and labor from AJ&K or KP.

**Compliance status based on applicable National and International laws/ regulation on labor including ILO core labor standards**

As per conditions stipulated in the Project construction contract between Company and EPC contractor those have been made in light of National and International laws and standards, implementation during the quarter has been observed accordingly. Statuses of compliance with these laws are given in the table below;

**Table: Compliance Status with International and National Labor Laws/Regulations**

CONTRACTUAL TERMS/ CONDITIONS	STATUS OF COMPLIANCE DURING QUARTER
<b>ENGAGEMENT OF STAFF AND LABOR</b>	
Except as otherwise stated in the Project Requirements, the Contractor shall make arrangements for the engagement of all staff and labor, local (People living in project vicinity) or otherwise, and for their payment, housing, feeding and transport.	EPC contractor has made all necessary arrangements for the engagement of staff and labor and payment for their wages/ salaries, housing, feeding and transport. However, the local staff/workers do not need accommodation on project base camp.
The Contractor and its subcontractor(s) shall prefer, to the extent practicable and reasonable, to hire unskilled staff and labor, and skilled staff and labor with appropriate qualifications and experience, who are residents of AJ&K or KP especially who are the affected of the Project	Unskilled jobs have been provided to nearby communities (Alda, Thori, Patrind, Tarcheela, Sarati, and other adjacent localities) in the reporting quarter. Also preference has been given to local people who qualify for skilled positions



<b>CONTRACTUAL TERMS/ CONDITIONS</b>	<b>STATUS OF COMPLIANCE DURING QUARTER</b>
The Contractor shall, and shall ensure that its subcontractors shall, fulfill and observe the Environmental and Social Requirements in relation to the engagement of staff and labor	EPC Contractor has established a proper mechanism of daily and weekly reporting and consistent monitoring of HSE and related social issues. On the basis of recommendations, corrective measures are being taken accordingly
<b>RATES OF WAGES AND CONDITIONS OF LABOR</b>	
The Contractor shall pay rates of wages, and observe conditions of labor, which are not lower than those established for the trade or industry where the work is carried out or as prescribed under the Laws of the Country. If no established rates or conditions are applicable, the Contractor shall pay rates of wages and observe conditions which are not lower than the general level of wages and conditions observed locally by employers whose trade or industry is similar to that of the Contractor.	The minimum salary for the permanent worker is 14,000/- for 208 hours monthly according to the budget notification 2015 plus food and accommodation if required.
<b>PERSONS IN THE SERVICE OF OTHERS</b>	
The Contractor shall not recruit, or attempt to recruit, staff and labor from amongst the Employer's Personnel.	Full compliance of the condition was observed during entire quarter
<b>LABOR LAWS</b>	
International Human Rights & Core Labor Standards The Contractor shall comply with all the relevant labor Laws applicable Contractor's Personnel, including Laws relating to their employment, health, safety, welfare, immigration and emigration, and shall allow them all their legal rights.	All regulations are in implementation. Local labor laws were devised in light of International Human Rights & Core Labor Standards; therefore, compliance with local standards is same with international laws /standards. Furthermore, Pakistan has ratified ILO's conventions on core labor standards.
The Contractor shall require its employees to obey all applicable Laws, including those concerning safety at work.	Site HSE status has been improved due to regular instructions and corrective measures.
Abolition of child labor	To ensure the abolition of child labor the Computerized National Identity Card (CNIC) has been made mandatory for induction which is only provided by the GOP after the age of 18.
Elimination of all forms of forced or compulsory labor	No forced labor observed /reported during quarter. Furthermore, during site inspections by SHPL, OE and EPCC's HSE staff, it is strictly checked that no forced labor has been undertaken on any site in any form.

<b>CONTRACTUAL TERMS/ CONDITIONS</b>	<b>STATUS OF COMPLIANCE DURING QUARTER</b>
Elimination of discrimination in respect of employment and occupation	No discrimination exists as all persons have been provided equal opportunities irrespective of color, race, origin and nationality. Only difference is the nature of job and relevant skills.
Freedom of association and the effective recognition of the right to collective bargaining	No ban is imposed on workers with regard to establishment of workers' organization or freedom to express labor concerns. However, formal labor union or association has yet not been established.
<b>WORKING HOURS</b>	
<p>No work shall be carried out on the Site on locally recognized days of rest, or outside normal working hours, unless:</p> <p>(a) Otherwise stated in the Contract,</p> <p>(b) the Employer gives consent, which shall not be unreasonably withheld, or</p> <p>The work is unavoidable, or necessary for the protection of life or property or for the safety of the Works, in which case the Contractor shall immediately advise the Employer</p>	Regular working hours were observed and no work has been carried out on weekends.
<b>FACILITIES FOR STAFF AND LABOR</b>	
(a) Except as otherwise stated in the Project Requirements, the Contractor shall provide and maintain all necessary accommodation and welfare facilities for the Contractor's Personnel. The Contractor shall also provide facilities for the Employer's Personnel as stated in Project Requirements.	Recommended facilities have been provided
(b) The Contractor shall not permit any of the Contractor's Personnel to maintain any temporary or permanent living quarters within the structures forming part of the Permanent Works.	Nobody has been permitted during reporting period

**(vi) Medical facilities provided to Staff and Labor during quarter:**

On both sites all time availability of clinical staff and facilities has been insured. No staff/workers visited medical facilities as the major construction activities are already completed in the previous quarter. However, availability of first aid boxes has been ensured at all sites Implementation of local labor standard.

**PROJECT PROCEDURES FOR: (A) HIRING; AND (B) ACQUISITION OF GOODS AND SERVICES:**

Procedures for hiring have been adopted as per EPCC's policy and also in compliance with EPC Contract. While, procurement of goods and services by EPC contractor is being carried out under Quality Assurance and Quality Control plan.

**(i) Local Employment Status:**

As per the EPC contract, EPCC is bound to employ unskilled labor from local areas/ adjacent villages and for skilled jobs preference has to be given to the qualified locals.

The summary of employment status is presented below.

• **As of 30 September, 2017**

S. No	Description	AJK	KPK	Others	Total
1	Daewoo E&C	55	07	23	85
2	Kyung Dong	0	0	0	0
3	Sungbo	0	0	0	0
Total		55	07	23	85

**Compliance with legal requirement for employment**

<b>Project Legal Agreement/Contract</b>	<b>Conditions/Requirements</b>	<b>Compliance Status</b>
EPC Contract Section 6.1 “Engagement of Staff and Labor”	“The Contractor and its subcontractor(s) shall prefer, to the extent practicable and reasonable, to hire unskilled staff and labor, and skilled staff and labor with appropriate qualifications and experience, who are residents of AJ&K or KP especially who are the affected by the Project”	Complied throughout the construction period.
As per Para 5 (n) of Environmental approval issued KPK EPA Approval Condition	“Non-technical jobs should be provided to the local community. Employment record for all positions shall be provided to EPA-Khyber Pakhtunkhwa and priority should also be given to local in technical jobs but not at the cost of merit or requirement of the management of the project”	Unskilled jobs were provided to local residents whereas preference has been given to locals for technical positions but subject to availability.
As per condition Environmental approval issued by AJK EPA	“As far as possible, employment should be provided to local people for all unskilled jobs. Preference may also be given to local people for all semi- skilled and skilled jobs. Employment record for all positions shall be provided to AJK-EPA positively”	Employment opportunities have been disclosed to the local communities through different avenues such as newspapers advertisement, public notice on prominent locations and through community coordinators and local project staff. Preference has been given to the locals subject to availability of skilled and unskilled human resources.

**ENVIRONMENTAL AND SOCIAL CAPACITY**

**i. Staff capacities in environmental and social management (as relevant)**

The Project is being managed/ monitored by EPCC/OE/SHPL having a balanced team of HSE staff comprising safety, environment and health professionals. An orientation to environmental management, health and safety during construction work is part of induction form of all the staff and workers hired. Furthermore, daily HSE monitoring, toolbox meeting programs and other related activities raise the awareness level among all staff and workers.

**ii. HSE Weekly Meetings:**

As per monthly HSE Plan of EPC contractor, weekly internal meetings and meetings with site construction teams have regularly been conducted on both sites.

Issues regarding compliance with HSE standards have always been main agenda items during the meetings.

**iii. Environmental laws and regulations**

EIA study of the project was completed in light of following laws and regulations. EMP

as part of EIA is in implementation under the same laws and regulations;

- Pakistan Environmental Protection Act 1997
- National Environmental Quality Standards (NEQS)
- AJK Environmental Protection Act 2000
- Land Acquisition Act 1894
- Draft National Resettlement Policy 2002
- NWFP Forest Ordinance 2002
- Sarhad National Conservation Strategy 1992
- ADB Safeguard Policy Statement 2009
- IFC Handbook (Resettlement Action Plan)

#### **iv. Safety Training and Campaign**

Capacity building activities coupled with effective supervision is always result oriented. Regular HSE trainings are conducted for project employees on different subjects. These trainings are conducted in the light of standards guidelines and procedures developed by Daewoo E&C for its project while working across the globe, however, site specific modifications have been made in manual.

#### **v. Induction Training**

Since, the Physical progress of the Project is completed 100% in the 1<sup>st</sup> quarter of the year, no new induction was done in the reporting quarter.

#### **vi. Tool Box Meetings**

This is a constant activity undertaken daily by EPCC before the start of every construction shift and is part of 3.5 Safety Campaign. Daily HSE related matters are conveyed to all staff and labor during the meeting by HSE staff.

#### **vii. Needs assessment of environmental and social management capacity**

As ongoing activity, continuous capacity building initiatives including more specific trainings on environment and social management are required for staff and labor. Furthermore, daily HSE monitoring, toolbox meeting programs and other related activities have raised the awareness level among all staff and workers.

EPCC's HSE department delivered orientation sessions, awareness raising and capacity building sessions on environment and social management and also identified following training needs of the staff and labor during the next quarter.

- i. Work on Height
- ii. Pollution Prevention
- iii. Corporate Social Responsibility
- iv. Safe behavior

## STAKEHOLDER CONSULTATION/CSR ACTIVITIES

To initiate and sustain constructive external relationships with Project stakeholders particularly with adjacent /local communities, consultation is an important tool to enhance the social performance of the Project.

Meetings and discussions were held with local NGOs and government departments (Environment Protection Agency, district administration and development authority Muzaffarabad). As part of the grievance redress mechanism the OE is also involved in the community/stakeholders engagement.

### **Details of community programs involving civil society/NGOs in implementation:**

Some professional services on quarterly basis are being hired by EPCC from locally based individuals and organizations during the quarter. Following organizations have been engaged to undertake activities under EMP and Social Uplift Plan.

HSE sign board preparation and printing activity requirements of the project is being undertaken by local vender (Add City) owned by Mr. Khursheed Qureshi, resident of Patrind village. Add City owner Mr. Khursheed is president of Kunhar Welfare Organization and he himself and rest of his partners are PAPs who are linked with same organization.

Flora and Fauna Study by local Fisheries and wildlife expert Mr. Yousaf Qureshi who is also retired Director Fisheries Government of AJK.

**Table: Organizations/NGOs consulted during the quarter**

<b>Organization Name</b>	<b>Location</b>	<b>Purpose/ issues discussed</b>	<b>Actions to address Issues</b>
Kunhar Welfare Organization	Patrind- (Upper Site AJK Part)	EPCC is in constant liaison with the organization regarding preparation of awareness material.	During quarter, HSE sign board preparation and printing activity is being undertaken by local vender (Add City) owned by Mr. Khursheed Qureshi, resident of Patrind village who is president of Kunhar Welfare Organization and he himself and rest of his partners are PAPs who are linked with same organization. Therefore, all printing works are allocated to same organization.
Pakistan Red Crescent Society (PRCS)	Muzaffarabad- (Lower Site AJK)	Placement of First Aid Trained Ambulances Drivers for night shift+ Fitness /service of both ambulances.	First Aid trained drivers placed on night shift and ambulances were sent for service and maintenance by PRCS.
Edinburgh DIRECTAID	Muzaffarabad- (Lower Site AJK)	Environmental monitoring reports submitted by the NGO were discussed to address and incorporate the comments/recommendations made by the owner engineer.	Environmental monitoring activities are being organized by local NGO Edinburg Direct Aid

## Light Vehicles & Drivers Detail (Patrind Hydro Power Project)

### Company Vehicle & Drivers

Sr.	Name	Vehicle No.	Vehicle Type	Used By	Remarks
1	Sajjad Ahmed	LED-460	Land Cruiser	PM	P/H Site
2	Sadaqat Ashknaz	LED-465	Prado	SM	P/H Site
3	Najam Pervaiz	LEC-3797	Fortuner	GM Admin	P/H Site
4	Muhammad Shahd Ali	LEC- 3798	Fortuner	Const.Dept	P/H Site
5	Muhammad Iqbal Mir	LED-473	Pickup (Vigo)	Common use	P/H Site
6	Irshad Khan	LEA- 3807	Fortuner	Planning Dept.	P/H Site
7	Muhammad Iqbal	LEC-3808	Fortuner	M&E Dept.	P/H Site
8	Shabbir Hussain	LEC- 3792	Pickup (Vigo)	H/E Dept.	P/H Site
9	Naseem Hijazi	LEC- 3791	Pickup (Vigo)	HSE Dept.	P/H Site
10	Ashiq Hussain	LEB- 732	Pickup (Hilux)	Admin Dept.	P/H Site
11	Khalid Hussain	LEC- 3793	Hi ace (Mini Van)	Local Staff Pick & Drop	P/H Site
12	Muhammad Muneer	LEC- 3795	Van High Roof	Local Staff Pick & Drop	P/H Site
13	Muhammad Arouf	LEC-3796	Fortuner	Const. Dept	Weir Site (Day Shift)
15	Muhammad Imran	LEC-3794	Hiace (Mini Van)	Local Staff Pick & Drop	Weir Site



## COMPLIANCE AND IMPLEMENTATION OF MITIGATING MEASURES IN ESMP

Compliance monitoring of environmental and social management plan has been an on-going activity undertaken by OE and EPCC's HSE staff on both sites. Non compliances with recommended standards and regulations were recorded and reported daily, weekly and monthly. EMP Compliance status is attached as **Annex-2**.

### **a. Environmental monitoring under EMP:**

Internal Environmental and Inspection checklist is developed and being filled on daily bases. Besides this following activities have been undertaken as part of environmental monitoring:

#### **i. Fish fauna Study Monitoring:**

Quarterly Study/monitoring was undertaken in Kunhar River (Up & down stream of Project site) during the month of September, 2017. Detailed report is annexed as **Annex-4**.



#### **ii. Flora Study Monitoring:**

Quarterly Study/monitoring was undertaken at both (Power house & weir) sites in September, 2017.

The monitoring report recommends the bio-engineering works for the treatment of unstable slopes and stabilization of landslides to retain the good looks and better environment; detailed report is annexed as **Annex-3**.

**iii. Water Quality Analysis:**

A team comprising of technical experts from PCRWR officials and Patrind hydropower project staff was assigned in order to carry out field survey and collect water samples from identified water sources being used by the local community and for drinking purpose and other domestic needs. Officials from PCRWR with the assistance of project staff collected the samples from identified site according to the standard procedure. The detailed report is attached as **Annex-6**.

**Environmental & Social Monitoring Report (July-September 2017)**

**Table: Compliance with NEQ's**

<b>Envrn. component</b>	<b>Standards (NEQS)</b>	<b>Compliance/Mitigation measure</b>	<b>Remarks</b>
<b>Air Quality</b>	EPA ambient air quality (EPAs standards for each Parameter )	NEQS: To ensure dust suppression due to transportation activity, unpaved roads are being sprinkled with water at least twice a day. The EPC is taking all necessary measures to limit pollution from dust and any wind-blown materials during construction.	Dust control has improved significantly during the quarter.
<b>Water quality</b>	WHO Guidelines (EPAs standards for each Parameter)	Waste water from tunnel is treated through sedimentation tanks. Waste water discharged from HRT is being measured	Biannual quality monitoring of waste and drinking water was undertaken in the last quarter. <b>Attached as Annex-6</b>
<b>Noise levels /Vibration</b>	EPA ambient noise standards and worldwide vibration standards.	Noise: Noise prone activities are avoided during night time. No open blasting occurs during quiet hours. Excavators and all heavy machines are lubricated in a routine matter to minimize the noise and to increase the life of equipment  Vibration: EPC is more concerned regarding factors of human comfort and structural damage and always try to comply with allowable vibration standards. Blasting checklist is used by HSE staff.	Noise level and vibration record is maintained on daily bases after each blast
<b>Soil quality</b>	EPA quality standard (Different standards for each Parameter)	No environmental incident except minor soil contamination has been observed.	Visual observations mitigation was done by removing the contaminated soil cover
<b>Flora</b>	Visual observations by relevant Forest professional during EIA study.	Study /monitoring during previous quarter undertaken	Study undertaken in Sept-17 ( <b>Annex-03</b> )
<b>Fish Fauna</b>	Observation by relevant wildlife & Fisheries professional during EIA study.	Study /monitoring for last quarter undertaken	Study undertaken in Sept-17 ( <b>Annex-04</b> )

**b. Occupational health and safety**

Health and safety of workers has been a prime consideration of Project. In accordance with the safety standards all workers working at site are provided with the Personal Protective Equipment (PPE) comprising of hard hats, safety shoes, and jacket and dust masks depending upon the job specification to prevent injuries. Morning physical exercise has also been undertaken regularly. Community Safety Health and Security:

1. Consistent supervision on surge shaft access road and power house protection works was ensured.
2. Waste management training sessions were held for supervisors and relevant personnel. Furthermore, waste segregation methods were practically taught to site workers and staff to adopt appropriate mechanism.
3. Water filter plant is installed for drinking water by Daewoo EPCC at camp residence to provide clean & pure water. Filter Plant cartridges are being replaced quarterly to have better quality of water.
4. During quarter, coordination meetings, monitoring and inspections were undertaken jointly by EPCC and OE's HSE staff with regard to site HSE status,. No dumping of excavated material was allowed on unapproved sites.
5. Waste segregation, collection, transportation and disposal mechanism has been improved during the month and full time waste collectors were placed on both sites. Waste management training sessions were held for supervisors and relevant personnel.

**c. CO2 emissions by the Project**

Following project activities are likely to produce CO2 emissions, which were given due consideration and following mitigating measures were adopted to minimize the CO2 emissions.

Sources of CO <sub>2</sub>	Mitigating/ Preventive Actions
Use of excavation machinery	Regular tuning/servicing of the machinery is made compulsory and regular inspection is done to ensure that. Smoke producing vehicles are banned from working right away until they are repaired.
Tree removal/Land use change	Removal of trees on construction sites will increase the concentration of CO <sub>2</sub> the Project Site atmosphere as trees acted as CO <sub>2</sub> sink. Therefore, as corrective approach, Tree Plantation shall be carried out as retrofitting measure as stipulated in the EMP when it will be practically possible.
Solid Waste Disposal	Improper waste management could result accumulation of CO <sub>2</sub> and CH <sub>4</sub> in the atmosphere. For temporary storage of waste proper waste collection and storage areas have been designated. During last month of the reporting quarter waste management mechanism was improved.
Use of Construction machinery	Regular inspections of machinery are practiced by HSE staff to check machinery conditions. Warning letters have been issued by OE and EPCC to the smoke producing and vehicles.
Usage of liquid fuel	Liquid fuel used at different project activities amounts the maximum CO <sub>2</sub> emissions by the project.
Emissions from electricity use	Electrical appliances release some trace amount of gases in order to mitigate that, it is in company's policy to switch off all the electrical appliances when not in use.

#### ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN, INCLUDING IFC E&HS ACTION PLAN

To manage the environmental and social issue appropriately, following detailed plans developed by EPCC have been in implementation to fulfill the environmental and social compliance requirements of the project;

- a) Plan for Disposal of Excavated Material
- b) Plan for Waste Management
- c) Plan for Traffic Management
- d) Social Uplift Plan

**a. Plan for Disposal of Excavated Material**

Excavated material is being disposed of in excavated waste disposal area approved as per EIA.

**b. Plan for Waste Management**

EPC and sub-contractors have waste collectors placed on both sites to maintain housekeeping and timely segregation /collection of waste. All waste generated in all operation at sites is being managed in accordance with EMP & Waste Management Plan. All the recyclable Waste has been carried and transferred to the scrap dealer by Daewoo vehicle. Paper, Plastic, cardboard and few iron bars have been properly measured by the scrap dealer, the quantity of which has been noted down on the waste consignment note. Daily environmental Performance regarding potential environmental impacts has been made and monitored at site regularly by direct observation and inspection. These impacts include the monitoring of air emissions, water consumption and discharge, waste management, housekeeping, noise impact, hazardous waste management at the project site. Waste Collection done on the daily basis; Waste Collectors of Daewoo and collect the trash from the site, camp residencies and dispose of in the trash bins, after waste collection the waste is segregated then non recyclables are taken to the government approved landfill for proper disposal of waste. Daewoo E & C is in contract with MCM for the collection of waste on tri-weekly basis.

Municipal Corporation Muzaffarabad is being paid to collect the community waste from collection point established near project site where as for project waste a detailed method statement has been prepared and is being implemented on both sites.

First step that has been followed so far in managing our Project Waste was the collection of all waste from all points of the site. that are used again by a different user or for a different purpose, like a jacket, shoes or a jar used for a cup.

**c. Plan for Traffic Management:**

Safety precautions have been placed to protect workers and the general public. Vehicles are equipped with directional control signage and are being inspected prior to use. Workers have been made aware of mobile equipment operating in the area. Hazard lights have been installed on heavy vehicles and mobile equipment.

**d. Social uplift plan:**

Revised social uplift plan (SUP) was submitted by EPCC to SHPL in October, 2015. Besides SUP various activities have also been undertaken to facilitate locals such as subletting works, supply of construction material. Detailed SUP is presented as **Annex-5**.

## RESETTLEMENT PLAN IMPLEMENTATION

### **i. Scope of Land Acquisition and Resettlement Impacts**

The land identified by the EPC Contractor on the basis of basic design of the Project measuring 872.65 Kanal (683.95 Kanal on AJK and 188.7 Kanal on KP side) was acquired by the Company through Land Acquisition Act (LAA), 1894 applicable in both AJ&K and KPK.

During the construction on the weir site, it was noticed that the land area of 3.7 Kanal “Additional Land” is further required on AJ&K side which is to be submerged due to the head pond of the Project. Due to this addition the total land for the Project becomes 876.35 Kanal.

Due to the change in the design and location of weir downstream, it was confirmed through survey that the land area of 10.3 Kanal is further required on AJ&K side the slope stabilization in the stilling basin area downstream of the weir.

Furthermore, lately on the complaint of the local Mr. Khalid who also raised the same issue during the Lenders’ E&S mission in November 2015, on the head pond area a survey was conducted to confirm whether his land is affected or otherwise. EPCC conducted the survey and it was confirmed that his land measuring 5.45 Kanal was being affected due to submergence in the head pond. The process of acquisition has been started by contacting the relevant revenue department.

**SUMMARY OF THE LAND TO BE ACQUIRED ON AJK AND KPK**

<b>PERMANENT LAND</b>						
<b>Sr.</b>	<b>Project Component</b>	<b>Affected Land (Kanal)</b>				
		<b>State owned Land/ Riverbed</b>	<b>Farmland</b>	<b>Wasteland</b>	<b>House land</b>	<b>Total</b>
<b>1</b>	Reservoir Impounding	87.3	282.05	231.9	9.1	<b>610.35</b>
<b>2</b>	Weir Structures	0	1.5	48.7	0	<b>50.2</b>
<b>3</b>	Powerhouse	13.6	30.1	32.85	5.25	<b>81.8</b>
<b>4</b>	Surge Tank	-	-	47.75	-	<b>47.75</b>
<b>5</b>	Additional Land	0.3	3.75	15.4		<b>19.45</b>
<b>Total Permanent Land Acquisition (Kanal)</b>		<b>101.2</b>	<b>317.4</b>	<b>376.6</b>	<b>14.35</b>	<b>809.55</b>
<b>TEMPORARY LAND</b>						
<b>1</b>	Colony of Expatriate construction staff, Switchyard, labor camp, access road, bridge, batching plant at Powerhouse Site	54.75	0	27.8	0	<b>82.55</b>
<b>Total Temporary Land Acquisition (Kanal)</b>		<b>54.75</b>	<b>0</b>	<b>27.8</b>	<b>0</b>	<b>82.55</b>
<b>Total Land Acquisition (Kanal)</b>		<b>155.95</b>	<b>317.4</b>	<b>404.4</b>	<b>14.35</b>	<b>892.1</b>

**ii. Status of Land Acquisition, Progress on Compensation Payments and Assistance Delivery**

Payment for land acquisition on both sides of the project is in process. The Company has deposited the assessed cost (100%) into Government treasuries for subsequent payment to APs. For the additional land acquired for the head pond about 97% payment has been made which is reflected in the below table. However, there is delay in the payment of compensation due to (i) unavailability of entitled land owners who are working or based in other cities or (ii) an existing shareholding dispute among the families. Status of the land acquisition is as follows;



**Summary of Land Acquisition Progress and compensation payments**

Village	Area	Award Amount	Disbursed	%age	No. of Persons	Persons received payment
<b>1. AJ&amp;K</b>						
<b>A. Land/Property</b>						
Powerhouse (Alda Village AJ&K)	81.8	92,479,824	87,593,842	94.72%	196	561
Headpond (Shoran Village AJ&K)	130.75	75,181,250	73,283,741	97.48%	611	200
Weir + Headpond (Patrind Village AJ&K)	341.1	204,037,798	195,911,948	96.02%		353
Forest land for Surge Tank (Alda village)	47.75					
<b>B. Additional Land/Property</b>						
Weir + Headpond (Patrind Village AJ&K)	3.7	2,127,500	1,955,000	91.89%	3	19
Weir + Headpond (Patrind Village AJ&K)	10.3	6,076,540	5,562,233	91.54%	3	19
<b>B. Trees</b>						
Alda		1,815,089	1,804,318	99.41%		19
Alda		75,546	75,546	100.00%		
Shoran		757,391	685,073	90.45%		58
Shoran		106,053	106,053	100.00%	1	1
Patrind		837,882	829,515	99.00%		32
<b>Sub-Total</b>	<b>615.4</b>	<b>383,494,873</b>	<b>367,807,269</b>	<b>95.91%</b>	<b>814</b>	<b>1262</b>
<b>2. KPK</b>						
<b>Land/Property/Trees</b>						
Weir + Headpond (Sarati Village KPK)	188.7	128,557,081	114,613,320	89.15%	196	Detail Yet to receive
<b>Sub-Total</b>	<b>188.7</b>	<b>128,557,081</b>	<b>114,613,320</b>	<b>89.15%</b>	<b>196</b>	

## RESETTLEMENT AND RECONSTRUCTION

Living standard has been improved due to better compensation received and economic activities in the project vicinity. PAPs who lost their houses had utilized compensation amount in reconstruction of houses. Others have made investment in alternative lands in urban areas for better facilities.

Furthermore, locals from adjacent villages also established small businesses like shops and canteens during the construction period.

## RESETTLEMENT RELATED CONSULTATION AND DISCLOSURE ACTIVITIES AND GRIEVANCE PROCEDURES

In order to ensure that grievances and complaints are addressed in a timely and satisfactory manner and that all possible avenues are available to project affected persons (PAPs) to resolve their grievances, a Grievance Redress Committee has been proposed with following composition:

- |                                      |                  |
|--------------------------------------|------------------|
| 1. District Revenue Officer          | Chairman         |
| 2. Union Council Nazim               | Principal Member |
| 3. SHPL Representative               | Member           |
| 4. Affected Community Representative | Member           |

Establishment of a grievance committee requires the consent from District Administrations (AJK & KPK). The proposed GRC has not been established because SHPL could not ensure the availability of District Revenue Officers as and when required. Nevertheless, while the GRC has not yet been formalized, issues related with acquisition and compensation and community complaints are being addressed with the involvement of same authorities. In practice the same forum is functional but officially has not yet been notified.

Furthermore, the lenders' E&S mission during their site visit in August 2015 suggested establishing a three tier GRC including the sub-contractors, EPC and SHPL/OE. The same was established and communicated to all the workers and the community for future matters and contact.

GRC would be a forum for raising objections and holding discussions to resolve conflicts. Moreover, consultation with the local community and concerned public representatives and officials of the relevant line departments is an ongoing process. Relevant information to the stakeholders has been provided in a timely manner and in a form and language that are understandable and accessible to them. A grievance mechanism is available to allow an AP appealing any disagreeable decision, practice or activity arising from land or other assets compensation. The community/ APs

complaints are being addressed very diligently and carefully at all levels, i.e. district and at project level. Even though the GRC has yet not been established but complaints received are being addressed at all levels (project & local administration level) depending on nature of complaints. Issues related to land acquisition and compensation requires involvement of District Revenue Officer who is part of proposed GRC while other matters related with employment or employees are being managed through community liaison officers/coordinators and project management.

# Annexures

# **Annex-1**

## **Inspections**

**Environmental & Social Monitoring Report (July-September 2017)**

Sr.	Inspection	Date			Location	Details
		Day	Month	Year		
01	Fire Extinguishers Inspection	06	07	2017	Weir Site	Color Coding Inspection of fire extinguishers
02	Camp Inspection	07	07	2017	Weir Site	Hygiene Inspection of accommodations carried out by HSE officers and Doctor
03	Camp office inspection	09	07	2017	Power House Site	Inspection of accommodations carried out by HSE Staff at Powerhouse site.
04	Fire Extinguishers Inspection	04	07	2017	Power House Site	Monthly Inspection of fire extinguishers carried out at powerhouse site
05	Fire Extinguishers Inspection	01	08	2017	Weir Site	Color Coding Inspection of fire extinguishers
06	Camp Inspection	01	08	2017	Weir Site	Hygiene Inspection of accommodations carried out by HSE officers & Camp Officer
07	Camp office inspection	03	08	2017	Power House Site	Inspection of accommodations carried out by HSE Staff at Powerhouse site.
08	Fire Extinguishers Inspection	03	08	2017	Power House Site	Monthly Inspection of fire extinguishers carried out at powerhouse site
09	Camp office inspection	07	09	2017	Power House Site	Inspection of accommodations carried out by HSE Staff at Powerhouse site.

# **Annex-2**

## **EMP COMPLIANCE STATUS**

Sr. No	Environmental Management Plan (Compliance Status)		
	Feature/Issue	Parameters/monitoring	Compliance Status/Action taken by EPCC
1.	Statutory Requirements	Compliance with approval conditions	<ul style="list-style-type: none"> <li>With few exceptions, implementation in compliance with EPA's NOC &amp; ADB's Environmental and Social Safeguards, IFC's Performance Standards</li> </ul>
2.	Landslides	Catchment stability	<ul style="list-style-type: none"> <li>Annual Monitoring undertaken during November 2017. Detailed report is attached as Annex-8.</li> <li>Slope stability on powerhouse and surge shaft slopes is under process and stone pitching is also under process on the right bank slopes on weir site.</li> </ul>
3.	Erosion and Sediment	i. Extent of erosion and sedimentation ii. Topsoil stripped and covered or seeded if stockpiled for longer than one month or during the monsoon	<ul style="list-style-type: none"> <li>Erosion &amp; Sediments on project sites has yet not been quantified, however, to prevent this protection works have been undertaken on slopes at both sites.</li> <li>Wind erosion of dust and sand has been controlled by frequent water sprinkling and covering stockpiles with polythene sheets</li> <li>To prevent HRT waste water sediments flow to the river settling tanks and chambers have already been constructed and are cleaned on regular basis.</li> </ul>
4.	Muck Disposal	i. Reuse of spoil/muck within project areas where possible ii. Correct disposal of surplus spoil/muck in designated areas	<ul style="list-style-type: none"> <li>Excavated material being used in civil works and dumping is done on approved area at both sites. Muck material has also been used in repairing of project access road during the month</li> </ul>
5.	Water Quality	Wastewater treated prior to river discharge (Temperature, dissolved oxygen, pH, conductivity, turbidity, total phosphorous, inorganic phosphorous,	<ul style="list-style-type: none"> <li>Biannual water quality monitoring was undertaken during the month of August 2017.</li> </ul>



**Environmental & Social Monitoring Report (July-September 2017)**

		total nitrogen, ammonia nitrogen, nitrogen oxides, biochemical oxygen demand and fecal coli forms)	
6.	Waste Management	i. Waste materials reused or recycled on-site where possible ii. Non-recyclable wastes disposed of appropriately	<ul style="list-style-type: none"> <li>• Papers, mineral water bottles are being sent to market for recycling</li> <li>• segregation on source has been improved</li> <li>• Waste consignment note has been maintained by keeping the recyclable waste record properly and remaining food waste has been composted into the designated trench in the disposal area</li> </ul>
7.	Hazards/Risk	i. Workers provided with appropriate safety equipment and regular safety training ii. Storage of hazardous goods in bounded areas or in secure sheds iii. Explosives stored in guarded bunkers iv. Use of hazardous goods according to manufacturers' specifications	<ul style="list-style-type: none"> <li>• Induction trainings</li> <li>• Providing PPEs</li> <li>• Tool Box Meetings, Job craft &amp; on site trainings</li> <li>• Explosive store established under NOC (Lower Site)</li> <li>• MSDS and SOPs partially followed</li> </ul>
8.	Aquatic Ecology	i. Fish and Aquatic populations	<ul style="list-style-type: none"> <li>• Fish study was undertaken in 3<sup>rd</sup> Quarter.</li> <li>• Fishing &amp; hunting prohibited on project sites. No endanger species found.</li> </ul>
9.	Flora	i. Direct observation of surrounding vegetation	<ul style="list-style-type: none"> <li>• Study/monitoring undertaken in 3<sup>rd</sup> Quarter, removal undertaken as indicated in EIA.</li> <li>• Plantation activity undertaken above surge shaft slopes.</li> <li>• Grass pitching and tufting activity to restore the look of an area</li> </ul>
10.	Noise and Vibration	i. Maintenance of equipment in accordance with manufactures' specifications ii. Controlled blasting	<ul style="list-style-type: none"> <li>• Regular inspections and service of heavy equipment</li> <li>• Regular monitoring, blast permit issuance and SOPs adopted</li> </ul>
11.	Air Quality	Exhaust emissions from machinery – visual inspection	<ul style="list-style-type: none"> <li>• Regular inspections and service of heavy equipment</li> </ul>
12.	Traffic/Access	i. Enforcement of speed limits on Project roads ii. Noise Traffic Signs	<ul style="list-style-type: none"> <li>• Heavy equipment/vehicle driver's education sessions</li> <li>• Speed limit and directional sign board installed</li> </ul>

# **Annex-3**

## **VEGETATION STUDY- KUNHAR**

## **RIVER**

## **147 MW Patrind Hydropower Project**

### **Impact of Patrind Hydropower on Vegetetation Status**



**July-September 2017**

**By**  
**Mohammad Yousaf Qureshi**

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## **IMPACT OF PATRIND HYDRO POWER PROJECT**

### **ON THE VEGETATION OF THE AREA**

#### **1. Background**

Patrind Hydro Power Project has been designed to generate 147 MW of electricity by using the water source of River Kunhar. The weir of the project has been established at Patrind in KPK and AJK. The construction of the infrastructure has been completed and project is in the testing phase. The tunnel for diverting the river water is complete and tested and it will enter into operational phase very soon. The existing river diversion tunnel has been closed and another flushing tunnel has been constructed. This study deals with exploring the possible impact on the flora of the project area at the intake and outlet side of the project area.

The area on the left and right banks of River Kunhar has been well strengthened to avoid any landslide or soil erosion. The embankments of the reservoirs have been lined with stone walls and wire stone gabions. The trees of the marked area were observed submerged in the lake water during the last study. Water level of the reservoir has gone down due to release of water from the weir and dried trees and bushes can be seen on the left bank of the river. The wall at the dumping site has settled down to some extent and it rings the danger bell for the future as the area may sink down if not treated in time. Dumping ground has been flattened and beautiful grass pitching has been done with some fixtures of seating facilities. . The area above the fence has good vegetation cover with broadleaved trees and bushes. The area will become a point of recreation for the visitors. Somebody is constructing one hut along the road for making ‘dhaba’. Careful planning is required to develop such facilities of good quality for the visitors of the area.

The area behind the powerhouse has been affected by the project development activities. Landslides have appeared around this area but area of high work concentration close to the powerhouse has been strengthened by shotcreting, retaining stone walls and to some extent planting. Other adjacent area has not been tackled for any activity. The adjacent big landslide volume has appeared due to the land triggering impact during the tunnel construction. This landslide needs stabilization by engineering, biological and bioengineering works as has been recommended in almost all the previous study reports. Vegetative cover is always affected by

the construction of the dams in one way or the other. The extent of the impact depends on the nature of the dam construction.

A project like Patrind Hydro Power production affects the vegetative cover in three ways.

**1<sup>st</sup>:** water storage impact; it affects the vegetation coming under the lake water. All the trees, shrubs and herbs submerge in the water and die. Various studies have been carried out to monitor the impact on the vegetation and soil around the project area during the construction phase. Infrastructure development has been completed now and the project is under test phase and planned to be completely operative very shortly.

**2<sup>nd</sup>:** The area affected by the tunnel construction. This phenomenon has not only triggered down the surrounding area creating or accelerating the landslides but also disturbed the natural water ducts coming out in shape of perennial springs. Blasting has also created dust and cracks in the neighboring houses.

**3<sup>rd</sup>:** Cutting of soil on both sites of the project. This study has been carried out to spell out the impact on the surrounding area from the inception of the project to its operational phase.

There is no land use policy implemented in Pakistan, due to which the steep slopes are not wisely used resulting into the massive vegetation loss which ultimately causes the land destabilization. Patrind is not the only area which has become so prone to land erosion, instead all adjacent areas on both sides of the river Kunhar, Jhelum and Neelum are showing the same picture.

The heavy population pressure on the northern mountain ecosystem has adversely affected the vegetative cover. The area around the powerhouse has been badly used by the local communities before the inception of this project. The only dominant tree species is the Chir Pine (*Pinus roxburghii*) which has been cut by the custodian community of Alda. The vegetative cover is very thin and this tree species requires about 120 years reaching its maturity. Removal of the vegetative cover on the steep slopes is very detrimental for the area as the heavy rain showers of monsoon bleach away the fertile soil and area becoming deserted. Another main reason for low tree cover is the high demand for grazing land and fodder for the animals. Local people in the area burn the land after cutting the grass in the month of October and November. This leads to the loss of all vegetative cover on the steep slopes and leaving behind the exposed surface to the mercy of the Nature. The soil loses the water percolation capability hence, giving support to start of gully making and erosion on

larger scales. Thus we can say that due to the heavy grazing, lopping, poor agricultural practices and urbanization, the original vegetation is almost destroyed. Due to the shortage of vegetation cover, the area is very badly suffering from soil erosion. This trend of vegetation loss is not going to reduce in the future as the population growth rate is very high. Total population of Pakistan has reached to almost 217 million according the 2017 census figures.

## **2. Introduction**

The study area is about 100 acres both on the weir point at Patrind ( $34^{\circ} 20' 36''$  N and  $73^{\circ} 25' 10''$  E at an elevation of 2516 ft.) and around the outlet at Alda ( $34^{\circ} 20' 06.05''$  N,  $73^{\circ} 27' 18.6''$  E) in AJK.

Economically and environmentally vegetative cover of a country requires 25% of its area under the forest cover. Pakistan has 4% of its area under the forest. The need for timber and fuel wood in the northern parts have grown many folds. Northern zone has domination of conifer trees with high age of maturity. Silviculture is a subject dealing with the plant life from seed to its maturity. Silvicultural rules are required to be followed to plant and harvest the trees for a sustainable yield. These rules have never been observed in Pakistan. If a tree is cut, there is no replacement or even the quality of replacement is very poor. A high valued conifer tree cannot be replaced by low valued broadleaved tree. There is need for long-term planning for keeping the forests of the country intact like it is done in the plantations of the plains (Change Managa, Cheecha Watni etc.).

The agricultural production system consists of upper catchments and gullied areas (wastelands), covering some 56% of the area, terraced fields along hillsides (39% of area) and irrigated agriculture (5%). Natural forests and rangelands are the major land use in the upper catchments.

Agricultural production on the terraced fields depends on runoff water harvesting and soil moisture conservation. These terraced fields were created by leveling with bulldozers/manual labor during the last 3-4 decades. Subsidized machinery encouraged the farmers to level the hillsides without considering the requirements for water harvesting and safe disposal of surplus runoff during high rainstorms.

### **3. Forest Types (Ecological Zones):**

The Patrind project area lies in the Sub-tropical ecological zone of the country. This zone is again classified into:

- a) Subtropical Scrub forest with broad leaved tree species in the foot hills and
- b) Subtropical Chir pine Forest with a major tree species of Chir Pine.



*A view of Powerhouse side showing landslide and vegetative cover*



*The view of weir at Patrind with the lake and left side vegetation.*



#### **4. Vegetative Cover**

Project site vegetation does not contain any species listed as endangered or threatened by the Government of Pakistan or IUCN. Only two species *Celtis austarulus* (Batculd) and *Ficus carica* (Enjeer) were found rare in Pakistan but they are listed as common for the rest of the world. The presence of these two species will not be disturbed as they were found above the submerged area and away from the area where trees needed to be felled down on the intake side. The rest of the vegetation species were found protected and common in Pakistan and for the rest of the world. So it is concluded that there will be no negative impacts of Patrind Hydropower Project on the plant species existence.

Following tree species were documented in the project area both in Patrind and in Alda:

<b><u>Common Name</u></b>	<b><u>Botanical Name</u></b>	<b><u>Type of Tree</u></b>	<b><u>Status</u></b>
Phagwarr	<i>Ficus Palmata</i>	soil binder	common
Anjeer	<i>Ficus carica</i>	Fruit	rare
Dhaman	<i>Grewia oppositifolia</i>	Fodder	common
Drawa	<i>Ailanthus anus</i>	firewood	common
Robinia	<i>pseudoacacia</i>	firewood	common
Drek	<i>Melia azadrach</i>	firewood	common
Batculd	<i>Celtis australis</i>	soilbinder	rare
Kangarr	<i>Pistacia khunjak</i>	soil binder	rare
Talli (shisham)	<i>Dalbergia sisso</i>	furniture wood	common
phulai	<i>Acacia modesta</i>	firewood	common
Sherol	<i>Alnus nitida</i>	Firewood	common
Shahtoot	<i>Morus alba</i>	Fruit	common
Akhrot (Wallnut)	<i>Juglans regia</i>	Fruit	common
Nim	<i>Azadirachata indica</i>	Firewood	common
Kau	<i>Olea cuspidate</i>	Firewood	common
Chir	<i>Pinus roxburglii</i>	Timber	common
Pipal	<i>Ficus religiosa</i>	Firewood	common
Kiker	<i>Acacia nilotica</i>	Firewood	common
Beence	<i>salix spp</i>	Firewood	common

Batang	<i>Prunus patia</i>	fruit	common
Ber	<i>Zizyphus mauritiana</i>	fruit	common
Snatha	<i>Dodonaea viscosa</i>	soil binder	common
Narri	<i>Arundo donax</i>	Hedge	common

The main contributor grass species are *Heteropogon contortus* (Sariala), *Cenchrus ciliaris* (Dhaman), *Desmostachya bipinnata* (Dab ghaas), and *Cynodon dactylon* (Khabbal).

Comparatively low vegetation cover was recorded in the flat area and highest from steep slope areas (74.29%) followed by gentle slope and gully bed areas. There is good stand of Cheer Pine trees above the power house but 12 big gaps were noticed.

Trend of decline has been observed in the vegetative cover in and outside the project area during the last studies.

### **5. Status of the area.**

The area behind the weir on both sides of the River Kunhar has been protected by concrete structures. The landslides appeared during the early phase of the project have been stabilized by concrete work on both sides of the weir and reinforced on the right bank of the lake appeared by stone pitching and wire gabions. The vegetative cover of the lake area has come under the water which was marked before. Embankment done under the project is very effective and no water scouring has been observed so far. Dumping site has been observed sinking down which is very alarming sign. An early attention is required before it creates hazard. The area outside the project has good vegetative cover most probably due to the use of LPG in the surrounding villages. This also shows the social uplift of the area contributed by the project which is a positive aspect of the project.



*Embankment of the sides at the outlet*

Most of the trees in the area had been removed by the local community before the rise of the water level.

The present status of vegetation does not depend upon the river Kunhar water but it depends on precipitation available in the area. So reduction in water regime downstream will not affect the terrestrial vegetation of the area but it will definitely affect the aquatic vegetation. The average biomass for forage that will be submerged under water after the construction of weir was calculated as 3,468 Kg/ha. The total biomass inundated is estimated to about 200 tons. (Farmer Study Report for Patrind project)

The area affected on the weir site due to inundation is 57.2 ha and on the powerhouse site is 5.5 ha which has come under construction.

The area above the Powerhouse at Alda has been strengthened by shotcreting and adjacent slide has not been treated by any means. This is the Forest land and no proper input and care has been observed by the Department of the Forest. The main transmission line is passing through the forest behind the powerhouse. The area coming under the transmission line has been cleared by the Forest department. The trees are cut, converted into planks and are still stacked at the edge of the hill. There is a dire need of planting this gap under the transmission line by some soil binding bush vegetative cover. There are large patches having no woody vegetative cover in the Chir pine forest. They need to be planted and protected from fire.



*The stacked wood lying in the project area for the last six months*

*Plantation of the February 2017 with some goats browsing the plants*



## **6. The results**

The appearance of lake will raise the water table in the adjacent areas on the intake side resulting the production of green belt on both sides of the river Kunhar. The study indicates that landscape, the nature of the rock and the redistribution of rainfall water by run-off are the main sources of spatial variation in the study area. The construction of the dams will positively affect the groundwater. At some location side sink age problem may occur at any time of the year as settlement problem has been observed on the Dumping sit. Probably compaction of the disposed material was not done properly. With the construction of tunnel, the water stored in the catchment area has disturbed affecting some of the deep rooted plant species at some places. Tunnel has also played a vital role in the expansion of the land slide above and adjacent to the powerhouse.

Some local tree and bush species were found near the top which are excellent soil binders and they need to be planted in the affected area as well.

Plantation work carried out in the project area in February 2017 is getting established but requires protection as goats we seen browsing on the saplings this time again. Long drought may cause the die back of the plants so watering must be done during the dry spell.

The species planted are not the ones recommended in the December 2016 report and they are not planted on the slide areas. Please follow the recommendations of the report otherwise there is no use of getting a technical report. All those works must be done to control the adjacent slide that may cause damage to the project in the near future. The area is highly unstable and needs special treatment.

## **7. Recommendations:**

1. Tree species of alternate requirement of water and soil should be planted in this area like shrole, salix, walnut, bamboo, wild fig, Anjeer instead of planting Robinia, Eucalyptus, Ailanthas.
2. Parachute cloth bags filled with sand and gravels have been removed and are lying there. The cheap empty cement bags should be stacked in rows in the slide areas one above the other filled with soil and in between each row the cuttings of mulberry and poplar should be inserted so that it becomes green even during the start of the first spring season in March-April. This activity is needed to be done on larger scale inside the large and small slides above the powerhouse before January 2018.
3. Grass tufting has been done in a limited area. This needs to be replicated along with deep rooted tree species of Walnut.
4. Lawn grass has been placed beside the powerhouse. This will make the area green and nice looking.
5. Dumping site needs special attention as sinking of the side has been observed here. If it is not done timely, it may cost heavy in the future.
6. Watering of the recent plantation must be done during the dry spell of the year
7. Check damming in the eroded gullies are required to be done to control further erosion. Steel wire gabions have been erected but very little work. That has to be done in the gullies just adjacent to the project area and at the bottom to control the river cutting.
8. Bomb sowing (seeds with sticky ball of soil) is required in the inaccessible areas. Some bush seed like, Dodona needs to be done.
9. Check damming is required to be done in gullies starting from the top and making at least three gullies near to the bottom. Check dams may be constructed with dry stone masonry if steel gabions are expensive for the project.

10. Bamboo cuttings should be planted in the marshy area along with Salix at the bottom of the slide.
11. Some 24 Acres gaps have to be filled with Chir pine tube plantation with 600 plants per acre.
12. Some goats were observed again inside the working site browsing on the newly planted area. These goat entries must be checked to get the plantation saved and grown. Grazing and browsing has to be controlled after the plantation for the better success rate.
13. Area above the powerhouse is facing the problem of soil erosion. It is again recommended that Bio-engineering works should immediately be started in these areas to control these slides effectively which include vegetated soft gabions, vegetated loose stone walls, gabion check dams, live brush wood check dams, planting, sowing and tufting, dry seeding, hydro seeding, hay seeding, grass sodding, sowing with geo- textile sheets, brush wattles, brush layering, hedge layering, semi-dead fences with live hedges etc. This is very important to undertake these activities during the months of December 2017 and January 2018. If this season is lost, then this opportunity may lose forever.
14. A new Socio-economic program is in process under the project. This should also address the training of the communities in:
  - a. Training in selection of plant suitable to the particular area with planting techniques
  - b. Training in cheap and practical means to control the small and large landslides
  - c. Plant nursery raising
  - d. Fruit orchard development
  - e. Fish Farming
  - f. Intensive farming



Diagram marked with color lines requiring different interventions

Red Line: Bio engineering works

Green Line: bamboo, Salix and Narre plantation

Blue line: plantation soil binding trees, Chirr pine, fruit plants and bushes under the transmission line



# **Annex-4**

## **FISH STUDY - PATRIND HPP**



## **Study report on Impact of the Patrind Hydro Power Project on Fish of River Kunhar July-September 2017**



**By**  
**Mohammad Yousaf Qureshi**

**1) Objectives of the Study:**

- a) To find out the impact of Patrind Hydro Power Project on the fish fauna of River Kunhar in, above and below the Patrind Project area during the construction and the operational phase.
- b) Suggest technical measures to have minimum impact on the aquatic life of River Kunhar by the Patrind Hydro Power Project.

**2) Background**

The Patrind Hydropower project has been designed on runoff water to generate 147 MW electric power. It has been designed to obstruct the River Kunhar at Patrind, divert its water through a tunnel of about 2.5 km and drop it in River Jhelum at Lower Chatter. The powerhouse has been established at Alda. Initial commitment of releasing minimum e-flow of water is 2.5 m<sup>3</sup>/s. This e-flow is practically how much is observed to be retained in the down flow, this depends on the administration of the project as no frequent check and balance procedure exists in government functionaries.

The Patrind project is almost in its operational phase with a delay in power production due to technical fault on the powerhouse side. Water reservoir had been established to its maximum upper level during August 2017 but now it has gone down to more than 25 feet. At the moment, the water released from the base of the main drainage gates is the same as at intake and there is no shortage of water in the river flow system. The flow is not muddy and it is clear. It is required to maintain the minimum E-flow from September to April every year. In spite of strong recommendations in the quarterly reports for having a safe fish pass and ensuring the minimum E-flow, no attention has been paid which is a very sad aspect of the project execution. The operation of the project has been delayed because of some technical faults at the powerhouse and may take another few months to start power generation. The river flow down the weir is at normal level and water colour is clear. The level of the reservoir has also gone down to about 25 feet. The water flow in the river is very low both at the intake and outlet due to the seasonal changes and long drought of about 2 months now. If the water is stopped at this part of the year, the downstream flow may go to zero again as it was done six months before. Surety of releasing required e-flow is very important to keep the river ecology at its minimum level of compromise otherwise the existing aquatic life may extinguish altogether or change its

behavior. This will be great loss to the endemic aquatic life of river Kunhar downstream of the weir.

### **3) INTRODUCTION**

The environmental consequences of the dams are numerous and varied, and includes direct impacts to the biological, chemical and physical properties of rivers and riparian (or "stream-side") environments. The energy produced by these dams helps quality of life for the people and the economies of the countries in which they are built, as power can be used in homes or to spur the construction of clinics and other amenities. However, the ecological tradeoffs have often been left ambiguous or understated. The report points out that around one-third of all species of freshwater fish globally can be found in the basins of these three rivers. Many species of fish have adapted for life in rapid water where dams are typically built. The dams not only affect diversity of fish species but also restrict their migrations and flood cycles, both of which are important for their life cycles. The construction of dams also requires deforestation so that roads can reach the sites and often the displacement of people from their land.

Another reason for the ecological side of hydropower to be valued more heavily is that the predicted benefits of hydroelectric dam construction are often exaggerated well beyond what is truly produced, causing them to appear great enough to outweigh negative effects. In fact, environmental impact reports can be ignored, completed after dam construction has already begun, or not conducted at all.

The world is currently facing a freshwater biodiversity crisis and the key to preventing further extinction lies in understanding all the threats facing aquatic habitats. Global freshwater habitats are losing biodiversity faster than terrestrial or marine areas, but so far they are the least well understood. Amongst the threats to freshwater species, including climate change and pollution, the most difficult to quantify are man-made obstructions to water flow. Dams can be found in every major biosphere, but very little is known about the effect of river obstruction on freshwater biodiversity, especially on a global scale.

Damming a river has a variety of effects on the freshwater ecosystem, more than just altering the flow from A to B. Dams create calm bodies of water, changing overall temperature regimes and sediment transport, leading to conditions which tend to favour generalist species. Loss of specialist species, particularly endemics, changes the

community structure and leads to biotic homogenization. A dam will withhold sediment in the reservoir, not just decreasing the amount of substrate available to local freshwater species, but even impacting diadromous, estuarine and marine species much further downstream. The competition between resident species for food and breeding sites will increase as damming isolates populations, and perhaps more importantly, damming completely restricts migratory fish species. Isolation may lead to decreases in genetic diversity and therefore puts species at greater risk from disease. All of these effects may be exacerbated by changes in the surrounding land use. Overall, damming river flow will lead to both a loss of native species, but also an increase in exotic and invasive species which are more likely to become established in degraded habitats. For this reason, dams are one of the greatest global threats to freshwater biodiversity.

A lack of data on global freshwater fish distributions has restricted a thorough investigation of the dam-related threats to fish species. However, attempts are being made to locally investigate the impact of small to larger dams obstructing the frequent river flow like in Kunhar at Patrind, Neelum and Jhelum at Nauseri, Karrot, Azad Patan, Mahal and Kohala dams in AJK and adjacent areas of Pakistan. The species catch are the basis of the study and these species are used as a measure of potential species loss in relation to dam obstruction. The model also included an assessment of the difference between dam impact in an undisturbed landscape and the compounded effect of dams and land-use change.

The dam wall itself blocks fish migrations, which in some cases and with some species completely separate spawning habitats from rearing habitats. The dam also traps sediments, which are critical for maintaining physical processes and habitats downstream of the dam (include the maintenance of productive deltas, barrier islands, fertile floodplains and coastal wetlands).

Another significant and obvious impact is the transformation upstream of the dam from a free-flowing river ecosystem to an artificial slack-water reservoir habitat. Changes in temperature, chemical composition, dissolved oxygen levels and the physical properties of a reservoir are often not suitable to the aquatic plants and animals that evolved with a given river system. Indeed, reservoirs often host non-native and invasive species (e.g. snails, algae, and predatory fish) that further undermine the river's natural communities of plants and animals.

The alteration of a river's flow and sediment transport downstream of a dam often causes the greatest sustained environmental impacts. Life in and around a river evolves and is conditioned on the timing and quantities of river flow. Disrupted and altered water flows can be as severe as completely de-watering river reaches and the life they contain. Yet even subtle changes in the quantity and timing of water flows impact aquatic and riparian life, which can unravel the ecological web of a river system.

A dam also holds back sediments that would naturally replenish downstream ecosystems. When a river is deprived of its sediment load, it seeks to recapture it by eroding the downstream river bed and banks (which can undermine bridges and other riverbank structures, as well as riverside woodlands). Riverbeds downstream of dams are typically eroded by several meters within the decade of first closing a dam; the damage can extend for tens or even hundreds of kilometers below a dam.

Riverbed deepening (or "incising") will also lower groundwater tables along a river, lowering the water table accessible to plant roots (and to human communities drawing water from wells). Altering the riverbed also reduces habitat for fish that spawn in river bottoms, and for invertebrates.

Large dams have led to the extinction of many fish and other aquatic species, the disappearance of birds in floodplains, huge losses of forest, wetland and farmland, erosion of coastal deltas, and many other immitigable impacts.

Impact of dams on river ecology always becomes conspicuous during and after the construction phases. This can be reduced during the design phase if construction of the dam is followed according to the Environmental Assessment Reports. Usually EIA reports are ignored in Pakistan while constructing the dams.

Dams impact fish directly and indirectly. Directly by blocking or creating hazards to migration upstream and downstream directions, and by mortality or damage when fish pass through dam discharge structures and indirectly dams impact fish biodiversity, fish stocks and fisheries management by modifying and/or degrading the upstream and downstream aquatic environments.

Fisheries management objectives in relation to dams include conventional management objectives: prevention of loss of endangered and/or commercially important fish biodiversity; maintenance of fish stock abundance; sustainability of catch, employment

and income; security of consumer food fish supply; and production of exportable fish products.

Fisheries management objectives specific to dams include provision of bypass facilities for up and downstream migrations, development of new fisheries potentials in reservoirs, and maintenance of biodiversity in impacted environments (affluent streams, downstream river etc.).

The key output of the study is an assessment of the level of impacts on, and the risks for, fish and fisheries. In addition to that recommendations are to be given for a set of mitigation measures and an environmental management. These recommendations should be given importance at every level of the project execution, which aim at preventing damage to fish biodiversity and fish stocks arising from construction activities. The main impacts are soil erosion and silt runoff into the river, siltation of key fish habitats downstream, blast damage from explosives and blockage of fish migration above Patrind site.

Reservoir fisheries management concerns focus on protecting spawning grounds in affluent inflow areas, stocking with indigenous and exotic fish species to increase production, development of a small pelagic fishery, and management of the water level to prevent erratic behavior deleterious to fish stocks.

Management of the fauna passage facility includes monitoring of fish traffic in terms of species, numbers and length/weight range. Fish safe path has not been provided in the dam construction for the migration of the native Shizothoranae fish which migrates at medium level during breeding season.

Downstream river fisheries management concerns focus on aeration of anoxic discharge water from the dam and reduction of turbulence in the stilling pool. The release of artificial mini-floods and the provision of adequate dry season flow are crucial to maintaining a suitable environment for migratory fish species, especially endangered species. The criterion 'no loss of biodiversity' is proposed as a goal towards which the dam on River Kunhar project should strive. Three fish species which are sure to be found in river Kunhar are:



*Schizothorax curvifrons*

[Sattar snow trout]



*Schizothorax plagiostomus*



*Schizothorax labiatus*

[Khunar snow trout]

The crucial part of dam construction on rivers and streams is the environmental management in and around the project area. Aquatic environment is most adversely affected by these projects and is a subject full of difficulties. It is a complex endeavor as it involves conventional fisheries management activities associated with regulating fishing

effort and maintaining stock abundance, as well as various types of civil engineering constructions and manipulation of the aquatic environment.

Unfortunately, the aquatic impact of the dam construction is mostly ignored during the dam construction and operational phases. River flow intensity in river Kunhar and other native rivers decreases during the winter months and it becomes a big challenge for the management to manipulate the water requirement for energy production and at the same time maintain the minimum downstream E-flow. In the past, fisheries management concerns have typically received only modest attention in terms of research budgets, importance as selection criteria for dam design alternatives (or project alternatives), and mitigation of negative impacts on fish biodiversity, fish stocks and fisheries. This situation has improved since environmental impact assessment (EIA) became universally mandatory for most types of dam projects. Important advances in management approaches and engineering of mitigation measures have resulted in new dam projects becoming more environmentally friendly than in the past.

Initial environmental Assessment had been carried out during the dam design and construction but no fish pass facility has ever been designed to have water connectivity for the migration of the fish especially during its spawning period.

Historical studies of the fish fauna in river Kunhar show a large diversity of fish species found here but unfortunately poor management in the riverine fishery for the last few decades have deteriorated the population and existence of many important fish species in it.

The Patrind project is almost in its operational phase but production of power has been delayed due to some technical fault. Water level of the reservoir has gone down as the diversion has stopped. Water quantity in the river is as per its natural flow. It is required to maintain the minimum E-flow from September to April every year. In spite of strong recommendations in the quarterly reports for having a safe fish pass and ensuring the minimum E-flow, no attention has ever been paid which is a very serious negligence of the administration of the project. Sudden need of water in the power generation may lead to the complete stoppage of the water which will have a serious negative impact on the aquatic life downstream.

The catches of fish during the study period show that only two species, *Schizothorax plagiostomus* and *S. curvifrons*, are existing and rest of the species could not be caught and they might get extinguished. Lateral studies will show the clear picture of the existence of other species when the water level in River Kunhar will drop during the



winter months. Another fish, *Schizothorax labiata* has been reported by an Angler which, according to him, he caught few days before. This fish might show the impact of water. The previous studies from September 2013 onward show that fish population has decreased to a considerable level due to the dam construction. No attention has been paid to the social sector development through the project for supporting them with mitigation measures. There is one new proposal, as shared by the environmental staff, to address the social and economic uplift of the affected six villages. This will improve the working relationship between the project authorities and the affected communities and this will also help in the smooth running of the project operations. Exotic trout fish can be introduced in the reservoir initially on experimental basis and then, depending on the positive results, on permanent basis as recreational/sport fishery has been steadily increasing in the upper reaches with cold water.

#### **4) Impact on Migratory Fish of River Jhelum**

Mahsher (Tor Pititora) used to be the famous sport fish of River Jhelum but it has disappeared altogether from this river and its tributaries. No safe migratory paths were provided at Mangla so the fish gone down for feeding could not come back in the river for spawning. Very little evidence of its existence is found in Mangla reservoir as it still exists in River Poonch and few of its tributaries. There is almost no possibility of upstream migration of fish fauna above Mangla Dam to the Project area as authenticated by the study results and supported by the local information recorded through the interviews. Even then, if some migration occurs that will be compensated by the Jhelum River. Thus, it can be safely concluded that the proposed Project will have an impact of river ecology in the stretch of 13 kilometers below the weir point due to shortage of water and 8 kilometers above due to increase in water level. There will be no impact on the available fish fauna as well as the migration of fish species in River Jhelum. i. Aquatic biodiversity in River Jhelum and Neelum will be affected by the Kohala and Neelum and Jhelum Hydropower generation projects. These projects will have a bigger negative impact on a larger stretch of water as compared to Patrind Hydropower Project. Nallah Boi will compensate the impact to some extent but its quality of water is different than the River Kunhar, so it may not support the same fish species.

#### **5) The River Fish**

Some past reports show that the Patrind project area had a rich biodiversity in river Kunhar but present study show that majority of the fish species have disappeared altogether. This is, most probably, due to hydrological changes, stream flow pattern, very high and devastating floods of 1992 and beyond that, illicit hunting of fish by the use of destructive means like explosives, poisoning, electric currents etc. Common Otter (*Lutra lutra*) used to be very common once in the area, but now this has disappeared and most probably it is no more existing in River Kunhar. No fisheries staff had ever been interacted during the study period. The departments of Fisheries of Khyber Pakhtoonkhaw and AJK have not been able to protect the river Kunhar below the town of Gharri Habibullah most probably due to the shortage of conservation staff with them.

The main natural factors which influence fish life in the Himalayan streams are: (i) current of velocity; (ii) fluctuation in water discharge; (iii) water temperature and dissolved oxygen level; (iv) substratum; (v) shelter from the current; and (vi) food availability represented mostly by organisms clinging to and growing on rock and stone surfaces in fast current.

Snow trout, a cold water riverine and medium migratory fish, is locally known as Malli or Sawti. It belongs to the family Cyprinidae and sub-family Schizothoracinae which are widely distributed in the Himalayan and sub-Himalayan region and much of the rest of Asia. Altogether 28 species of Schizoranae are reported in Himalayan river waters but only two of genus Schizothorax are recorded in the study area of river Kunhar and one more reported this time by an angler. i.e., *Schizothorax labiata*, *schizothorax curvifrons* and *Schizothorax plagiostomus*. Two of them are still common in river Kunhar. These species are phytophagous fish and have developed a special mouth to scrape the algae attached on stones. They spawn twice a year during September/October and March/April, but September/October is the best season for spawning. Clear water, stony bottom of creeks composed of fine pebbles and gravel, and water flow of 2.8-4 m/sec, pH 6-7 and dissolved oxygen concentrations of 8-15 mg/L form good spawning conditions in the natural environment.

To cope with the steep, fall in temperature in winter months, schizothoracines migrate from headwaters to lower altitudes where they represent a sizeable part in fish catches in large rivers and their tributaries. The rise in temperature in Kashmir and Kunhar streams from near-freezing level to 10-18°C during May-June induces *S. plagiostomus*, *S. longipinnis*, *S. kasmiriensis* and *S. curvifrons*, *S. labiata* to spawn. During the upstream migration the fish still finds itself in waters of low temperature of 8.0-9.5°C, owing to the

steady influx of snow-melt water. This induces the species to migrate to and spawn in side streams or point of warm and cold water confluence, which receive warmer ground water of 17.5-21.5°C. In the same drainage, *S. plagiostomus* and *S. curvifrons* migrate downstream to the lowermost reaches where it spawns from September to December at 15.0 to 21°C. These observations indicate that in some schizothoracines multiple spawning is determined by temperatures and flow rates optimal for egg laying. The eggs are large-sized (3.0-4.0 mm diameter) and sticky in nature. They are laid in shallow pools (50-70 cm depth) and remain adhered to the substratum until the hatching of fry.

The absence of minimum E-flow in the stream, fluctuating discharge of water and drying out of streams, leaving only isolated pools or no water at all, is another important factor for the species and population decline in river Kunhar. A general observation during the last studies on seasonal fluctuation in river discharge in Kunhar river system indicate that the range of mean flow from October to March (winter months) represents only 8-10% of the total annual flow. There are also variations from year to year depending on the winter and monsoon precipitation. Reduction of torrential streams to stagnant pools exposes the fish to terrestrial predators and to depletion in dissolved oxygen concentrations, especially when autumn leaf fall takes place. However, due to low temperature, the level of dissolved oxygen may not fall below the optimum requirement of cold water fish (7.0-8.0 mg l). As soon as the flow is restored with spring rains and snow-melt water, a rapid re-colonization of the stream takes place.

Increased level of water, making stagnant reservoir is the other factor causing negative environment for the survival and optimum growth of the native fish. Some juvenile fish at the disposal point were noticed during this study. They might have come due to lowering the water level in the reservoir and their growth and survival is not sure. This has to be visualized during the coming studies in December 2017 and March 2018.

*Schizothorax* and *Schizothoracichthys* spp are dominant among the cold water fish in river Kunhar in terms of catch and abundance in all seasons. The substratum consists of boulders, stones, gravel and patches of aquatic vegetation in the pools with lichens on the shallow sides of the river.

As a result of this study in river Kunhar it came out that a gradual increase in water temperature and pH corresponds to a decrease in dissolved oxygen, decline in the density of nymphs of mayflies and stoneflies, but in an increase in larval and adult aquatic beetles. The information collected during expeditions is based on spot measurements and it does not represent average values. The following parameter ranges for the Kunhar

River were recorded at six sampling points during the study. Following table shows the result; transparency; pH; water temperature (°C); dissolved oxygen;

**Table-1 showing water parameters**

S No	Point	Dissolved Oxygen (ppm)	pH	Temperature °C	Transparency
1	Boi	8.1	6.5	16	0.98
2	NallahBoi	8.5	6.5	16.5	0.95
3	Parri	8.1	6.5	16	0.91
4	Outlet	8	6.5	16	0.94
5	Disposal area	9	7	22	1
6	Shorran	9	7	16	1

**6) Fish catch and fishery potential**

The only fish caught was *Schizothorx plagiostomus* at Point-1 Boi. Another very small fingerling was caught in the net and while dragging out it escaped. The colour of the fish was showing the resemblance of *Schizothorax curvifrons*. The fish catch is very low but still the river ecology has the potential of supporting various fish species suitable to this area. The fish catch was very high during the fall in the water level downstream due to stoppage of water at the weir. But; now the fishing in the project area has almost stopped due to water shortage. Water storage above the weir has reduced the river water level downstream and possibility of the use of any fishing gear has become impossible. People can catch the fish by their hands. Similarly, fish potential will be reduced to almost non-existent level if the minimum E-flow of water is not observed. If some people take interest in rearing fish downstream of the weir, they can develop larger pools and may start external feeding. If this once becomes successful, an additional income generation activity for the poor local communities may get started. This needs training of the local people through the proposed community support programme of the project.

**7) Fish catches and species composition**

As usual the fisherman, Muhammad Haneef, was engaged for fishing in the river Kunhar at six sampling points. Fishing in the Kunhar River using cast nets of 1 m to 1.5 m diameter. The water was clayish muddy. The impact of the dam construction has appeared on the aquatic life in the river Kunhar. Catch in the deep lake behind the weir

has become impossible due to the depth of the lake and fish survival probability has also become near to impossible as the river ecology has changed altogether.



*1. Fisherman Mr. Muhammad Haneef*

Reported Fish species of River Kunhar in the past:

**Family: Salmonidae**

*Oncorynchus mykiss {Salmo gairdneri}* (Rainbow Trout)

*Salmo trutta* (Brown Trout)

**Family: Cyprinidae**

*Schizothorax esomus*

*Schizothorax plagiostomus*

*Schizothorax micropogon*

*Schizothorax curvifrons* (Snow Trout)

*Tor putitora*

*Tor*

*Labeo spp*

*Cyprinus carpio*

**Family: Sisoridae**

*Glyptothorax kashmiriensis*

1) Potential of Sports and recreational fishery

***Trout***

The trout fish is very common in the upper reaches of River Kunhar. The newly appeared lake behind the Patrind weir point has a great potential to harbor Rainbow and Brown trout fish species. This needs to introduce the fish under technical observation at experimental level for the first six months by external feeding the fish with special food. Observation in the survival, rate of growth and production in a unit area will further guide us in establishing this entrepreneur in the Patrind Lake. The management of trout fish may be handed over to the apex committee of the affected communities in the near future or any such appropriate arrangements could be done for that.

2) Fisheries Status of River Kunhar in view of locals

We met a professional angler, Nawab khan of Dalola village. According to his statement he comes every next day for fishing starting from Nallah Boi and going down up to 5 kilometers. According to him the decline in fish catch has been observed very much after the construction of obstruction at Patrind. He further said that last week he could catch another type of fish which never found here in his life as he used to fish for the last 25 years. The fish shape and colour etc. explained by him was identical to *Scizothorax labiatus*. It was noticed during this study that the number of anglers have increased at the downstream. This new reported fish species show that the ecology of the river system will change altogether and fish species will disappear if the minimum E-Flow is not maintained down the weir side. The existence of fish species at present could only be possible due to upstream migration from the point of the confluence of Nallah Boi and water above that point was sufficient to support the survival of the fish in the river.



Interview with a professional Angler Mr. Nawab Khan of Dalola village

#### **8) Field Results:**

##### **Point-I (Boi)**

This is the first sampling point of the study and is situated at  $34^{\circ} 18' 19''$  N,  $73^{\circ} 26' 44''$  E at 2422 ft. of elevation above sea level. The water flow is normal as during the same month in 2016. Colour of the water is clear and sides of the bed can be seen. One fish species, *Schizothorax plagiostomus* was caught here with a weight of 121 grams and a length of 25 cm. Water course is mostly confined in the middle. Water velocity is faster and confined mostly in the middle. There is a clear indication of change in the course of water away from the sides.



*S. plagiostomus* species caught at Point-I



pH reading at point-I



## **Point-II (Domel Boi)**

The second sampling point is situated at  $34^{\circ} 18' 36''$  N,  $73^{\circ} 26' 43''$  E at 2398 ft. of elevation above sea level. The nallah and river waters are very clear. The river flow is more centered in the middle at this time. One small fry fish could be caught but escaped due to the size of the fish smaller than the mesh side of the net. The fish could be identified as *S. curvifrons* from its shape and colour. This is the only larger source of water contributing below the weir in the river Kunhar down the Boi to Domeshi joining river Jhelum.



*Confluence of Boi Nallah with Kunhar in October 2017*



*Fishing in nallah Boi*

## **Point-III: (Parri)**

This sampling point is situated at  $34^{\circ} 19' 47''$  N,  $73^{\circ} 25' 35''$  E at 2475 ft. of elevation above sea level. The small creek joins the river here. No fish could be caught by the fishermen. The river flow is confined to center and colour is clear. This time solid waste was seen thrown in the river which will definitely affect the river ecology.



*Point-III Padri. Garbage from the road thrown in the river can be seen*



#### **Point IV: Outlet**

There was a report of fish catching through the use of gill net at the point of outlet erected from a height of about 30 feet above. This gill net was taken out to see the result but there was no fish in the net. Speed of the water is very fast flowing from the bed of the Drain Gate.



Outlet of the weir at Patrind two views



*Few people sitting on the other side of the river for fishing by line.*

#### **Point-V: Disposal point**

Green recreational ground has appeared now at the right bank of the lake. Slight bed setting was observed. The water level has decreased by some 25 feet as diversion tunnels are not operational at this time. No fish could be caught but many juvenile fish was observed in the lake. This might have come here due to lowering the water level of the reservoir. There is no chance of the survival of the fish as the water is deep, temperature and chemical properties are very much different from the naturally flowing river. This area has developed a good potential of recreation for the visitors. Some more provisions of public interest area required to be fixed here. Sampling was done here but no fish could be caught as water level is very high and no food

ingredients are found on which the fish can feed. The introduction and rearing of trout fish in the lake is possible here with artificial feeding mechanism. If utilized carefully, the lake can produce several tons of trout fish annually and area can be leased out or handed over to the affected local community for farming the trout fish and earning some money from here.



*Disposal point developed to a recreational spot*

#### **Point-VI Shorran**

This is the tail point of the lake. Water speed is higher as compared to last sampling and color is clear. This is the ideal point for the introduction of trout fingerlings in the area. Natural food seems to be abundant and it can be supplemented by the artificial food. No fish was found here.



Sampling October 2017

Small creek joining river Kunhar

Table-2 Showing Data collection at each sampling point

Point-I							
S No.	Air temp. °C	Water temp. °C	pH	DO mg/l	Fish Species	Weight (gms)	Length (cm)
1	32	16	6.5	8.1	<i>Shizothorax plagiostomus</i>	121	25
Point-II							
2	32	16.5	6.5	8.5			
Point-III							
3	31	16	6.5	8.1	No fish		
Point-IV							
4	32	16					
Point-V							
5	31	22	7	9.0	No fish		
Point-VI							
6	31	16	7	9	No fish		
Total Fish collected							
					<i>Schizothorax plagiostomus</i>	1	
					<i>Schizothorax curvifrons</i>	1	

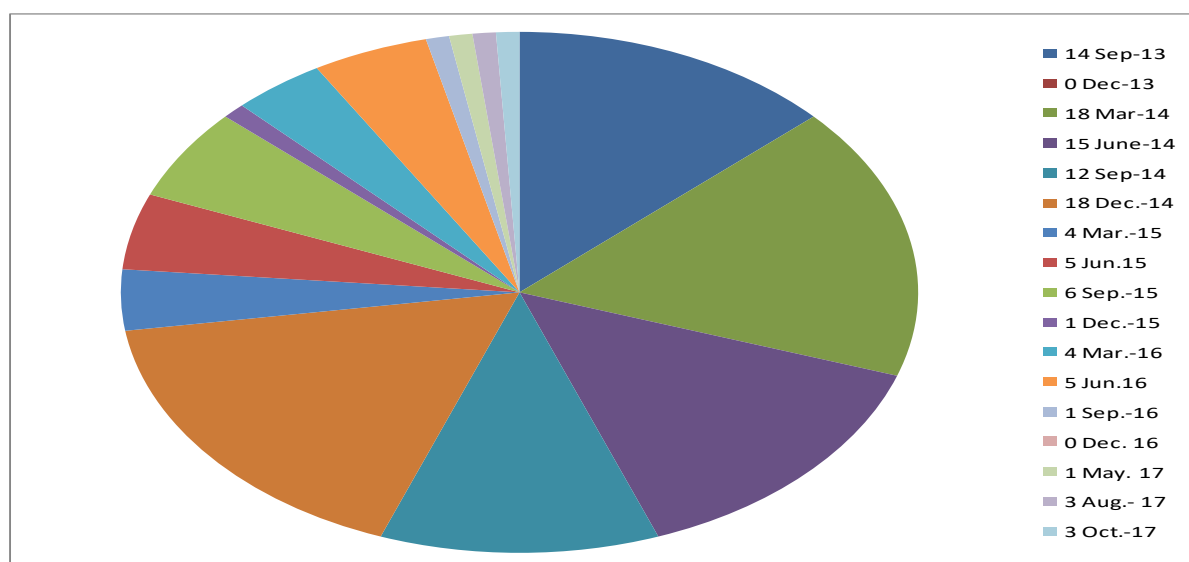
## Species composition

*Schizothorax curvifrons* = 1

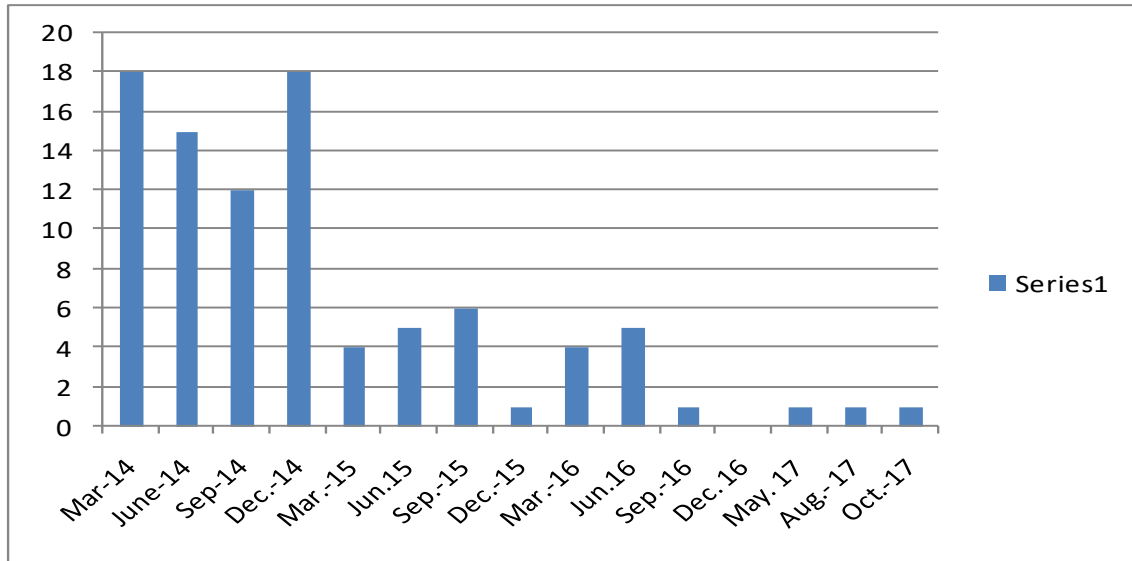
*Schizothorax plagiostomus* = 1

## 9) Comparison

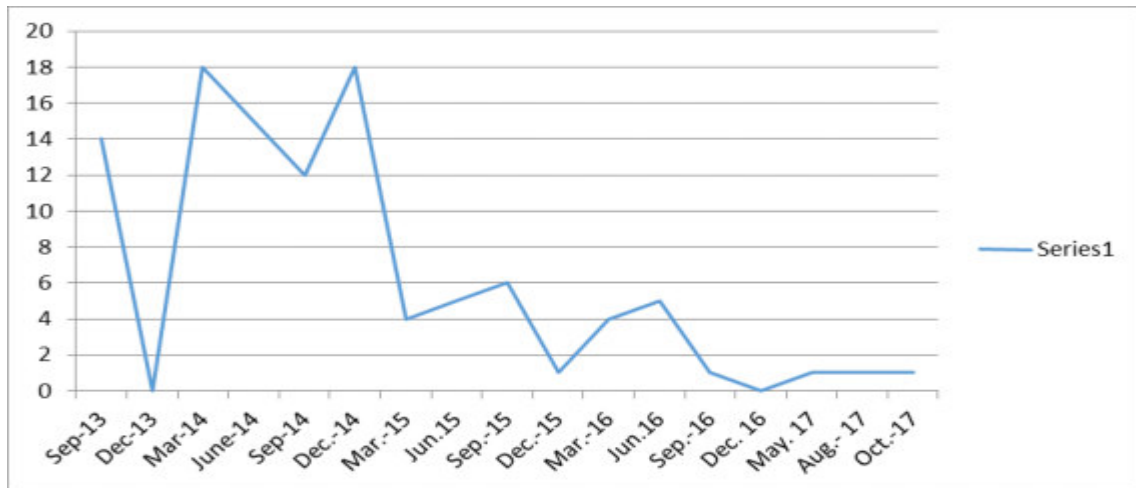
The low catch of fish shows the negative impact on the fish population. The graph below shows the trend of fish availability in the river Kunhar. Fish population remained higher in the early catches but it has decreased with the passage of the time. A definite impact has been noticed. The impact can further be explored during the next studies in the winter months. The minimum e-flow has to be guaranteed especially during the winter season when quantity of water in river is very low. Next study during the operational phase will spell out the change and existence of the fish species in the river. The size and weight of fish in the pool will be higher and change in species composition is also expected as some other species may get better survival environment here. Migration of fish will stop due to nonexistence of safe paths. The major change in ecology is expected during the operational phase and obstruction on the river flow. This will affect the migration of the fish even upstream and all breeding grounds will highly be affected downstream. New fish species of *S. labiatus* was reported by a local and this is the appearance of the change in species composition. This may be conspicuous during the coming studies.



Pie graph showing percentage of catch during each study



*Bar graph showing number of fish caught on each study*



*Line Graph showing trend of fish availability as derived from the studies of the project area*

**Table-3 Comparative number of fish Caught at sampling points**

Period	Point	No. of fish	Period	Point	No. of fish	Period	Point	No. of fish	Period	Point	No. of fish
July-September 2013	1	3	July-September 2014	1	0	July-September 2015	1	4	July-September 2015	1	0
	2	6		2	4		2	1		2	0
	3	4		3	1		3	1		3	0
	4	0		4	2		4	0		4	0
	5	1		5	3		5	0		5	0
	6	0		6	2		6	0		6	1
<b>Total:</b>		<b>14</b>			<b>12</b>			<b>6</b>			
October-December 2013			October-December 2014	1	6	October-December 2015	1		October-December 2016	1	0
				2	5		2			2	0
				3	0		3			3	0
				4	4		4			4	0
				5	0		5			5	0
				6	3		6			6	0
<b>Total:</b>					<b>18</b>						
January-March 2014	1		January-March 2015	1	2	January-March 2016	1		January-March 2017	1	1
	2			2	0		2			2	0
	3			3	0		3	3		3	0
	4			4	0		4			4	0
	5			5	0		5	1		5	0
	6			6	2		6			6	0
<b>Total:</b>					<b>4</b>			<b>4</b>			<b>1</b>

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April-June 2014	1	5	April- June 2014	1	3	April- June 2016	1	4	April- June 2017	1	0
	2	7		2	1		2			2	1
	3	4		3	1		3			3	2
	4	0		4	0		4			4	0
	5	No access		5	0		5			5	0
	6	2		6	2		6	1		6	0
<b>Total:</b>		<b>18</b>			<b>7</b>			<b>5</b>			<b>3</b>
<b>Period</b>	<b>Point</b>	<b>No. of fish</b>	<b>Period</b>	<b>Point</b>	<b>No. of fish</b>	<b>Period</b>	<b>Point</b>	<b>No. of fish</b>	<b>Period</b>	<b>Point</b>	<b>No. of fish</b>
July- September 2017	1	1	July- Septemb er 2018	1		July- Septem ber 2019	1		July- Septe mber 2020	1	
	2			2			2			2	
	3			3			3			3	
	4			4			4			4	
	5			5			5			5	
	6			6			6			6	
<b>Total:</b>		<b>1</b>									
October- December 2017	1		October- Decembe r 2018	1		October - Decemb er 2019	1		Octobe r- Decem ber 2020	1	
	2			2			2			2	
	3			3			3			3	
	4			4			4			4	
	5			5			5			5	
	6			6			6			6	
<b>Total:</b>											

## **10) Result**

Each new study shows that the impact of the Patrind project downstream and in the reservoir is more conspicuous. Fish migration has stopped, spawning of fish is affected, river ecology has changed and witness of new species appeared. Better and clear picture will come during the next studies in the winter and summer months when water quantity in the river will change according to the release downstream. Ecological conditions become different and water pool formation is more prominent. The river water flow is more concentrated in the middle and food production probability has reduced. Different pools of water will appear downstream and impact on fish breeding and its growth will definitely change. Stagnant water can support different aquatic life both in animal and plants. This can also lead to the species change as invasive species may come and dominate the ecosystem altogether. Similarly, aquatic life in the lake will also be affected as deep water and low in food content may not be able to support the life here. Trial of Trout culture with external artificial feeding can be experimented and if successful this could be a great economic activity. It needs careful expert inputs.

## **11) Recommendations**

Since the safe fish pass has not been designed and placed in Patrind Power Project area so these points need to be addressed as the alternative measures:

1. Reservoir fisheries management concerns focus on protecting spawning grounds in affluent inflow areas, stocking with indigenous and non-indigenous fish species to increase production, development of a small pelagic fishery, and management of the water level to prevent erratic behavior deleterious to fish stocks.
2. Downstream river fisheries management concerns focus on aeration of anoxic discharge water from the dam, reduction of turbulence in the stilling pool, and mitigation of fish losses on the floodplain. The release of artificial mini-floods and the provision of adequate dry season flow are crucial to maintaining a suitable environment for migratory fish species, especially endangered species.
3. Fish catches in the Kunhar River have been declining because of the use of illegal fishing methods such as poisoning and use of electro-fishing gears. To



preserve the fish stocks, controls should be imposed on illegal fishing practices and a fish sanctuary be established. The deep water pools of the Kunhar and its feeder streams should be declared fish sanctuaries for the protection of brood stock. The Fisheries departments of KP and AJK should be taken on board to check the illegal fish catch.

4. Habitat improvement is an essential factor for fishery improvement. To avoid seasonal changes of water level, suitable pools should be created under the management of the local development authority. Such a practice will improve the fish habitat quality and avoid the winter desiccation.
5. Protection of fish stocks and fishery regulation should be based on periodic assessments of fish stocks. It is high time to enforce the existing fishery law and to restrict the use of nets with less than 2 cm mesh size.
6. Early planning and consultation with expert should be initiated to have aquaculture development in the cold water lake appeared as a result of damming on river Kunhar at Patrind. This needs introduction of trout fingerlings, external feeding and management.
7. There is a proposal of socio-economic support program for the local affected communities. This proposal must include the involvement of communities on trout fish culture training and management and mechanism should be proposed to provide economic benefit to all affected communities.

## **12) Potential Impacts and Mitigation Measures**

Aquatic ecology is affected by water quality, quantity, availability of breeding habitat (such as spawning and rearing grounds), foot access to the river, fishing methods and terrestrial activities along the river banks and in the watershed (Helland-Hansen et. al., 1995). The existing aquatic habitat of the Kunhar River in the Project area is continuously changing with the change in the flow patten. Fast flowing water may have a big impact on its quality and quantity to support the aquatic life. Downstream changes have to be observed very carefully and any big impact could be addressed by alternate measures such as production of safe breeding pools, lifesaving points and surety of minimum e-flow.

Lake area will definitely have distinct change in the aquatic habitat that may not be as supportive to the existing aquatic life. Introduction of Trout culture program is a better

option for this area as this will provide the opportunity of great economic development through fish production and tourism promotion.

The populations of sedentary, resident fish species above the reservoir will not be directly affected by the Project, but will become genetically isolated from populations downstream.

Furthermore, it should be noted that the topography of Kunhar River valley downstream of the weir is characterized by high river banks with relatively deeper bed levels that prevent the use of the Kunhar River for agricultural irrigation and drinking water supply. The operation of the Project for hydropower generation will reduce flows downstream of the weir. A minimum of 2.5 m<sup>3</sup>/s of water will be released from the head pond as ecological flow throughout the year. This flow will increase further downstream as numerous medium and small streams enter the Kunhar River, thus providing mitigation measures for aquatic flora and fauna in the downstream reach of the weir. These additional side streams will, on average, contribute an estimated 1.8 m<sup>3</sup>/s to the Kunhar River flow downstream of the weir.

***Importantly it should be ensured to release the agreed amount of E-flow below the spillway without a single interval, otherwise chances of the existence of the local fish becomes dubious.***

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# **Annex-5**



## **Implementation Plan of Social Uplift Plan**

Pakistan Hydropower Project






## Implementation Status & Future Plan of Social Uplift Plan

[June, 2017]




### Part I. Environmental & Social Uplift Program during Construction Phase

No.	Classification	Description of Plan	Time Schedule	Status	Photos
1.	Bridge connecting Alda to Muzaffarabad	<ul style="list-style-type: none"><li>Permanent bridge across Jhelum River connecting Lower Chatter Muzaffarabad to Alda village.</li></ul>	<ul style="list-style-type: none"><li>Completed in Sep. 2012</li><li>Full time Vehicular traffic access will be allowed to the local community after construction phase.</li></ul>	<ul style="list-style-type: none"><li>Construction was completed in stipulated time during month of September 2012.</li><li>Pedestrian, motorbike and light vehicles limited access is available due to construction activities at power house site.</li></ul>	 

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No.	Classification	Description of Plan	Time Schedule	Status	Photos
2	Improvement on existing road  (Weir Site)	<ul style="list-style-type: none"> <li>Link road up to Sarati village Mosque</li> </ul>	<ul style="list-style-type: none"> <li>Completed in 2013</li> </ul>	<ul style="list-style-type: none"> <li>This is conducted as part of Road improvement of Weir Site</li> <li>Link road constructed to give convenient access to the Mosque in Sarati village</li> <li>.</li> </ul>	 
3	Embank protection	<ul style="list-style-type: none"> <li>Slope protection and embankment against the risk of encroachment and inundation during heavy rainy season</li> <li>- Rip-rap protection</li> <li>- Gabion protection</li> </ul>	<ul style="list-style-type: none"> <li>Completed in 2015</li> </ul>	<ul style="list-style-type: none"> <li>Permanent protection measure with concrete works have been taken (Up &amp; downstream the access bridge) along the river bank at batching plant area and M&amp;E fabrication workshop area</li> <li>Same measures have been undertaken on power house site in front of O&amp;M building and powerhouse structure site.</li> </ul>	 
4	Water supply for Power House  (Alda)	<ul style="list-style-type: none"> <li>Cash support for RCC water tank construction for <b>Alda Village</b></li> </ul>	<ul style="list-style-type: none"> <li>Completed <b>In June, 2016</b></li> </ul>	<ul style="list-style-type: none"> <li>EPCC paid PKR 600,000 to local community as building cost of water tank.</li> <li>- Size (3m×3m)</li> <li>- Pvc pipe line: 1,500m</li> <li>-</li> </ul>	

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No.	Classification	Description of Plan	Time Schedule	Status	Photos
5-0	Water supply for Weir site	<ul style="list-style-type: none"> <li>Initially water supply were planned for Tarcheela, Patrind, Taitree(Sarati) because Tarcheela and Patrind, were designated as camp area</li> <li>However, acquisition of Tarcheela and Patrind land turned down by villagers</li> <li>Eventually our current camp was built in Taitree adjacent to Sarati</li> <li>Developing water supply for Tarcheela and Patrind cancelled</li> </ul>			
5-1	Water supply for Weir site	Water supply to the <b>Sarati village</b> after developing and using the well in weir camp	<ul style="list-style-type: none"> <li>Water tank completed in 2012</li> <li>Handed over</li> </ul>	<ul style="list-style-type: none"> <li>Water resistivity survey was carried out but no ground water was found. Currently Sarati village is using weir camp water source after making branch pipe</li> </ul>	
5-2	Water supply for Weir site	<ul style="list-style-type: none"> <li>Connection of <b>water pipe line</b> to the water tank at <b>Sarati village</b></li> <li>Installation of <b>surface drainage</b> line at <b>Sarati village</b></li> </ul>	<ul style="list-style-type: none"> <li>Completed in 2013</li> <li>Handed over</li> </ul>	<ul style="list-style-type: none"> <li>Water pipe line was developed from existing water tank to Sarati village in 2013. <ul style="list-style-type: none"> <li>GI pipe(D50mm): 230m</li> </ul> </li> <li>Installation of fence and protection wall for water source were installed and access road was also repaired.</li> <li>Surface drainage line was developed at Sarati village in 2013. <ul style="list-style-type: none"> <li>RCC pipe(D450mm): 87m</li> <li>3 Manholes and block masonry</li> </ul> </li> </ul>	 





**Environmental & Social Monitoring Report (July-September 2017)**

No.	Classification	Description of Plan	Time Schedule	Status	Photos
5-3	Water supply for Weir site	<ul style="list-style-type: none"> <li>Repairing water tank at Sarati village with proper top covering</li> </ul>	<ul style="list-style-type: none"> <li>During construction phase</li> </ul>	<ul style="list-style-type: none"> <li>Water tank for Sarati village was repaired and has been made dirt free</li> <li>- Top cover is installed surrounded by a concrete protection wall</li> </ul>	
5-4	Water supply for Weir site	Installation of water tank for <b>Deedal Hoondi village</b>	<ul style="list-style-type: none"> <li>Completed in 2013</li> <li>Handed over</li> </ul>	<ul style="list-style-type: none"> <li>Water tank installed near access to disposal area in <b>Deedal Hoondi village</b> in September 2013 and this is currently in use.</li> <li>Source comes from behind batching plant. Water comes from under the ground (spring water)</li> </ul>	
	[Additional Support]	Community access to the water source lying behind batching plant of weir site.	<ul style="list-style-type: none"> <li>Completed In 2015</li> </ul>	Pathway towards spring was constructed to facilitate local's access to the water source.	

## Part II. Environmental & Social Uplift Program after Construction Phase




No.	Classification	Description of plan	Time Schedule	Status	Photos
1	Water supply for Power House Site	<ul style="list-style-type: none"> <li>Water supply to the Lower Chatter and Alda villagers using the well in labor camp area</li> </ul>	<ul style="list-style-type: none"> <li>Completed in 2014</li> <li>The local community will have access to this water well <b>after construction phase</b></li> </ul>	This well is currently being used to supply water to CNEEC and Kyungdong workers who are engaged in Powerhouse construction during construction phase.	
2	Water supply for Weir Site (Tarcheela)	<ul style="list-style-type: none"> <li>Cash support on tubular well construction for Tarcheela village</li> </ul>	<ul style="list-style-type: none"> <li>Tarcheela find spot for tubular well and EPCC paid Rs.150,000/- on 21<sup>st</sup> Mar,2017 <b>they will complete building the tubular well April in 2017(time line is subject to change)</b></li> </ul>	<ul style="list-style-type: none"> <li>As agreed EPCC paid half payment Rs. 150,000/- to Tarcheela village. Tubular Well construction work is progress and hopefully complete on 30<sup>th</sup> April 2017</li> </ul>	
3-0	Improvement on access to isolated	<ul style="list-style-type: none"> <li>Because Tarcheela and Patrind land acquisition turned down by villagers, Improvement on access Sarati to Patrind &amp; Tarcheela plan partly cancelled</li> <li>Link plan between KP and AJK remains.</li> </ul>			

**Environmental & Social Monitoring Report (July-September 2017)**

No.	Classification	Description of plan	Time Schedule	Status	Photos
	villages  (Weir Site)				
3-1	Improvement on access to isolated villages  (Weir Site)	<ul style="list-style-type: none"> <li>Provision of Link between KP and AJK regions to local people</li> <li>As the permanent link route, <b>Spillway bridge of Weir</b> will be allowed to the locals.</li> </ul>	<ul style="list-style-type: none"> <li>After construction phase in March 2017</li> <li>Time line is subject to change according to progress</li> </ul>	<ul style="list-style-type: none"> <li>Cofferdam was constructed in 2013 and used to be an access for Tarcheela villagers</li> <li><b>Currently, road passing through the weir site</b> is being used by the locals as access between AJK &amp; KP Site.</li> </ul>	
3-2	Improvement on access to isolated villages  (Weir Site)	<ul style="list-style-type: none"> <li>Installation of pedestrian bridge for Patrind villagers.</li> </ul>	<ul style="list-style-type: none"> <li>Pedestrian bridge installed in 2012 and 2013</li> </ul>	<ul style="list-style-type: none"> <li>The villagers used to go across the river by cable trolley but it was washed away by flood in May 2005.</li> <li>As part of corporate social contribution, EPCC built the pedestrian bridge temporarily.</li> </ul>	 <p>[Bridges installed in 2012 &amp; 2013]</p>




**Environmental & Social Monitoring Report (July-September 2017)**

No.	Classification	Description of plan	Time Schedule	Status	Photos
4-1	Improvement on existing road  (Weir Site)	<ul style="list-style-type: none"> <li>• <b>1<sup>st</sup> improvement</b> for Boi road between sarati village and batching plant completed</li> </ul> 	<ul style="list-style-type: none"> <li>• completed in 2014</li> </ul> 	<ul style="list-style-type: none"> <li>• After maintenance passing by is improved.</li> </ul> 	
4-2	Improvement on existing road  (Weir Site)	<ul style="list-style-type: none"> <li>• <b>Final improvement</b> for Boi road between sarati village and batching plant (Hoondi).</li> </ul>	<ul style="list-style-type: none"> <li>• After construction phase in April 2017</li> <li>• Time line is subject to change according to progress</li> </ul>	<ul style="list-style-type: none"> <li>• From Hoondi (batching plant) to Sarati Village (Weir Offices) area around 1600m is finally paved on 15<sup>th</sup> April 2017.</li> </ul>	
5-1	Improvement on existing road  (Power House)	<ul style="list-style-type: none"> <li>• <b>1<sup>st</sup>~3<sup>rd</sup> improvement done</b></li> <li>• EPCC have done several restoration works for the sliding section of the road until now.</li> </ul>		<ul style="list-style-type: none"> <li>• EPCC subcontracted to DAM (Development Authority of Muzaffarabad) 3 times for that work.</li> <li>- <b>1<sup>st</sup>:</b> : Construction of road and barrier</li> </ul>	


No.	Classification	Description of plan	Time Schedule	Status	Photos
				<p>near Awan Block Factory.</p> <ul style="list-style-type: none"> <li>- 2<sup>nd</sup>: : Construction of barrier near Ice Factory.</li> <li>- 3<sup>rd</sup>: : Re-construction of damaged retaining wall near house</li> </ul>	
5-2	Improvement on existing road (Power House)	<ul style="list-style-type: none"> <li>• <b>Final improvement</b></li> <li>• The rest part of road from labor camp area to Jhelum River bridge will be improved</li> </ul>	<ul style="list-style-type: none"> <li>• Road Pavement is completed from Ice Factory to Jhelum River Bridge.</li> </ul>	<ul style="list-style-type: none"> <li>• To improve the road condition for ongoing traffic, EPCC has been completed concrete road pavement from Ice Factory to Jhelum River Bridge and from Bridge to Alda Village.</li> </ul>	 




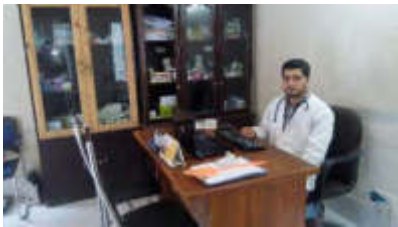

**Environmental & Social Monitoring Report (July-September 2017)**

No.	Classification	Description of plan	Time Schedule	Status	Photos
5-3	Improvement on existing road  (Power House)	<ul style="list-style-type: none"> <li>Road from Power House to Alda village entrance will be fenced</li> </ul>	<ul style="list-style-type: none"> <li>After construction phase in April 2017</li> <li>Time line is subject to change according to progress</li> </ul>	<ul style="list-style-type: none"> <li>Boundary fencing work is under progress.</li> </ul>	
6-0	Improvement of construction area	<ul style="list-style-type: none"> <li>Because Tarcheela and Patrind land acquisition turned down by villagers, Improvement plan(Park) for Patrind &amp; Tarcheela cancelled.</li> </ul>			
6-1	(Weir Site)	<ul style="list-style-type: none"> <li>Disposal area in weir site will be changed into cricket field &amp; park</li> </ul>	<ul style="list-style-type: none"> <li>After construction phase in April 2017</li> <li>Time line is subject to change according to progress</li> </ul>	<ul style="list-style-type: none"> <li>Park has been developed including playing facilities for kids.</li> </ul>	
6-2	(Power House)	<ul style="list-style-type: none"> <li>Labor camp &amp; workshop area in Power House Site will be changed into cricket field &amp; park</li> </ul>	<ul style="list-style-type: none"> <li>After construction phase in April 2017</li> <li>Time line is subject to change according to progress</li> </ul>	<ul style="list-style-type: none"> <li>Conceptual design has been developed and is under discussion with Development Authority Muzaffarabad.</li> </ul>	






**Environmental & Social Monitoring Report (July-September 2017)**

No.	Classification	Description of plan	Time Schedule	Status	Photos
6-3	Improvement of construction area  (Power House)	<ul style="list-style-type: none"> <li>- Batching plant &amp; Stock yard, will be changed into cricket field &amp; park</li> </ul>	<ul style="list-style-type: none"> <li>• After construction phase in April 2017</li> <li>• Time line is subject to change according to progress</li> </ul>	<ul style="list-style-type: none"> <li>• Working on plan.</li> </ul>	

### Part III. Development of Medical Treatment, School Support and Charity





No.	Classification	Description of Plan	Time Schedule	Status	Photos
1	Medical treatment for local residents	<ul style="list-style-type: none"> <li>• In case of emergency, ambulance and medical aid is available and locals can be facilitated.</li> </ul>	<ul style="list-style-type: none"> <li>• During construction phase.</li> </ul>	<p>A doctor and male nurses are placed on both sites and local people could be facilitated in emergency.</p> <p>An ambulance is also available for them during any emergency situation.</p> 	 

**Environmental & Social Monitoring Report (July-September 2017)**





No.	Classification	Description of Plan	Time Schedule	Status	Photos
	[Case]	<ul style="list-style-type: none"><li>Emergency support case on road side accident (Outside project)</li></ul>	On 24 <sup>th</sup> June 2014, a traffic accident occurred outside the project boundary at weir site that resulted in injuries. EPCC's HSE team provided the first aid and using site ambulance injured person was shifted to Kunhar Christian Hospital where he was admitted for further treatment. <i>(Person belongs to PAPs from adjacent village Sarati)</i>		
			<div></div>		
2-1	School support  (Weir Site)	<ul style="list-style-type: none"><li>Deedal Meera school was badly damaged due to earthquake in 2005</li></ul> <div></div>	<ul style="list-style-type: none"><li>Completed in 2013</li></ul>	<ul style="list-style-type: none"><li>EPCC installed the entire roof, doors and windows in 2013.</li></ul>	<div></div>





***Environmental & Social Monitoring Report (July-September 2017)***

No.	Classification	Description of Plan	Time Schedule	Status	Photos
2-2	School support  (Weir Site)	• Deedal Meera school support	• March 2014	• After training on how to cross road safely gifts awarded  	
2-3	School support  (Weir Site)	• Patrind school support	• February 2015	• Food and stationary gifted  	

**Environmental & Social Monitoring Report (July-September 2017)**


No.	Classification	Description of Plan	Time Schedule	Status	Photos																		
3-1	School support  (Power House)	To aid schools and residents adjacent to the site	<ul style="list-style-type: none"><li>During construction phase</li></ul>	<ul style="list-style-type: none"><li>TV set has been gifted to residents near the site as goodwill.</li><li>Various sessions on HSE awareness have been held in adjacent schools</li><li>Private School yard has been protected by EPCC adjacent to camp office.</li><li>Stationary and books were distributed among school children</li></ul>	  																		
3-2	Donation to school  (Power House)	Table / Chairs / Stationary donated to local school near Power House Camp	<ul style="list-style-type: none"><li>28<sup>th</sup> of March, 2016</li></ul>	<table><tr><th>Item</th><th>Q'ty</th><th>Amount</th></tr><tr><td>Table(student</td><td>6</td><td>12,000</td></tr><tr><td>Table(teacher</td><td>4</td><td>18,000</td></tr><tr><td>Office table</td><td>1</td><td>6,500</td></tr><tr><td>White board</td><td>4</td><td>18,000</td></tr><tr><td>Total</td><td></td><td>54,500</td></tr></table>	Item	Q'ty	Amount	Table(student	6	12,000	Table(teacher	4	18,000	Office table	1	6,500	White board	4	18,000	Total		54,500	
Item	Q'ty	Amount																					
Table(student	6	12,000																					
Table(teacher	4	18,000																					
Office table	1	6,500																					
White board	4	18,000																					
Total		54,500																					

**Environmental & Social Monitoring Report (July-September 2017)**

No.	Classification	Description of Plan	Time Schedule	Status	Photos
4	Local employment	<ul style="list-style-type: none"> <li>Local residents of AJK or KP especially PAPs (Project Affected Persons) will be given a priority over others for employment.</li> </ul>	<ul style="list-style-type: none"> <li>During construction phase</li> </ul>	<ul style="list-style-type: none"> <li>Nearly 86% of total manpower is employed from the local communities. (AJ&amp;K: 65.5%, KP: 20.5%)</li> <li>EPCC has kept employment for the local people despite the delay in construction work during the first half of 2014.</li> </ul>	 <p>[Local Job advertisement]</p>
5	Economic Activities / Indirect employment	<ul style="list-style-type: none"> <li>Creating business &amp; job opportunities.</li> </ul>	<ul style="list-style-type: none"> <li>During construction phase.</li> </ul>	<ul style="list-style-type: none"> <li>Locals from adjacent villages have established small business such as shops and canteens.</li> </ul>	<ul style="list-style-type: none"> <li>The activation of construction work attracted business &amp; jobs opportunities.</li> </ul> 

# **Annex-6**

## **Water Quality Analysis**

	<b>WATER QUALITY LABORATORY MUZAFFARABAD</b> Pakistan Council of Research in Water Resources Ministry of Science & Technology, Government of Pakistan Shaha Nara Tariq Abad by Pass Road, Muzaffarabad Office Phone # 05822-920949
<b>WATER QUALITY TEST REPORT</b>	

Report Serial No.	WQL-MZD- 3070 -2017	District Name	Muzaffarabad
Name of Theist	Muzaffarabad	Town/ Union Council	Muzaffarabad
WQL Sample Code	MCL-PTN-(01)-T7-2017	Clint Code	PP.08.17
Sampling Date	8.08.2017	Reporting Date	12.08.2017
Sampling Site Address	Camp Filtration Plant, Weir (Upper Side)		
Clint Name & Address	HSE Manager (DAEWOO E & C), Pakistan Patrind Hydropower Project		

CHEMICAL & MICROBIOLOGICAL PARAMETERS				
Sr.#	Water Quality Parameters	Units	Permissible Limits	Results
1.	Electrical Conductivity	(micro-S/cm)	NGVS	369
2.	pH	-	6.5-8.5 (PSQCA)	7.35
3.	Turbidity	NTU	<5 (PSQCA)	0.04
4.	Chloride	(mg/l)	250 (PSQCA)	7
5.	Chlorine	(mg/l)	0.3 (PSQCA)	0.00
6.	Bicarbonate	(mg/l)	NGVS	160
7.	Carbonate	(mg/l)	NGVS	0.00
8.	Calcium	(mg/l)	100 (PSQCA)	48
9.	Hardness	(mg/l)	500 (PSQCA)	170
10.	Sodium	(mg/l)	200 (WHO)	80
11.	Potassium	(mg/l)	10 (PSQCA)	1.3
12.	Total Dissolved Solids (TDS)	(mg/l)	1000 (PSQCA)	203
13.	Flouride	(mg/l)	1.5 (PSQCA)	0.03
14.	Total Coliforms (P/A Kit)	+ve/-ve	Nil (PSQCA)	-Ve


PSQCA: Pakistan Standard Quality Control Authority, P/A: Presence/Absence, +Ve: Presence of Bacterial Contamination, -Ve: Absence of Bacterial Contamination, NGVS: No Guideline Value Set, WFP: Water Filtration Plant, WQL: Water Quality Lab., BDL: Below Detection Limit

**Terms & Conditions:**

- Test Results in this report relate only to the test item/sample submitted and tested. Tested parameters followed the APHA (American Public Health Association) standard methods, 21<sup>st</sup> Edition.
- The test report shall not be reproduced except in full, without written approval of WQL-PCRWR
- Water Quality Parameters exceeding the WHO Drinking Water Guideline values (Guidelines for the drinking Water Quality, third editions, 2004) National Environmental Quality Standards (1999) and Pakistan Standard Quality Control Authority (PAKEPPA, 2008) are highlighted

Remarks: 'Safe Water'

Prepared By: (Lab. Analyst)		Checked By: (QC Incharge)	
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	<b>WATER QUALITY LABORATORY MUZAFFARABAD</b> Pakistan Council of Research in Water Resources Ministry of Science & Technology, Government of Pakistan Shaha Nara Tariq Abad by Pass Road, Muzaffarabad Office Phone # 05822-920949
<b>WATER QUALITY TEST REPORT</b>	

Report Serial No.	WQL-MZD-3076-2017	District Name	Muzaffarabad
Name of Theist	Muzaffarabad	Town/ Union Council	Muzaffarabad
WQL Sample Code	MCL-PTN-(07)-T7-2017	Clint Code	PP.08.17
Sampling Date	8.08.2017	Reporting Date	12.08.2017
Sampling Site Address	Ex Beaching Plant Tube Well ,Lower Side		
Clint Name & Address	HSE Manager (DAEWOO E & C), Pakistan Patrind Hydropower Project		

CHEMICAL & MICROBIOLOGICAL PARAMETERS				
Sr.#	Water Quality Parameters	Units	Permissible Limits	Results
1.	Electrical Conductivity	(micro-S/cm)	NGVS	558
2.	pH	-	6.5-8.5 (PSQCA)	7.53
3.	Turbidity	NTU	<5 (PSQCA)	0.09
4.	Chloride	(mg/l)	250 (PSQCA)	17
5.	Chlorine	(mg/l)	0.3 (PSQCA)	0.00
6.	Bicarbonate	(mg/l)	NGVS	230
7.	Carbonate	(mg/l)	NGVS	0.00
8.	Calcium	(mg/l)	100 (PSQCA)	64
9.	Hardness	(mg/l)	500 (PSQCA)	200
10.	Sodium	(mg/l)	200 (WHO)	86
11.	Potassium	(mg/l)	10 (PSQCA)	4.0
12.	Total Dissolved Solids (TDS)	(mg/l)	1000 (PSQCA)	307
13.	Flouride	(mg/l)	1.5 (PSQCA)	0.00
14.	Total Coliforms (P/A Kit)	+ve/-ve	Nil (PSQCA)	-Ve

PSQCA: Pakistan Standard Quality Control Authority, P/A: Presence/Absence, +Ve: Presence of Bacterial Contamination, -Ve: Absence of Bacterial Contamination, NGVS: No Guideline Value Set, WFP: Water Filtration Plant, WQL: Water Quality Lab., BDL: Below Detection Limit

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- Water Quality Parameters exceeding the WHO Drinking Water Guideline values (Guidelines for the drinking Water Quality, third editions, 2004) National Environmental Quality Standards (1999) and Pakistan Standard Quality Control Authority (PAKEPPA, 2008) are highlighted

Remarks: 'Safe Water'

Prepared By: (Lab. Analyst)		Checked By: (QC Incharge)	
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# **Annex-7**

## **Complaint Log**

**Environmental & Social Monitoring Report (July-September 2017)**

Sr. No.	Date	Issue	Plaintiff	Response		Status
				OE	EPCC	
1	13-Aug-15	No written agreement with the labor	Syed Iqtadar Hussain Kazmi (Electracian) (KungDong)	OE forwarded the complaint to EPCC and requested EPCC to sort out the matter and convey its findings to OE	EPCC instructed their Sub-Con to make a formal written agreement with the labor. Sub-Con followed EPCC's instructions and made a formal agreement with the labor	<b>Closed</b>
2	13-Aug-15	Termination without prior notice	Mohsin (Surveyor Helper) (KungDong)	OE forwarded the complaint to EPCC and requested EPCC to sort out the matter and convey its findings to OE and requested EPCC to reinstate the labor	EPCC asked Sub-Con to reinstate the labor who was later reinstated and also asked to issue prior notice before terminating any employees services	<b>Closed</b>
3	14-Sep-15	Reinstatement after recovering from injury	Latif Qazi (Worker EPCC)	OE forwarded the complaint to EPCC and requested EPCC to sort out the matter and convey its findings to OE and requested EPCC to reinstate the labor and resolve the compensation issue	EPCC reinstated the labor and also reimbursed the medical bills along with the due salary for the period in which labor was recovering from injury	<b>Closed</b>
4	8-Nov-15	Termination of labors for asking for PPE's	Labors (KD)	OE forwarded the complaint to EPCC and requested EPCC to sort out the matter and convey its findings to OE and requested EPCC to reinstate the labor	EPCC investigated the incident and found that labors were terminated wrongfully and instructed their Sub-Con to reinstate the labors and also instructed that such an incident should not be repeated in future. Sub-Con reinstated the labors and provided assurance that this kind of incident will not happen again	<b>Closed</b>



**Environmental & Social Monitoring Report (July-September 2017)**

Sr. No.	Date	Issue	Plaintiff	Response		Status
				OE	EPCC	
5	14-Nov-15	Termination of labors because of duty timings	Steel Fixers HRT (KD)	OE forwarded the complaint to EPCC and requested EPCC to sort out the matter and convey its findings to OE and requested EPCC to reinstate the labor	EPCC investigated the matter and reported that labor got late for duty after lunch time and the supervisor terminated them. EPCC instructed Sub-Con to reinstate the labor after verbal warning. Later labor were reinstated	Closed
6	1-Jan-16	Termination of KD carpenter Foreman-PH site	Tasveer Ahmad	Complaint forwarded to EPCC with request to find out cause.	It was observed that he was not maintaining the record of attendance of his subordinates. Due to that reason the concerned Korean fired him from the job. The firing of foreman from the job has been immediately address by the Mr. Kim, Tae Jin (Project Manager – KD) and after discussions with complainant and grant the permission him to continue his job on same basis without any hesitation	Closed

**Environmental & Social Monitoring Report (July-September 2017)**

Sr. No.	Date	Issue	Plaintiff	Response		Status
				OE	EPCC	
7	9-Jan-16	Delay of Salary to laborers (KD)	KD Laborers	Complaint forwarded to EPCC with request to find out cause and make arrangement to release salary from 7~10 of every month.	KD addressed the issue as follows: Our company gives the salary to the labour through bank and due to the holidays of bank (i.e Sat & Sun) labour received the salary on next working day. But just for the kind note most of the labour also got the salary on Friday at Site area dated 08-01-2016 as bank depute its staff to provided them the salaries at door step. Further, we will try to compensate the labour before 10th of each month however also consider the total strength of labour is exceeding 1,200 and to manage the things takes time	<b>Closed</b>
8	12-Jan-16	Labor and Korean foreman (KD) conflict due to misconduct	KD Labor-HRT	Complaint forwarded to EPCC with request to find out cause. Moreover, EPCC was requested to counsel both parties to avoid misconduct and improve behavior and working relation at site.	During the working Korean Lining & Tunnel Foreman ordered to hold the steel. Due to hardness of steel some delay happened in the work and on the spot they started pushing each other. At the moment when worker came outside he himself teared his clothes. The issue has been addressed by the Korean Incharge (Mr. Kim) and resolved after the discussion with them	<b>Closed</b>

**Environmental & Social Monitoring Report (July-September 2017)**

Sr. No.	Date	Issue	Plaintiff	Response		Status
				OE	EPCC	
9	14-Jan-16	Termination of 12 Labors from Batching Plant	Terminated Laborers	Complaint forwarded to EPCC with request to find out cause and try to adjust the terminated laborers at other component of the PH site	EPCC responded that the reason for the termination of the workers was the discontinuation of one shift of batching plant. EPCC adjusted the terminated workers at PH site.	<b>Closed</b>
10	15-Jan-16	Irregular deployment of labor at various components on PH Site	Laborers	Complaint forwarded to EPCC with request to sort out this irregular deployment and deploy labor as per their expertise and utility	Labour raised the issue for deployment to Patrind & Muzaffarabad Site. By considering the efficiency of the labour the concerned in charge decided to deploy according to the abilities of the labour. That's why the mechanism of deployment for both sites has been introduced. It is a remedy for the labour instead of termination from the job	<b>Closed</b>
11	18-Jan-16	Complaint for inappropriate behavior of Mr. Lee with Laborers	KD Laborers-PH site	Complaint forwarded to EPCC with request to find out cause. Moreover, EPCC was requested to counsel both parties to avoid misconduct and improve behavior and working relation at site.	Some of the labour complaint about the behavioral issues of Mr. Lee, ImSeok. The issue has been directly address by the G.M(Mr. Kwon, Sang Chul) and strictly warn to not do the same in the future. Also Mr. Lee, ImSeok take the promise not to do the same in future	<b>Closed</b>
12	19-Jan-16	Deedal Meera Community complained to extend the disposal area fence both in horizontal and vertical	Deedal Meera Community	Received Application was forwarded to EPCC for action	EPCC accepted the community demand and extended the fence as per Community requirements	<b>Closed</b>

**Environmental & Social Monitoring Report (July-September 2017)**

Sr. No.	Date	Issue	Plaintiff	Response		Status
				OE	EPCC	
		direction to maintain their privacy				
13	19-Jan-16	Labor complaint against quality of food provided in Mess	Sung-bu Laborers	Complaint forwarded to EPCC with request to improve the messing facility for the laborers and improve the quality of food items	EPCC directed its sub-contractor to improve food quality and agreed to closely monitor the messing standard	<b>Closed</b>
14	19-Jan-16	Delayed release of Salary for Sung-bu Laborers	Sung-bu Laborers	Complaint forwarded to EPCC with request to find out cause and make arrangement to release salary with in due course of time	EPCC directed its sub-contractor Sung-bu to immediately release salaries and make necessary arrangements to avoid such situation in future	<b>Closed</b>
15	20-Jan-16	Laborers complaint against non-availability of PPEs	KD Laborers-PH Site	EPCC was requested to take up the matter and investigate as why the most essential requirement is not being fulfilled. Moreover, EPCC must immediately direct its sub-contractor to provide PPEs	Due to the shortage in supply of safety material labour face problems & we have provided the desired safety items to the complainant as we got the supplies without any delay. However, in order to avoid this in future, we are trying to reduce the time of supply chain.	<b>Closed</b>

**Environmental & Social Monitoring Report (July-September 2017)**

Sr. No.	Date	Issue	Plaintiff	Response		Status
				OE	EPCC	
16	23-Jan-16	Complaint from Ambulance driver against Sung-bu Laborers for verbal and physical misconduct	Muhammad Ashraf (Ambulance Driver-EPCC)	Complaint forwarded to EPCC with request to find out cause and carry out disciplinary action against the guilty	EPCC investigated the incident and reported that an accident occurred at the weir site and the ambulance driver was not present. When he arrived, the anguished laborers took him to account which resulted in this unfortunate event. EPCC has issued warning letters to all people involved in this matter	<b>Closed</b>
17	24-Jan-16	Complain from Engineers and Laborers against M&E In-charge Mr. Chae's inappropriate Behavior	Engineers and Laborers at Weir Site (M&E)	Complaint forwarded to EPCC with request to find out cause. Moreover, EPCC was requested to counsel Mr. Chae to avoid misconduct and improve behavior and working relation at site.	Mr. Chae himself addressed the situation by saying that he did not mean to offend any of his sub-ordinate staff and his strictness was only for keeping the workers on course	<b>Followed up by OE staff. Issue closed for the time being.</b>
18	25-Jan-16	Sung-bu Laborers Salary Increment Issue	Sung-bu Laborers	Complaint forwarded to EPCC with request to compensate the workers.	EPCC directed its sub-contractor to investigate the issue and solve it as per its company policy. Sung-bu raised the salary by 700/- p.m for workers working for less than a year and 1200/- p.m for workers working for a year or more	<b>Closed</b>

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Sr. No.	Date	Issue	Plaintiff	Response		Status
				OE	EPCC	
19	27-Jan-16	EPCC laborers salary issue: Laborers being paid less than the amount fixed in their contract	EPCC Laborers	Complaint forwarded to EPCC with request to compensate the workers as per company policy and contract	EPCC explained the company Policy.	Closed
				OE in response requested EPCC to explain the structure of salary in the contract to its workers.	EPCC accordingly revised the contracts; explaining the salary structure. The contract was signed by the Architecture laborers only which the civil works workforce refused to sign the new contracts up till now.	
				OE has requested EPCC to update the OE on this matter and inform as why laborers are not signing the new contracts	EPCC provided the contracts signed by the all the labourers after explaining them the terms and conditions	
20	28-Jan-16	Termination of 5 EPCC laborers from the Project	Terminated Laborers	OE forwarded the complaint to EPCC and requested EPCC to sort out the matter and convey its findings to OE	EPCC clarified that the workers were not terminated and were only reprimanded by the supervisor. The laborers are back to work.	Closed
21	8-Feb-16	Termination of 10 EPCC laborers from the Project	Terminated Laborers	Complaint forwarded to EPCC with request to find out cause and try to reinstate the terminated laborers.	EPCC responded that the reason for the termination of the workers was that they were not performing their duties and also not following the instructions given to them by their supervisor.	Closed

**Environmental & Social Monitoring Report (July-September 2017)**

Sr. No.	Date	Issue	Plaintiff	Response		Status
				OE	EPCC	
				OE ask did EPCC give them any warning letters.	On 9th Feb 2016 Labours were kept standby not terminated, some of them will go back to PH and some will work at batching plant.	
				OE ask when these labors will be call back on site.	On 10th Feb 2016 Four labors were re hired and they will start work with civil team from tomorrow regarding the others we in discussion. On 23 February EPCC responded as follows 1. 4 labors were transferred to civil team(no. 1~no.4) 2. 6 labors were terminated in accordance with their habitual absence and verbal warnings.	
22	16-Feb-16	A labourer Munsif Alvi was terminated from the service due to un-informed absence from duty. Reportedly he was sick and was recommended one-day rest by the doctor.	Munsif Alvi (Labourer)	OE forwarded the matter to EPCC and requested EPCC to consider the matter in light of the stated grounds.	Mr. Munsif Alvi started working in civil team since yesterday night as night duty	Closed

**Environmental & Social Monitoring Report (July-September 2017)**

Sr. No.	Date	Issue	Plaintiff	Response		Status
				OE	EPCC	
		However, he could not get better in one day and continued rest for further 9 days without informing his supervisor. Due to this he was terminated from service. He accepts his negligence and requests to be re-hired				
23	19-Feb-16	Syed Shabbir Hussain Shah performing scaffolding work was terminated over the issue of half day leave. The affectee has allegedly	Syed Shabbir Hussain Shah (Scaffolder)	OE forwarded the matter to EPCC and requested EPCC to consider the matter in light of the stated grounds.	EPCC responded that the scaffolder was terminated over violation of code of conduct from time to time and was issued warning letters at various occasions therefore the termination was done in accordance with the company policy.	<b>Closed</b>



**Environmental & Social Monitoring Report (July-September 2017)**

Sr. No.	Date	Issue	Plaintiff	Response		Status
				OE	EPCC	
		worked for 27 days without leave.				
24	3-Mar-16	30 Laborers were terminated by Daewoo E&C two weeks from their appointment. Also they have not yet been paid for their work.	Terminated Laborers (30)	OE forwarded the matter to EPPC and asked her to clarify the issue as per their policy.	EPCC responded that the laborers were appointed just for a period of two weeks and they were informed about it at the time of contract. Moreover the salary issue was sorted and the laborers were paid their remunerations accordingly.	<b>Closed</b>
25	4-Mar-16	KD laborer Noman was terminated from the job.	Noman (Terminated Laborer)	OE forwarded the matter to EPPC and asked her to clarify the issue as per their policy.	EPCC responded that the subject laborer was issued three warning letters before termination over code of conduct violation. Afterwards he was terminated as per the company policy.	<b>Closed</b>
26	1-Apr-16	Two labors were terminated by Chinese company for dispute among Chinese supervisor and workers	Maqsood Butt and Nazeer Ahmad (Terminated Laborers) (GDYT)	OE forward the matter to EPCC and requested to solve the problem	EPCC has investigated the matter and offered labors to recommence the work. However, the labors by their own will have not resume the work.	<b>closed</b>

**Environmental & Social Monitoring Report (July-September 2017)**

Sr. No.	Date	Issue	Plaintiff	Response		Status
				OE	EPCC	
27	18-Apr-16	CNEC driver complaint on weir site OE's office regarding misbehavior of sungbo PM and use of abusive language during work hours	Sajad (CNEC Driver)	Complaint forwarded to EPCC with request to find out cause. Moreover, EPCC was requested to counsel both parties to avoid misconduct and improve behavior and working relation at site.	Corrective action has been taken by EPCC as per OE's recommendations	Closed
28	20-May-16	Electric fans/exhausts are not properly working and needs repair. Additional fans are also required in some areas of both camps.	KD & CNEEC labour jointly brought up the matter during a visit to the camp	OE forwarded the complaints received and its observations to EPCC for corrective action	On 24th June 2016 EPCC replied we are still working on it. On 24th July 2016 EPCC replied All required items are installed. Please see attachment 1	Closed

**Environmental & Social Monitoring Report (July-September 2017)**

Sr. No.	Date	Issue	Plaintiff	Response		Status
				OE	EPCC	
29		In some areas the lightning system is not working properly and additional lights are also required in both camps.		On 20th June 2016 OE send an email to EPCC requesting an Update on these issues.	On 24th June 2016 EPCC replied we are still working on it. On 24th July 2016 EPCC replied All required items are installed. Please see attachment 1	Closed
30		In wash rooms, water tabs are out of order and need to be replaced/repair.		On 20th July 2016 OE send an email to EPCC requesting an Update on these issues.	On 24th June 2016 EPCC replied we are still working on it. On 24th July 2016 EPCC replied All required items are installed. Please see attachment 1	Closed
31		There is no fence around Chinese labor camp and we suggest of installation of fence in order to ensure the security of workers. (According to the submitted			On 24th June 2016 EPCC replied we are still working on it. On 24th July 2016 EPCC replied Installed Please see attachment 2. Local labor camp of CNEEC/GDYT is adjacent to main camp police base. 3 CCTVs are installed nearby. We don't think security fence is essential	Closed

**Environmental & Social Monitoring Report (July-September 2017)**

Sr. No.	Date	Issue	Plaintiff	Response		Status
				OE	EPCC	
		drawing EPCC must install fence around the Chinese camp).				
32	14-Jun-16	Complaints are noted from Kyung Dong labor regarding salary and termination issue. it was informed that the salary of some staff was not given by admin department based on the reason of fake attendance. Moreover, the aforementioned staff was also terminated from Job. Labors are	Waheed, Sayed Arif Hussain Shah, Noman, Imran Fareed, Syed Ihsan Naqvi, Syed Imraz Naqvi, Syed Imtiyaz Hussain, Majid Kazmi.( KD Labors)	OE forwarded the complaint to EPCC and requested EPCC to sort out the matter and convey its findings to OE.	KD labors fake attendance turned out to be true. KD were trying to accuse them to Police, but labors admitted their faults and they decided to quit the job. (Kyung Dong is keeping the actual attendance record). All of them got salary as per their actual working days	Closed

**Environmental & Social Monitoring Report (July-September 2017)**

Sr. No.	Date	Issue	Plaintiff	Response		Status
				OE	EPCC	
		giving the justifications for not faking the attendance but admin dept. is threatening them to leave the site otherwise they would be handed over to police.				
33	23-Jun-16	A labour approached PES office regarding misbehavior of Mr. Choe (Welder foreman) and termination from job.	Hassan bin Abdul Aziz (KD Labor)	Complaint forwarded to EPCC with request to find out cause. Moreover, EPCC was requested to reinstate the labor and counsel both parties to avoid misconduct and improve behavior and working relation at site.	Corrective action has been taken by EPCC as per OE's recommendations	<b>Closed</b>

**Environmental & Social Monitoring Report (July-September 2017)**

Sr. No.	Date	Issue	Plaintiff	Response		Status
				OE	EPCC	
34	27-Jun-16	KD laborers started the strike on 26-Jun-2016 because of salary amount in Ramdhan. As conveyed by labors, it was agreed by KD management to pay 14 hrs. salary during Ramadhan but the actual payment is	As noted during routine site visit	OE is consciously monitoring the situation and asked EPCC's management to sort out the issue as soon as possible	The issue has been discussed with local administration (Deputy commissioner) in the presence of labor and KD representative. A mutual agreement is being made between labor and KD in the presence of local administration and the issue is resolved. Agreement b/w KD management and Labor is; 1 :Lump sum Rs.875 will be considered for the previous days of Ramadan on the written recommendations of Private Power Cell (PPC). 2: Lump sum Rs.875 will be paid for the remaining days of Ramadan with the condition of one hour additional work. 3: Company will pay 14 hours 28/06/2016 as per decided Labors rates for 9 hours. 4: No punitive action will be taken against the labors on the basis of strike.	

**Environmental & Social Monitoring Report (July-September 2017)**

Sr. No.	Date	Issue	Plaintiff	Response		Status
				OE	EPCC	
		made of 12 hrs. The work has been stopped by KD's labors and strike is still in progress. Negotiations are in progress with local administration for solving the dispute		On 20/07/2016 OE asked EPCC to furnish details regarding the implementation of the commitments made during the strike.	On 27/7/2016 EPCC replied that they received a letter regarding this issue from SHPL as well. On the issue of payment of full salary for the month of Ramadan it was agreed that this will be further discussed and there was no such commitment that EPCC Sub-con (Kyung Dong) will pay the labors full salary. The same response has been sent to SHPL via letter.	
				On 10/08/2016 OE asked EPCC to furnish details regarding the implementation of the commitments made during the strike.	On 13/08/2016 Kyung Dong replied that they would consider the salary issue for further discussion and finally they decided not to pay 1 hour bonus	

**Environmental & Social Monitoring Report (July-September 2017)**

Sr. No.	Date	Issue	Plaintiff	Response		Status
				OE	EPCC	
35	18-7-2016	Complaints are noted from Kyung Dong labor regarding salary and termination issue. it was informed that the salary of some staff was not given by admin department based on the reason of fake attendance. Moreover, the aforementioned staff was also terminated from Job. Labors are giving the justifications for not faking the attendance.	Kamran Qureshi, Zeeshan javed (KD Labor)	OE forwarded the complaint to EPCC and requested EPCC to sort out the matter and convey its findings to OE.	KD labors fake attendance turned out to be true. Labors admitted their faults and they decided to quit the job. (Kyung Dong is keeping the actual attendance record). All of them got salary as per their actual working days	Closed



**Environmental & Social Monitoring Report (July-September 2017)**

Sr. No.	Date	Issue	Plaintiff	Response		Status
				OE	EPCC	
36	25-7-2016	Qadeer Qureshi reported that while working on site in 2014 a chemical got spilt on his hands and arms and suffered burns. Sungbo E&C committed to pay for the treatment. He got treatment from a hospital and submitted the hospital bills to the company. Some of the bills were paid however others are pending due to which he is facing difficulties.	Qadeer Qureshi (Sungbo Labor)	OE forwarded the complaint to EPCC and requested EPCC to sort out the matter and convey its findings to OE.	<p>1. He was compensated for damages due to chemicals and agreed that he had no further demand in 2015</p> <p>2. In July 2016, he brought doctor fee bill with amount of Rs. 4,000. Normally simple doctor fee does not exceed Rs. 1,000 and Sungbo manager noticed the labor's re-writing on the bill. He changed number '1000' into 4000, and he sent him back</p> <p>3. Sungbo manager sent him back</p>	Closed

**Environmental & Social Monitoring Report (July-September 2017)**

Sr. No.	Date	Issue	Plaintiff	Response		Status
				OE	EPCC	
37	28-7-2016	GDYT HSE Officer complaint on weir site OE's office regarding misbehavior of Mr. Tan Jiancai Fit up Worker and use of abusive language during work hours	Johar HSE Officer GDYT	Complaint forwarded to EPCC with request to find out cause. Moreover, EPCC was requested to counsel Mr. Tan Jianai to avoid misconduct and improve behavior and working relation at site.	Corrective action has been taken by EPCC as per OE's recommendations	Closed
38	23-8-2016	Labors approach OE office with a complaint that extra Mess bills are deducted from their salary.	KD labors (Yasir Rasheed, Mohammad Khursheed, Abdul Hameed, Noman, Mohammad Mirza, Khursheed, Haji Ghulam)	OE forwarded the complaint to EPCC and requested EPCC to sort out the matter and convey its findings to OE.	On 24-8-2016 K.D Manager explained that cafeteria is not their own organization. KD just provided land and gasses free of charge. What KD does is to calculate food deduction based on their list. If workers have argument on the food deduction, they have to discuss with the cafeteria company If they cannot reach an agreement, it is suggested they go another road cafeteria for their meals.	Closed

**Environmental & Social Monitoring Report (July-September 2017)**

Sr. No.	Date	Issue	Plaintiff	Response		Status
				OE	EPCC	
				On 29-8-2016 If KD has nothing to do with that cafeteria except providing land and gas free of charge then why KD calculate and deduct food charges from worker's salaries. It is requested to you to ask KD to take this matter seriously and solve this issue as soon as possible because they are deducting the charges, so the responsibility of check and balance is also theirs.	On 30-8-2016 EPCC replied K.D manager has been giving pressure to cafeteria owner to clarify the issue but they did not solve the issue. K.D asked related workers not to use the cafeterias. K.D also complains that they don't listen to K.D instructions behaving unfriendly harshly.	
				On 31-8-2016 We suggest of having a joint meeting with all concerned parties for resolving the issues with mutual understanding instead of shifting the responsibilities.	On 30-9-2016 KD hold a meeting with Mess owner in which the issue was discussed and Mess owner agreed that if he deducted extra money he will return it back, KD admin confirm that all those labors who complained have get their money.	

Sr. No.	Date	Issue	Plaintiff	Response		Status
				OE	EPCC	
39	24-8-2016	A labor approach OE office with a complaint that he has been terminated from the job without any reason.	EPCC Labor (Adeel Manzoor)	Complaint forwarded to EPCC with request to find out cause. Moreover, EPCC was requested to reinstate the labor.	On 25-8-2016 He was fired by construction manager because he cannot be seen at site many times. Another violation was refusal to order.	<b>Closed</b>

**Environmental & Social Monitoring Report (July-September 2017)**

Sr. No.	Date	Issue	Plaintiff	Response		Status
				OE	EPCC	
40	24-8-2016		KD Labor ( Ishfaq Ahmed Awan)	Complaint forwarded to EPCC with request to find out cause. Moreover, EPCC was requested to reinstate the labor.	On 25-8-2016 1. According to K.D manager, he never provided 18-month employee agreement. It was 3-month appointment form. KD distributed appointment form to fill out personal details with period not written. He wrote 18 months on it with his own writing. It is considered as counterfeiting. 2. Now that the gantry crane operator job is done, KD sent him home (he is daily worker) 3. The operator filed a suit asking for compensation of Rs.250,000 4. K.D paid medical cost for his injury on July 17, 2016 5. Both parties are going to follow court decision.	Closed

Sr. No.	Date	Issue	Plaintiff	Response		Status
				OE	EPCC	
				On 29-8-2016 EPCC is requested to provide all relevant documents (contract, court proceeding, notices etc.) for justifying the facts provided by EPCC at earliest.	On 30-8-2016 EPCC replied Please see attachment 4, the appointment letter whose salary has been written by himself and lawyer notice (labor side). The lawyer gave notice that he would file a suit. According to Kyung Dong, no petition has been received yet. As you can see from the appointment letter, this is 3-month appointment letter form which is familiar to you. This is not permanent agreement form. Kyung Dong is not supposed to write 18 months instead of 3 months.	

***Environmental & Social Monitoring Report (July-September 2017)***

Sr. No.	Date	Issue	Plaintiff	Response		Status
				OE	EPCC	
				<p>On 31-8-2016 The statement stated by you is contrary with the attachment 04. The attached signed contract of 18 months is a legal document which should be followed and can be quoted everywhere. We would like to mention that the attached agreement is for 18 Months and according to labor law a regular contract should be made for such labors (working more than 90 days). As the job duration of 18 Months is clearly mentioned in the attached signed agreement therefore, your excuse for 3 Months contract/daily wages is not acceptable and the labor should be treated as regular employee. Furthermore, we have not received any complaint about the salary from the aforesaid labor therefore, we have no concern about the salary.</p>	<p>On 21-9-2016 At the beginning of Sep.2016, Rs 55,000 paid as compromise and case closed.</p>	

**Environmental & Social Monitoring Report (July-September 2017)**

Sr. No.	Date	Issue	Plaintiff	Response		Status
				OE	EPCC	
41	20-9-2016	Umar Ishan, surveyor claimed that he was fired due to lateness to Tool Box Meeting	Umar Ishan (Sungbo surveyor)	Complaint forwarded to EPCC with request to find out cause. Moreover, EPCC was requested to reinstate the labor.	1. He wasn't simply late to exercise, he came to work 8 am every day whereas duty starts 7 am 2. Over the last one month, manager, Mr. Kim and time keeper warned him many times not to be late but he has not changed. 3. Based on a few warnings, Sungbo eventually issued a termination letter.	Closed
42	27-9-2016	EPCC laborers went on strike on 27-Sep-2016 because of termination from job and nonpayment to one of the equipment supplier	As noted during routine site visit	OE is consciously monitoring the situation and asked EPCC's management to sort out the issue as soon as possible	EPCC has submitted a detailed report on the matter which is attached herewith.	Closed
43	3/10/2016	Mr. Gu Gye Seong misbehaved with a labor in the Surge shaft during the night shift. The complainant reported Physical violence against his supervisor.	Mr. Rafiullah Khan (KD Labor)	OE forwarded the issue to EPCC mentioning the previous incidents of the same nature and instructed EPCC to take strict action against the supervisor for resorting to physical violence.	EPCC investigated the matter and found the supervisor guilty of misconduct. EPCC issued a warning letter to the supervisor.	Closed



**Environmental & Social Monitoring Report (July-September 2017)**

Sr. No.	Date	Issue	Plaintiff	Response		Status
				OE	EPCC	
44	6/10/2016	Mr. Gu Gye Seong misbehaved with two labors in the Surge shaft during the night shift. The complainants reported Physical violence and verbal abuse against their supervisor.	Mr. Amir (KD Labor) Mr. Ali (KD Labor)	OE forwarded the issue to EPCC mentioning the previous incident couple of days back involving the same supervisor and asked EPCC to remove the supervisor from the site	EPCC acted in accordance with the OE's recommendations and removed Mr. Seong from site.	Closed
45	18/11/2016	Mr. Nadir Ali Hashmi approached OE office with a complaint that SUNGBO C&E construction	Nadir Ali Hashmi (EPCC crane rigger at weir site)	OE forwarded the issue to EPCC mentioning the previous incidents of the same nature and instructed EPCC to take strict action against Mr. Son for resorting to physical violence.	On 22/11/2016, Mr. Son, Sungbo manager says the one who misbehaved is Nadir Ali Hashmi. And he only grabbed his shirt on his chest, there was no assault.	closed

**Environmental & Social Monitoring Report (July-September 2017)**

Sr. No.	Date	Issue	Plaintiff	Response		Status
				OE	EPCC	
		manager Mr.Sohn kwan woo misbehaved with him. The complainant reported Physical violence and verbal abuse against Mr. Son kwan woo.		On 22/11/2016, OE's investigation reveals that the misbehavior is from Mr. Son. The labor belongs to Daewoo E&C while Mr. Son is from Sungbo C&E. Therefore, he has no authority over the complainant in any capacity. Moreover, OE's investigation found that Mr. Son has general behavioral issues which need to be addressed. OE suggest that EPCC must reprimand Mr. Son. The self-respect and dignity of every worker on site is to be maintained and ensured.	EPCC replied that they Mr.Son said sorry to Mr. Nadir Ali Shah and ensured that he will not act like this in future.	

**Environmental & Social Monitoring Report (July-September 2017)**

Sr. No.	Date	Issue	Plaintiff	Response		Status
				OE	EPCC	
46	1/12/2016	Mr.shafique approached OE office with a complaint that during work he slipped from stairs and got injuries in back bone and leg, the company administration take him to hospital for treatment and the doctor said that you have to visit hospital till you are completely fit, but the company administration take me 3 or 4 times and then they said to me that now you are perfectly all right no need for further visits to the hospital, but I have not recovered fully and still have problems, so it is the responsibility of company to	Shafique(Carpenter) Sungbo C&E	OE forwarded the issue to EPCC and instructed them to sort out the issue with their sub-contractor and complainant. OE suggest a joint meeting of all parties to sort out this issue	EPCC replied that after investigation we found that our sub-contractor had completed all their responsibilities, they have paid full attention to his medical treatment and take him to the best hospital and doctor, after the doctor statement that he is completely recovered and no further treatment is required we stop taking him to hospital, all the relevant documents are attached. But the complainant is not satisfied. EPCC replied that we have arranged meeting 3,4 times as OE knows but the complainant is not coming to the meeting,	As the complainant is not coming to attend the meeting, it seems that his complaint is wrong so the case is Closed

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Sr. No.	Date	Issue	Plaintiff	Response		Status
				OE	EPCC	
47	7/12/2016	EPCC worker approach OE office with a complaint that his leg got broken while working on the project initially he was treated and the treatment cost was borne by EPCC however he was terminated from the job at a later stage before the completion of his treatment. The man return to the OE with a request to advise EPCC to complete his treatment.	Qazi Abdul Latif EPCC Worker	OE noted down his complaint and forwarded to EPCC and ask them to accommodate the worker.	EPCC agreed for his further treatment and made the compensation.	Closed

**Community Complaint Register**

Sr.#	Date	Issue	Plaintiff	Response		Status
				OE	EPCC	
1.	26-Sep-15	A complaint has been reported from local community of Thuri villagers regarding domestic waste removal.	Residents of Thuri Village	This concern was forwarded to EPCC with the recommendation to collect wastes and make proper disposal arrangements	EPCC carried out the collection of waste material from the marked area and has installed waste bins at regular intervals for waste collection	<b>Closed</b>
2.	2-Oct-15	A complaint has been noted about the access road maintenance, cleaning & water sprinkling for dust control.	Residents of Thuri Village	OE recommended EPCC to carry out the proper maintenance of the access road and make arrangements for water sprinkling in order to control dust which may cause serious health hazards	EPCC constructed the access road to the project site and is now maintaining the road through proper water sprinkling on weekly basis	<b>Closed</b>
3.	8-Nov-15	During Site visit at Weir Site, community from Patrind village complained against EPCC to install fence at the border of village.	Residents of Patrind Village	This issue were conveyed to EPCC and recommended that EPCC must install the fence on priority basis.	EPCC has installed the required fence to facilitate the local community as per their requirement	<b>Closed</b>
4.	10-Nov-15	Community complaint has been noted regarding the cleaning of community access road during rainy days. The community went on strike during day shift.	Residents of Sarati Village	OE followed up the issue and conveyed the problem to EPCC and recommended that the community be facilitated	EPCC responded that it carries out the cleaning and maintenance work for the said road however sometimes due to high work load and frequent use of the road maintenance is ignored and after the work is completed it carries out the cleaning work. But from now on EPCC will carry out the cleaning work on regular basis without any delay.	<b>Closed</b>

**Environmental & Social Monitoring Report (July-September 2017)**

Sr.#	Date	Issue	Plaintiff	Response		Status
				OE	EPCC	
5.	22-Dec-15	House Compensation and Disturbance Allowance	Residents of Sarati Village	The complaint was received during an OE, EPCC joint visit. The problem was discussed on site and OE recommended that EPCC should compensate the affectees	Please understand that we are not in the position to comment on these matters. This matter is entirely being handled by SHPL.	The allowance has been paid.
6.	22-Dec-15	1) Road and Drainage System Repair, Community stated Road and drainage system is not in good condition due to the heavy machinery, so need to maintain the road as well as drainage.	Residents of Sarati Village	OE visited the Sarati village jointly with EPCC representatives and addressed the issue. OE made the following recommendations: 1. Periodic cleaning and maintenance of the road shall be ensured. 2. Side drains shall be maintained accordingly.	Daewoo E&C are aware that the road has to be maintained, and administration team conducted survey in December 27 & 28, 2015 and made maintenance plan. Target date for completion is the end of March, 2016. But the schedule is subject to change because we can pour the concrete when main work is not busy. We will do our best to preserve and maintain the road in project area according to the same agreement, article 21 (see attachment A). One of our basic principle for this work is that we can pour the concrete only when batching plant is free. Secondly, we will repair damaged area, not whole road and we will improve drainage system	<b>Closed</b>
7.	22-Dec-15	1) Water Source Cleaning in Village Deedal, Community complained water way near water source in stream should be cleaned and maintained.	Residents of Sarati Village	The complaint was received during an OE, EPCC joint visit. The problem was discussed on site and OE recommended that EPCC should maintain the water source immediately as it is the most basic and human demand from the community and any health hazard generating will be EPCC's responsibility.	A few months ago, we tried this maintenance, but village people stopped our activity saying that the land is their property. However, we will try to finish this work by the end of January, 2016 unless there is no disturbance from local community.	<b>Closed</b>

**Environmental & Social Monitoring Report (July-September 2017)**

Sr.#	Date	Issue	Plaintiff	Response		Status
				OE	EPCC	
8.	22-Dec-15	Local Contract, Community stated that it is their right to have local contract such as building protection wall at river side near coffer dam	Residents of Sarati Village	The complaint was received during an OE, EPCC joint visit. The problem was discussed on site and OE recommended that EPCC should compensate the local community on priority basis	This statement is not true, they have right to participate in the open bidding, but they should satisfy Daewoo E&C's requirements in order to get selected as a contractor. Until now, Sarati community performed a couple of contracts. Mr. Aurangzeb who was in the meeting, performed the water pipe connection work for his village.	<b>Closed</b>
9.	22-Dec-15	House Crack Issue and FIR, Abdur Rahman stated his house was cracked and demolished due to blasting in tunnel and wrote to A/C Abbottabad. Community asked to cancel FIR made against Abdul Rahman and other people.	Residents of Sarati Village	The complaint was received during an OE, EPCC joint visit. The problem was discussed on site and OE recommended that EPCC should carry out a survey and establish whether the damage to the property is due to blasting or some other reasons and if blasting is the cause then EPCC must pay the compensation accordingly.	We already proved that house cracks have nothing to do with blasting. Abdur Rahman house was surveyed many times and we submitted survey reports to AC office Abbottabad 3 times. Those were also submitted to social expert of OE in the meeting of December 14(2015) (See attachment B, crack and damage report). We think they deserve this FIR because of their behavior. There was an incident in November 2015 when Abdul Rahman and other people blocked the project road. Village people threatened and almost hit a Korean site manager asking compensation for damaged houses. As a foreigner, he was terrified and felt jeopardized. Local police saw it and launched FIR against them and the relevant people are still in investigation. FIR and letter attached (see attachment C).	<b>Closed</b>

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Sr.#	Date	Issue	Plaintiff	Response		Status
				OE	EPCC	
10.	22-Dec-15	Employment and Hiring of Heavy Machinery. Community people complained that employment is not satisfactory.	Residents of Sarati Village	The complaint was received during an OE, EPCC joint visit. The problem was discussed on site and OE recommended that local community be preferred for employment	We would like to say hired resources from Sarati(Hoondi) and deedal village is overwhelming considering its small population. - Sungbo is renting Imran family house as office. Daewoo E&C is renting 2 office building from Saleem family. And OE is also renting one. - Sungbo is renting 1 excavator, 4 dumpers, 1 crane and 2 light vehicles (see attachment D, equipment list). - Daewoo E&C is also renting 9 mixer trucks (Aurangzeb, Arsalan), 1-wheel loader(Aurangzeb) and 1 pick-up(Eshan) - Mr. Arsalan is an aggregate supplier. We would like to make sure that we can hire manpower and heavy equipment only when we have vacancies. In the event that heavy equipment provided is poor conditioned or not functional well, we may return them and in case that manpower does not fulfill our expectations, we may not continue employment.	<b>Closed</b>



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Sr.#	Date	Issue	Plaintiff	Response		Status
				OE	EPCC	
11.	22-Dec-15	AJK Electricity Demand. Community stated that Mushtaq and Ahsan Gillani (electrical engineer) promised them to give electricity connections when Daewoo E&C installed AJK overhead transmission lines in 2012.	Residents of Sarati Village	The complaint was received during an OE, EPCC joint visit. The problem was discussed on site and OE asked EPCC to clarify its position in this regard.	It is assumed that community misunderstood what Mr. Ahsan Gillani's meant. What he told in 2012 is that if they can get NOC from WAPDA, Daewoo E&C will not stop them to use our line. In this case, transformer, line installation and electricity bill is all theirs. (Please see attachment E, written statement)	<b>Closed</b>
12.	22-Dec-15	Mir family in Sarati village accused that due to construction of new batching plant, their houses are cracked.	Mir Family	The complaint was received during an OE, EPCC joint visit. The problem was discussed on site and OE asked EPCC to clarify its position on the claim. And if the claim is correct then EPCC must compensate.	Our internal survey does not show that houses are affected and damaged when we build batching plant, but we can repair it for humanity reason on condition that Mir family cancel or change their accusation.  EPCC and Mir Family entered in to a mutual agreement where Mir Family agreed to withdraw the law suit and EPCC agreed to repair the damaged property	<b>Closed</b>
13.	22-Dec-15	Mir family stated that EPCC is using extra 5 Kanal in disposal area without rent.	Mir Family	The complaint was received during an OE, EPCC joint visit. The problem was discussed on site and OE asked EPCC to clarify its position on the claim. And if the claim is correct then EPCC shall either evacuate the extra land and pay damages or retain the land and pay rent	Our own survey result show that we are using only 2 and half Kanal additionally, from here began argument. Both of us will finalize the size of land and of course we will pay rent according to mutual understanding. We will try it until February of 2016.	<b>Closed</b>

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Sr.#	Date	Issue	Plaintiff	Response		Status
				OE	EPCC	
					EPCC and Mir Family entered in to a mutual agreement where EPCC agreed to pay rent for the additional land used by EPCC as per the rate after the correct measurement from Revenue department is received. The rent will be paid from 2014 to 2016.	
14.	22-Dec-15	Mir asked about the progress for land acquisition in disposal area(submerge land)	Mir Family	The complaint was received during an OE, EPCC joint visit. The problem was discussed on site and EPCC was asked to discuss the issue with SHPL as well	We provided all survey results to SHPL about how many Kanal would be submerged when water reaches full level. The rest is SHPL's work scope. We are not in the position to comment on this issue.	Land acquisition is under process and will be finalized soon.
15.	1-Jan-16	Compensation for Land/Property Damaged due to sliding during Blasting for the construction of Tunnel	Residents of Gilari Village	Received Application was forwarded to EPCC for action	EPCC responded with a survey and investigation report for the said slide conducted jointly with the Government officials in which it technically justified that the slid was not caused by blasting activity but was due to natural cause.	<b>Closed</b>
16.	19-Jan-16	Deedal Meera Community complained to extend the disposal area fence both in horizontal and vertical direction to maintain their privacy	Residents of Deedal Meera Village	Received Application was forwarded to EPCC for action	EPCC accepted the community demand and extended the fence as per Community requirements	<b>Closed</b>

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Sr.#	Date	Issue	Plaintiff	Response		Status
				OE	EPCC	
17.	2-Feb-2016	Community demanded for bridge or cable trolley between Tarchilla and Sarati village so that they can cross river	Residents of Tarchilla Village	In a joint OE, EPCC visit to the village the demand was received and OE & EPCC deliberated on the issue. OE asked EPCC to deal with the demand in light of the Social Uplift Plan	EPCC is not obligated to provide bridge or cable trolley	<b>Closed</b>
18.	2-Feb-2016	Community demanded for water supply scheme for the reason that 2 out of 3 water sources will be submerged due to increase in water level in the weir water reservoir	Residents of Tarchilla Village	OE recommended EPCC to survey and validate the claims. If the claim is validated, then it is EPCC's responsibility to provide for the affectees water source. OE asked EPCC to take up the matter on priority basis.	EPCC is in the process of survey to find out another water source. We will give you updates later. (Target date: Before completion of project)	<b>Closed</b>
				On 10August 2016 OE asked EPCC for update on this issue.	On 13 August 2016 EPCC replied 1. Community meeting in Feb 2,2016, we told we would try to find a source as humanity 2. We conducted a couple of surveys later on, and found one, however this source is very far and requires high maintenance to village people. 3. And we also considered bore hole in their village but, it cost a lot and nobody is sure of the existence of water under the ground. Therefore we announce that we would not proceed with this task.	

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Sr.#	Date	Issue	Plaintiff	Response		Status
				OE	EPCC	
				<p>On 29 August 2016 You have mentioned that EPCC would not proceed with this task. OE is not agree with your statement. As per survey report, the natural water source would be submerged after impounding of the reservoir therefore; alternate water source would be required for the villagers. As this loss of natural water source is due to PHPP therefore, we strongly recommend providing of alternate source for drinking water to the villagers. Please be aware that the issue is not only limited to land compensation. Land compensation was paid to the concerned person only however, the issue of water source is related to the whole community therefore, land compensation should not be linked with this drinking water source. Furthermore, it should be noted that this issue was also raised by Lenders during their visit in November 2015.</p>	<p><i>On 26th October 2016 EPCC responded by stating that EPCC has achieved an agreement with the community. As per the agreement EPCC will pay a lump sum amount of 3 lakh (Three hundred thousand rupees) to the community for the construction of Water supply scheme. (Agreement is attached with the report.</i></p>	

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Sr.#	Date	Issue	Plaintiff	Response		Status
				OE	EPCC	
19.	2-Feb-2016	Mr. Noor Zaman Qureshi complained that his house cracks were created due to blasting in the tunnel and demanded compensation.	Mr. Noor Zaman Resident of Tarchilla Village	The complaint was received during an OE, EPCC joint visit. The problem was discussed on site and OE asked EPCC to clarify its position on the claim. And if the claim is correct then EPCC must compensate	EPCC has submitted a survey report to A/C office in Muzaffarabad showing that houses are not affected by tunnel blasting because the blasting has been controlled. Survey report has been attached.	<b>Closed</b>
20.	2-Feb-2016	Community demanded retaining wall from coffer dam to disposal area along the river line for the protection of village slope.	Residents of Tarchilla Village	OE asked EPCC to check the stability of the slope through its construction team and if deemed necessary than retaining wall shall be considered. OE will also mobilize its construction team to evaluate the requirement of the retaining wall.	The reason river line has been compensated in that submerged area is considered. There is no more responsibility left.	<b>Closed</b>
21.	7-Mar-2016	The residents of village Shoran complained that the wall constructed for slope protection is inadequate and quality of construction was also compromised. Moreover the length of the wall is short which endangers the adjoining houses, lands and graveyards.	Residents of Shoran Village	OE asked EPCC to check the quality concerns over the subject wall through its construction team. OE also requested EPCC to ensure the safety of lands, houses and graveyard by extending the wall	Through a geological site survey, we even extend work area 40 meters longer to prevent surface erosion. Therefore you can say that there will be no damage in slope.	<b>Closed</b>

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Sr.#	Date	Issue	Plaintiff	Response		Status
				OE	EPCC	
22.	7-Mar-2016	A resident of village Shoran complained that that he owned a land and had a water floor mill constructed on it. EPCC acquired the land but did not pay compensation for the water floor mill. Moreover, compensation for 1 Marla land has also not been paid.	Resident of Shoran Village	OE has asked EPCC to submit a report on the subject matter	The villagers should communicate with Star Hydro.	The issue is relevant to SHPL, It has been forwarded to SHPL.
23.	7-Mar-2016	Muhammad Israfeel of Shoran village complained that 1 Kanal land was acquired from him for the project. Only half of the payment was made to House Building Finance Cooperation as the land was pledged by HBFC. However the remaining half has not yet been paid.	Muhammad Israfeel	OE has asked EPCC to submit a report on the subject matter	The villagers should communicate with Star Hydro.	The issue is relevant to SHPL, It has been forwarded to SHPL.
24.	7-Mar-2016	Residents of Shoran village requested that they should be permitted to use the river material from the land they sold to the project.	Residents of Shoran Village	OE asked EPCC to take up the request and deal with it as per the policy.	River and river material is government property.	<b>Closed</b>

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Sr.#	Date	Issue	Plaintiff	Response		Status
				OE	EPCC	
25.	7-Mar-2016	Residents of Shoran village requested that EPCC should construct a fence separating the reservoir and adjacent lands to ensure the safety of children and residents	Residents of Shoran Village	OE asked EPCC to take up the request and do necessary arrangements to ensure the safety of the residents	This is not work area. We have no obligation for fence	<b>Closed</b>
26.	7-Mar-2016	Residents of Shoran village requested that EPCC to provide water supply scheme for the community.	Residents of Shoran Village	OE asked EPCC to help the community and facilitate them in this matter as this is a humanitarian request	We have no obligations for this.	<b>Closed</b>
27.	25-Mar-2016	Faheem Ahmed Awan from Thuri complained that his privacy is suffering from the project activities and EPCC should ensure complete privacy for his house and family	Faheem Ahmed Awan	OE asked EPCC to install a sheet to maintain the privacy of the residents	EPCC provided sufficient sheet to the complainer to install in his land and maintain his privacy	<b>Closed</b>
28.	27-Mar-2016	Local community on weir site organized a peaceful strike demanding EPCC to construct a protection wall along the reservoir to protect their lands	Local community weir site	OE coordinated with community coordinator and EPCC to call of the protest in a peaceful and asked EPCC to negotiate with the local community over the issue	EPCC assured the local community that it will take up the matter with the owners of the project and discuss the possible arrangements to ensure the protection of the area of local community at hazard. EPCC forwarded the issue to SHPL. SHPL asked EPCC to conduct a detailed survey and submit the report to SHPL and DC Abbottabad. EPCC prepared the survey & the report and its recommendation was that there is	<b>Closed</b>

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Sr.#	Date	Issue	Plaintiff	Response		Status
				OE	EPCC	
					no need for the retaining wall and all requisite walls for community land protection had already been constructed. The report was forwarded to the designated offices. No response has yet been received.	
29.	3-Apr-2016	Local community of thuri complaint about open sewerage pits requesting for proper cover and barricading in order to avoid any accident	Local community of Thuri village	OE conveyed the concerns to EPCC and request to solve the issue accordingly	EPCC has solved the issue as per request of community	<b>Closed</b>
30.	<b>2-May-2016</b>	A retaining wall in between Korean Mess and my house is needed as there were symbols of cracks, because of excavation during the construction of camp building by the contractor, and this may cause heavy loss to my house if happen heavy rain. For this I had already informed the	Ali-Ur-Rahman Weir Site Korean Camp Owner	OE asked EPCC to check the stability of the slope through its construction team and if deemed necessary than retaining wall shall be considered.	We could not find any clues or signs of collapse and sliding in this slope area. We answered the same way before. However, he is still showing the same concerns without any supporting data. Cracks were caused by differential settlement. But it does not mean necessity of a retaining wall. Moreover, it is his own issue.	<b>Closed</b>



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Sr.#	Date	Issue	Plaintiff	Response		Status
				OE	EPCC	
		contractor but they ignored and the facts happened accordingly and heavy cracks appeared in these heavy rains of March, not only a slid in the land but heavy cracks in my house.		OE asked EPCC to furnish the survey report from its technical team.	The material claimed to be sliding behind Korean mess and other areas is actually the cut material that was left there during construction of camp and was not disposed of. It carries no hazards of sliding or collapse. The only danger to the slope in that area is the water coming down from the owner's house, during rain etc. We demand the owner to make proper drainage for the water to eliminate this hazard. Cracks in the owner's house are due to poor construction of the house rather than due to construction of the camp buildings. The soil beneath the owner's house was insufficiently compacted resulting in cracks appearing now due to settlement of soil. this is a normal issue in most constructed houses not adhering to standards of good construction practices.	
31.	2-May-2016	Supporting wall behind the mosque is very essential to be complete/Extended to protect the building of residential block	Ali-Ur-Rahman Weir Site Korean Camp Owner	Received Application was forwarded to EPCC for action	We do not think it is risky area. The retaining wall that has already been installed is what Daewoo has done in 2015	Closed
				OE does not agree with EPCC's stance and asked EPCC to extend the wall.	We will complete extension, but we are not obliged to make the wall higher. And we don't see any safety hazards here. He is asking this for future benefits because he is the one who will take over Daewoo camp building.	
32.	2-May-2016	No Proper system to control the overflow of camp water tank.	Ali-Ur-Rahman Weir Site Korean Camp Owner	Received Application was forwarded to EPCC for action	It is not true we have a switch system that can stop and resume water flow	Closed

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Sr.#	Date	Issue	Plaintiff	Response		Status
				OE	EPCC	
33.	<b>2-May-2016</b>	The sewerage line hanged with the wall laid totally open along with the road side, which must be covered by concreting around the pipe.	Ali-Ur-Rahman Weir Site Korean Camp Owner	Received Application was forwarded to EPCC for action	We have been working on this work.	<b>Closed</b>
34.	<b>2-May-2016</b>	No proper maintenance of camp building is being carried out, which will damage the life of building.	Ali-Ur-Rahman Weir Site Korean Camp Owner	Received Application was forwarded to EPCC for action	Maintenance of camp building is our own concern, not his business. However cleaning affects our neighbor environment, so we will focus only on this issue.	<b>Closed</b>
35.	<b>2-May-2016</b>	Unnecessary plants are not being removed which will cause dangerous, in security point of view for the camp.	Ali-Ur-Rahman Weir Site Korean Camp Owner	Received Application was forwarded to EPCC for action	We will remove unnecessary plants step by step.	<b>Closed</b>
					We have cut all the unnecessary plants. Please see photos attached in the updated survey report.	
36.	<b>31-Jul-2016</b>	The community of Aldha village complained that SHPL had committed to pay an additional 10% of the cost of property in terms of displacement allowance. However this payment has not yet been made.	Aldha Village community	The issue is relevant to SHPL, It has been forwarded to SHPL.		

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Sr.#	Date	Issue	Plaintiff	Response		Status
				OE	EPCC	
37.	<b>31-Jul-2016</b>	The community of Aldha village requested that when SHPL will take over the project then during O&M period SHPL should hire workers from local community who are directly affected by the project.	Aldha Village community	The issue is relevant to SHPL, It has been forwarded to SHPL.		
38.	<b>31-Jul-2016</b>	The community of Aldha village complained that 15 Kanal land (Shamilaat) was acquired by SHPL however during the course of time Daewoo has encroached up to 45 Kanal. The local community demanded compensation for this additional land that was encroached.	Aldha Village community	The issue is relevant to SHPL, It has been forwarded to SHPL.		
39.	<b>31-Jul-2016</b>	The community of Aldha village complained that EPCC has only hired labors from local	Aldha Village community	OE forwarded the complaint to EPCC.	We always had given chances by putting advertisement whenever we hire skilled workers. Final selection depends on their carrier and capacity especially for skilled workers.	<b>Closed</b>

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				OE	EPCC	
		community and no educated or qualified people were hired from local community. Even no internship opportunities were provided to qualified persons from local community		<p>On 15-8-2016 OE ask EPCC that during the meeting, local community raised an issue that EPCC didn't provide any opportunity for the internship purpose. The submitted minutes is missing information about the said issue. Please provide details and status of this issue.</p>	<p>On 18-8-2016 EPCC replied that we do not instigate internship program and we have no intention to do so in the future. we did not consider that any comment on this issue is necessary because during the course of the meeting our Social officer had already replied that no internship was envisaged either now or in the future</p>	
				<p>On 23-8-2016 We would like to clarify that our sole intension was to incorporate/report all discussions to the meeting in the minutes. Furthermore, we haven't asked EPCC to provide any internship opportunity to local community but only highlighted that the aforesaid issue is not reported in the minutes of meeting. Unfortunately, your understanding in this regard so illogical and disappointing.</p>	<p>On 24-8-2016 EPCC replied that we don't have official internship program or procedures, however we used to run it as per request of village people. When applicants submitted applications, we evaluated their qualifications and hired sometimes. We don't advertise internship program.</p> <p>We guess Alda villagers have not submitted applications or their candidates are not selected. Currently this program is not in operation.</p>	

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Sr.#	Date	Issue	Plaintiff	Response		Status
				OE	EPCC	
40.	<b>31-Jul-2016</b>	The community of Aldha village complained that they have been informed that the project stakeholders (SHPL & EPCC) have decided not to construct the road from the backside of powerhouse up to the Aldha village (A provision in the Social Uplift Plan) and this route will be closed for local community. The community will not accept any such action and demands the construction of the road.	Aldha Village community	OE forwarded the complaint to EPCC	The access to Alda village will remain.	<b>Closed</b>
41.	<b>31-Jul-2016</b>	The community of Aldha village complained that EPCC had agreed to provide water supply to	Aldha Village community	OE forwarded the complaint to EPCC.	We both agreed that our 600,000 rupees' donation includes water tank and pipeline in lump sum. it's written in agreement and we paid 600,000 Rupees.	<b>Closed</b>

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Sr.#	Date	Issue	Plaintiff	Response		Status
				OE	EPCC	
		every house in the village. EPCC has made the payment for the water tank however no efforts have been made for the supply lines. This is an important issue and local community should be facilitated.		On 15-8-2016, In the submitted minutes of meeting, EPCC mentioned about an agreement made b/w EPCC and community for the construction of water tank. Copy of the said agreement is missing in the subject submittal. Please provide copy of the said agreement in order to know agreed terms and conditions.	On 18-8-2016 that this agreement is not included due to the fact that this is an internal agreement b/w EPCC and the local people and as such we do not consider that we are required to attach it with our minutes of meeting. It is suggested, therefore that in the event there is any confusion that you visit to our office to peruse the same at any time that is convenient.	
				On 23-8-2016 OE ask EPCC to please clarify your statement "this is an internal agreement b/w Daewoo and local people". We would like to clarify that all such agreements which are part of community welfare, should be shared with all concerned parties without keeping concealed. There is no such excuse of making things internal which are directly related to community welfare.	On 24-8-2016 EPCC replied WE herewith enclosed the related agreement on water tank support	

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Sr.#	Date	Issue	Plaintiff	Response		Status
				OE	EPCC	
42.	31-Jul-2016	The community of Aldha village questioned the appointment of community coordinator and asked that EPCC shall describe the qualification and criteria for the appointments on such positions.	Aldha Village community	OE forwarded the complaint to EPCC	This is not the matter that villages is concerned.	Closed
43.	11-Aug-2016	Deedal village community near disposal area blocked entrance of disposal area demanding relocation of dumped material which was dumped in their land not acquired by EPCC and no more higher dumping because it is disturbing their privacy.	Deedal village community (Weir Site)	OE ask EPCC to conduct a survey and if the community complaint and demand is valid then EPCC should remove the dumped material from the community land and also lower down the highest of disposal area.	On 13 August 2016 EPCC replied 1. Through survey, we noticed that we are using some of their land as dumping place in addition to our own land 2. Sungbo C & E promised to shift those dumping material in village land into another place. 3. Sungbo C & E also agreed not to make the land higher with dumping material. Sungbo is already using another place to dump near the river. 4. Village people convinced and returned.	Closed
				On 19-8-2016 OE ask EPCC for update on the said issue.	On 25-8-2016 After 2nd survey on 24th of August, 2016 we found that we don't use additional land and villagers are aware of this.	

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				OE	EPCC	
				<p>On 29-8-2016 Please provide the survey report and drawing which EPCC have conducted at the start of the project and also of the recent surveys you have conducted in August 2016. Designated area for the dumping materials and their protection arrangements should be clearly marked on the drawings.</p> <p>On 31-8-2016 OE suggest of providing a comparison of original disposal area plan and the present status of disposed material by carrying out a detail survey. Any variation from the original plan should be mentioned clearly. Moreover, the attached agreement is only signed by EPCC's surveyor. Any agreement with community should be duly signed or in case of verbal discussions, minutes of meeting should be shared.</p>	<p><i>On 30-8-2016 EPCC replied Please see attachment 3- survey report and current drawing. Their first requirement was not to file up over elevation 765. After discussion with villagers, we mutually agreed to file dumping material up to elevation 770 meters but not higher than that. Materials filed up over 770 have been removed. Now dumping materials are being filed up near river side. And we are not violating horizontal line.</i></p> <p>On 21-9-2016 Regarding riverside area that we are dumping, we are going to do stone-pitching as per the drawing that we have already submitted to OE.</p>	Closed
44.	18-Oct-2016	The residents of Alda Village approached the office of the Deputy Commissioner Muzaffarabad with the plea to instruct EPCC to deposited the excavated material in their land to	Aldha Village community	OE team attended the meeting in the office of the DC along with EPCC representatives. OE conveyed to the DC office that deposition of material along the river bank is an environmental issue and will attract the attention of EPA. OE proposed a joint survey with EPCC and community representatives to decide the	EPCC marked the boundary and agreed to start material deposition in the selected areas. EPCC is currently working on the design of the protection wall and the work will soon commence.	



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				OE	EPCC	
		level it and also construct a protection wall to prevent the deposited material from washing away. The DC office issued summons to OE and EPCC for a meeting on 19th October, 2016.		locations where material should be deposited. OE, EPCC & Community representatives carried out the joint survey in the afternoon on the same day. Areas suitable for dumping of the material were marked and OE asked EPCC to dump the material within the agreed boundary and construct the protection wall		
				In a follow-up visit on 20th October OE noted that no dumping of excavated material had started. OE approached the EPCC and asked them about the reason for not starting the work.	EPCC responded that there is an internal dispute among the community members which is causing the delay in the commencement of work.	
				OE suggested to conduct a meeting with the community members	EPCC responded that they are in touch with the community and had already requested a meeting but the community members have their commitments due to which they are currently unavailable for the meeting. As soon as EPCC gets a response from the community the meeting will be conducted in the presence of OE representative to resolve the matter.	
				On 22/11/2016 OE ask EPCC to update us on this issue.	On 22/11/2016 We tried to start civil work to construct protection structure, however it was disturbed intentionally by villagers. They claimed land acquisition for the outer land of retaining wall planed.	

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Sr.#	Date	Issue	Plaintiff	Response		Status
				OE	EPCC	
				OE suggests a joint meeting to resolve the issue.	Through meeting, some of land owner agreed excavation of 140 meters long retaining wall under the condition that EPCC give some contact whereas other land owner have not agreed excavation of the rest 170 meters long. Instead they demanded land acquisition of the land. After that a couple of meetings were arranged in the month of January by EPCC with the un agreed land owners, Daewoo E&C replied that land owner cannot claim for ownership of this river land to Daewoo E&C because it became part of river even though it used to be their land long time ago. A/C Muzaffarabad could not conclude as well because this dispute can be resolved only at the Court.	
				In February 2017, OE ask EPCC to arrange a meeting with the un agreed land owners to resolve the issue	In 3rd week of February, eventually land owner accepted building 170 meters retaining wall on condition that they get some contract related to this wall.	
				OE ask for the agreement copy and the copy of the contract for the construction of protection wall	EPCC replied, copy of the agreement and contract b/w EPCC and Alda village community.	

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Sr.#	Date	Issue	Plaintiff	Response		Status
				OE	EPCC	
45.	26-Oct-2016	A few residents of Sarati village approached the OE during a site visit with the complaint that they have not yet received the displacement compensation worth 5lakh (Five Hundred Thousand rupees) from SHPL.	Mr. Danish Mahmood Mr. Ali Khan Mr. Sajjad Residents of Sarati Village	The issue has been forwarded to the Client (SHPL) for perusal.	-	
46.	15/11/2016	Mr.Qadeer Qureshi complained that his house cracks were created due to blasting at weir site near Patrind village dated 18/9/2016 and demanded compensation.	Qadeerr Qureshi (Patrind village)	OE forwards the issue to EPCC and asks for repair works.	We've told him that we are ready to repair house cracks but Mr. Qadeer Qureshi is still insisting on cash settlement. Our responsibility is to repair house cracks, not cash payment. Therefore, this issue is being pended by Mr. Qadeer Qureshi, not us. We will submit our application to D/C office.	Closed
				OE suggest to provide repair material (Cement etc.) And also the labor payment to Mr Qadeer Qureshi to resolve the issue affably.	EPCC and Mr Qadeer Qureshi both agreed on OE suggestion. EPCC conducted house survey to calculate that how much repair material will be needed and in how much day's repair work will be done. EPCC provide all the related repair material accordingly and payed one-week payment of labor as the work will be complete in one week.	
47.	10/12/2016	They asked compensation for the affected area due to	Shoran affected village community.	OE forwarded this issue to EPCC and demanding the current scenario related about this issue.	1) EPCC conducted pre-survey on November 21, 2016. We are waiting for revenue office's confirmation on survey findings.	Closed

Sr.#	Date	Issue	Plaintiff	Response		Status
				OE	EPCC	
		collapse of protection structure			2) Revenue office confirmed size of land to be acquired at the beginning of December, 2016. However, we are still waiting for their official letter including survey findings. Then we can submit official application for land acquisition.	
					Revenue office issued section 5 of land acquisition act 1894 Pakistan. In this section, Land owners can make objection on land acquisition, however they (Shoran village community) don't raise any objection. We can say procedures are coming to its final stage now	
				OE ask for updates on this issue.		
				OE ask for updates on this issue.	EPCC replied that the amount of 2837560 PKR for the required land which is 4 Kanal 13 Marla 1 Sarsai has been deposited in the govt. treasury, now govt will pay to the land owner.	

**Environmental & Social Monitoring Report (July-September 2017)**

Sr.#	Date	Issue	Plaintiff	Response		Status
				OE	EPCC	
48.	17/03/2017	A complaint received from Tarcheela village community regarding the tubular well construction payment. According to the agreement, EPCC will pay them three hundred thousand PKR in installments for the construction of tubular well after Tarcheela village community present bills received from the contractor of tubular well. Now the Tarcheela village community is saying that they have presented the bills received from tubular well contractor but EPCC is not paying them the payment and saying that after the completion of tubular well EPCC will pay them the agreed amount.	Tarcheela village community	<p>OE forwarded the complaint to EPCC, Once EPCC agreed with the community and made a written agreement that the payment will be done in installments upon the presentation of bills, now it is obligatory on EPCC to follow the agreement.</p> <p>On 21st March 2017 OE ask EPCC for updates on this issue and also ask for the documents which proves that the payment has been made to the community</p> <p>On 30th March 2017 OE ask EPCC for updates on this issue and also ask for the documents which proves that the payment has been made to the community.</p> <p>On 1st June 2017 OE ask EPCC for updates on this issue and also ask for the documents which prove that final payment has been made to the community.</p>	<p>We are going to pay them 50% of the total agreed amount for the construction of tubular well which is Three hundred thousand PKR for which we have started our process and soon they will get the 50% amount. On 21st March 2017 EPCC replied that they are still in process of making the payment.</p> <p>On 25th April 2017 EPCC replied that one hundred fifty thousand PKR payment has been made to the tarcheela community representative Mir Rehmat Qureshi and the rest of the payment will be given upon the completion of tubular well.</p> <p>On 22nd June 2017 EPCC replied that the final payment of one hundred fifty thousand has been paid to Tarcheela village representative Mir Rehmat Qureshi.</p>	Closed

# **Annex-8**

## **Landslide Study**

**MONITORING REPORT ON  
LANDSLIDE/CATCHMENT STABILITY AT PATRIND  
HYDRO POWER PROJECT AREA (MUZAFFARABAD  
AJ&K)**



**November 2017**

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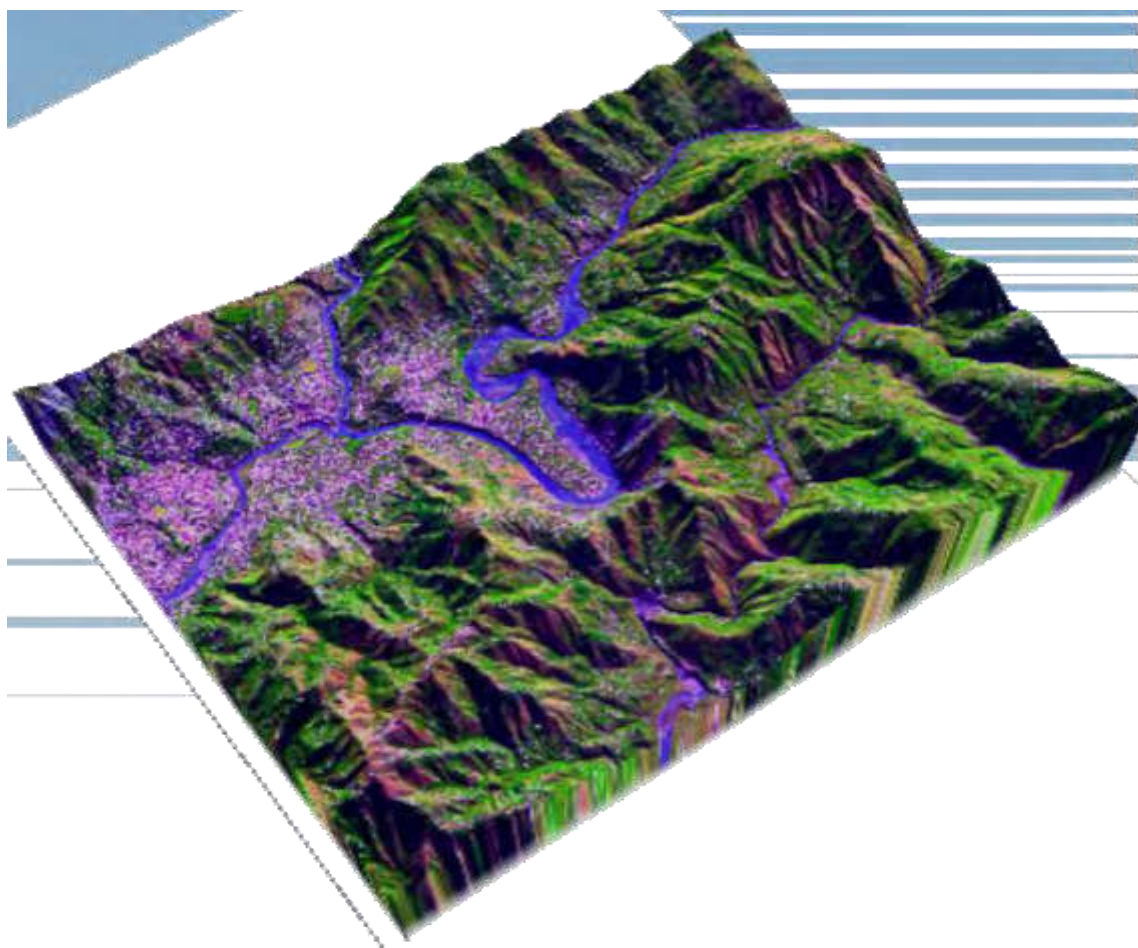
## **Background**

This monitoring report has been prepared in continuation of the previous reports on the landslides around Patrind Hydro Power Project area. The strengthening of the Patrind side of the project area was discussed in detail in the vegetation reports and this area has been strengthened with concreting the sides of the weir and lake. Stone masonry and wire-stone gabion works have been carried out on the sides of the lake thus the erosion has been completely controlled.

The slide on the powerhouse side has partially been concreted with some plantation but the major part of the slide has not been treated in any way and the issue of expansion of the slide is still there. The slide of Lohar Gali is a continuous headache for the Government of the State of Azad Jammu and Kashmir as it could not be controlled in spite of various efforts. More area has come down and Earthquake of 2005 has further destabilized the area as the fragile mountains around the city of Muzaffarabad were badly shaken, cracks in the mountains, immature rock status and water percolation in the slide are the major problems in controlling the slide. The local rock type plays a vital role in the condition of the slide and it needs a particular type of intervention to control the slide. Engineering techniques are often applied in these areas but they usually do not give the required results because:

1. They are very expensive even for a small patch of slide,
2. They do not prove to be very efficient
3. The area shows a bad look
4. Green belt is wasted
5. Water inside the mass of soil again damages such concrete, stone or reinforced cement concrete structures.

The earthquake shaken slides are further trigger down due to devastating human activities like the construction of huge projects in these areas. Dam construction, tunneling or bridge construction are the best examples of these constructions. Intense rainfalls during one season create a big havoc in the absence of the vegetative cover. The productive soil is always lost due to the erosion. If a big stream or river flows through the base of the slide, this becomes scouring source of the footings of the mountain and land slide increase.



3D view of Study Area

## **Introduction:**

The Patrind Hydropower Project area has two parts one on the intake side at Patrind where the main weir has been constructed and a lake has appeared behind this weir. The water level has been raised and carried through a 2.5 km tunnel to drain into the River Jhelum after generating 147 MW of electricity. This is the Part two of the project area. The study area is about 10 km up and downstream of river Kunhar from the weir point at Patrind (34° 20' 36" N and 73° 25' 10" E) at an elevation of 2516-3123 ft a.m.s.l) and around the outlet at Alda (34° 20' 06.05" N, 73° 27' 18.6" E) in AJK. It covers both the eastern aspects on the left bank of river Kunhar and right bank of river Jhelum in AJK. Total Area is about 100 Acres.

The capital city Muzaffarabad lies 138 kilometers North of Islamabad and about 76 kilometers East of Abbottabad. Muzaffarabad is positioned on the confluence of the Jhelum and Neelum rivers. The district is bounded by Khyber-Pakhtunkhwa in the west, by the Kupwara and Baramulla districts of Indian administrated Kashmir in the east, and the Neelum District of Kashmir in the north.



The October 2005, Kashmir earthquake main event was triggered along the Balakot-Bagh Fault which runs from Bagh to Balakot, and caused more damages in and around these areas. Major landslides were activated during and after the earthquake inflicting large damages in the area, both in terms of infrastructure and casualties. These landslides were mainly attributed to the minimum threshold of the

earthquake, geology of the area, climatologic and geomorphologic conditions, mudflows, widening of the roads without stability assessment, and heavy rainfall after the earthquake. These landslides were mainly rock and debris falls.

Landslides occurred mostly along weakly cemented and in durated rocks, colluvial sand and cemented soils. It is also worth noting that fissures and ground crack which were induced by main and aftershock are still present and they pose a major potential threat for future landslides in case of another earthquake activity or under extreme weather conditions.

The second/follow up landslide monitoring survey was carried out during third week of September (after monsoon) 2015 to determine the changes in landslide types and spatial distribution of slope failures and to compare the outcome with the ground situation of last year. The first monitoring survey was carried out during October 2014 while the selected sites were re-visited in the subsequent studies. This has allowed us to make an assessment of the short-term changes that occurred during the period due to certain factors including construction work, slope cutting, change in vegetation cover, seasonal changes, weather events and other human induced factors. The collected data and set of photographs facilitate to compare further landslide changes in the coming years.

The study area is situated on the northwestern part of the Indian plate. The Indian plate is moving North-East at a rate of 5 cm per year and is being driven beneath Eurasian plate which is moving at a rate of 2 cm per year. Main Boundary Thrust (MBT) and Panjal Thrust are folded to form an antiformal structure known as Hazara Kashmir Syntaxis (Fig. 1). The Muzaffarabad and Jhelum faults lie along the western limb of the Hazara Kashmir Syntaxis. The footwall of MBT comprises of tertiary clastics of Murree formation. Hazara Kashmir Syntaxis also comprises of siliclastics and dolomites of the Precambrian Muzaffarabad formation, Cambrian Abbottabad formation, and Paleocene Lockhart limestone and shale of Patala formation.

Jhelum River and its tributaries (Neelum & Kunhar) drain the region. The rapid flow of these rivers have resulted in intense fluvial incision, thus producing steep lower valley slopes that have a gradient of  $> 50^\circ$ . Between the Jhelum and Neelum river valleys, the mountains reach elevation of  $> 3000$  m a.s.l.



*Fig: The eroded area at the riverside adjacent to the Powerhouse at Allara*

Most of the terrain is mountainous with the highest peaks exceeding 4500 m above sea level (asl). The landscape is deeply dissected with the main valley floors between 500 and 2000 m asl. The region is drained by the Jhelum River and its two tributaries the Neelum and Kunhar rivers (Kunhar forming the Kaghan Valley). These rivers flow westward forming deep antecedent valleys before flowing southwards along broader valleys to the Indo-Gangetic Plain. These three main rivers flow very rapidly with discharges of approximately 470, 240, and 80 m<sup>3</sup>/s, respectively. (Pakistan Water Gateway, 2007). This has resulted in intense fluvial incision and resultant high erosion rates, producing steep lower valley slopes that exceed 50°.

The population of Muzaffarabad is 0.268 million with the population density of approximately 350 people/km<sup>2</sup>, which is mainly concentrated along the valley floors, on river terraces and on areas that have gentle slopes.

The high population densities place a severe environmental pressure on the mountain's ecosystems. The rugged terrain and intense summer rainfall make transportation extremely difficult through the region. Many roads are constructed along steep slopes often by excavating deep notches into the weathered bedrock and/or on fill that is perched precariously on steep slopes.

### **Climate of Area:**

The study area has a monsoonal climate with very wet summers. The mean maximum and minimum annual temperatures are about 42°C and 3°C. Northern parts of the district Muzaffarabad are much colder than the southern parts.

Generally, in July and August, heavy rainfall occurs with monthly extremes of up to 650 mm leading to rainfall-triggered landslides in the region. In September, rainfall declines, and by November conditions are dry, with minimal rainfall of 4 cm/month. Muzaffarabad receives >1400 mm precipitation on average during the year, of which one-third falls as rain during the monsoon season from late June until the end of August and sometimes till the mid of September. Also the cloud bursts can bring as much rain as 100mm during one shower, causing significant damage in the form of flash floods and debris flows. Intense rainfall patterns can occur throughout the year with the changing climatic conditions. This often results in severe flooding and landslides, notably debris flows which were experienced during early September this year also. During the winter, precipitation falls as snow at elevations above 1500 masl. Little precipitation occurs in spring, but snowmelt provides abundant surface waters to slopes, which results in erosion and/or infiltration into slopes increasing the height of the groundwater table.



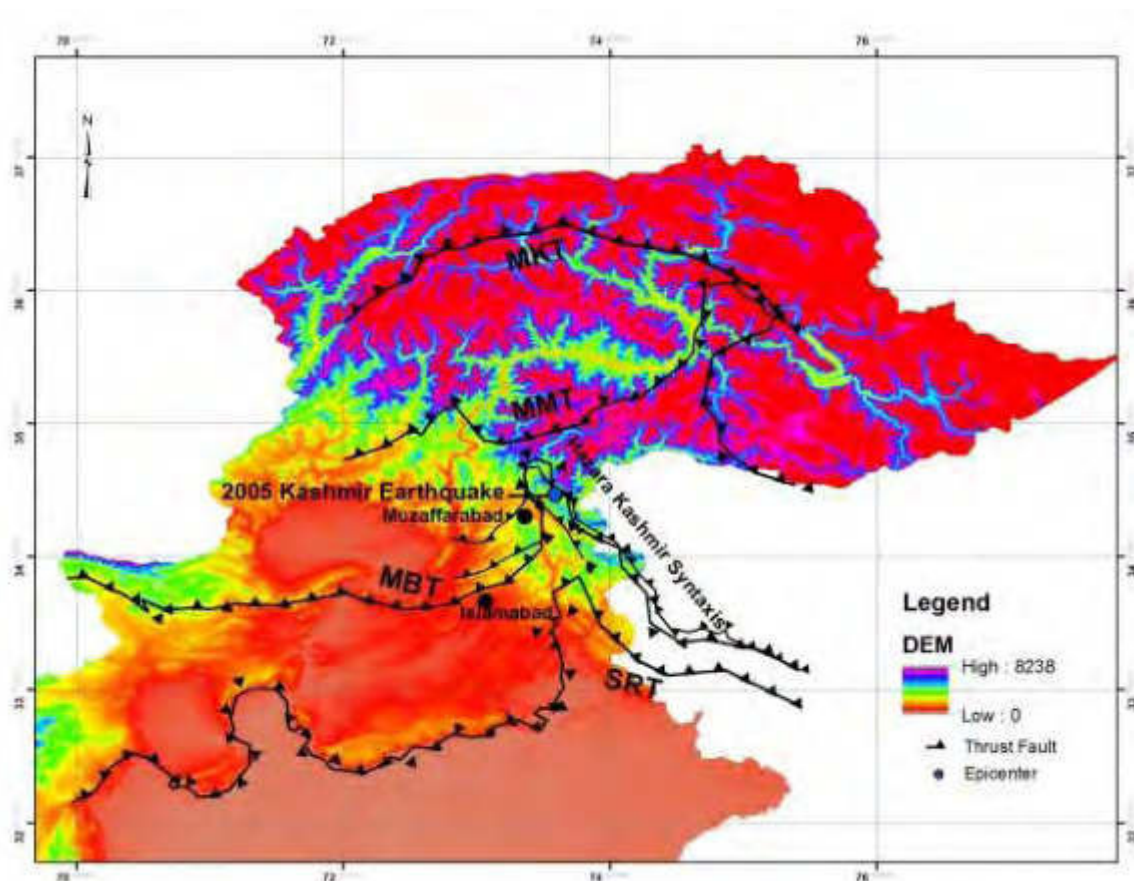


Fig. 1: Map showing major fault systems in Northern Pakistan and Kashmir Earthquake, 2005 epicenter location.

## GEOLOGICAL SETTING

Geologically Azad Kashmir area can be divided into two parts, the Northern and the Southern region. The Southern region is relatively less disturbed and exposes a sequence of rocks ranging from permo-carboniferous to recent age. In Southern region, rocks are represented by Murree Series of Middle to upper Miocene age, and consists of thick bedded to massive mainly brick red, ferruginous and calcareous clays/shale (predominating) alternating with thick bedded dirty red weathered, grey to dark grey, medium-and-stones. Uniform iron contents of 6 to 8% can be observed while travelling through the project area. Northern Region is constituted by phyllites, schists, gneisses and igneous

## LANDSLIDES

Landslides can be triggered by an earthquake, either by an increase in shear stress or due to decrease in soil strength. Significance of landslides depends upon location and magnitude of earthquakes but local conditions can also be of much importance. Earthquake triggered landslides have caused significant loss of life throughout history (Table 1).

The Kashmir earthquake triggered mass movements and these mass movements directly or indirectly caused more than 30000 fatalities. The landslides that were triggered by the earthquake have an area of >7500 km<sup>2</sup>. Hazara-Kashmir syntaxis dominates the area and is enclosed by Main Boundary Thrust (MBT). The footwall of MBT is composed of Murree Formation. Other formations that are present in Hazara-Kashmir Syntaxis are Precambrian Muzaffarabad Formation (dolomites and siliclastics), Abbottabad Formation, Patala Shales and Lockhart Formation.

Landslides in Murree Formation occurred alongside lower valley slopes. Landslides in Hazara Formation occurred in the fluviably incised slopes. Rockslides were extensive on the mid slope regions. Muzaffarabad Formation showed extensive fissuring.

Owen et al., (2008) studied 1293 landslides and grouped them into six different geomorphic-geological settings. The study showed more than 90% of landslides were small (<1000 m<sup>2</sup> in area) and were mostly in the form of shallow rock and debris falls from the top few meters of weathered bed rock and soil. Rock falls (<100 m<sup>2</sup>) and rock slides were common on ridge and spur crusts throughout the whole region. Slopes which have a gradient of < 20° and which were present on foot wall rocks of the MBT showed little evidence of land sliding. Landslides in Murree formation occurred along lower valley slopes which have a gradient >50°. The study also showed that the Precambrian Dolomites and siliciclastic rocks of Muzaffarabad formation were extensively fissured. Previous studies on the effects of large earthquakes in Himalayan region were carried out by Owen et al., (1995) and Barnard et al., (2001) showed that earthquake damage was concentrated on alluvial fans and on lower stretches of valley slopes.

Recorded large scale landslide events in terms of numbers and fatalities

<b><i>Location</i></b>	<b><i>Year</i></b>	<b><i>Cause of Landslide</i></b>	<b><i>Fatalities</i></b>
<i>Gansu, China</i>	1920	Earthquake	180,000
<i>Vargas, Venezuela</i>	1999	Heavy Rainfall	30,000
<i>TienShan, Tajikistan</i>	1949	Earthquake	28,000
<i>Kashmir, Pakistan</i>	2005	Earthquake	30,500
<i>Armero, Colombia</i>	1985	Volcanic Eruption	23,000
<i>Yungay, Peru</i>	1970	Earthquake	22,000
<i>Nevados, Huascaran</i>	1970	Earthquake	18,000
<i>Huaraz, Peru</i>	1941	Landslide	4,000-6,000
<i>Sichuan, China</i>	1933	Earthquake	3,100
<i>Badakshan, Afghanistan</i>	2014	Heavy Rainfall	2,000
<i>Rio De Janeiro, Brazil</i>	2011	Heavy Rainfall	1,000

Number and Percentage of different types of Landslides (Total Area = > 750 km<sup>2</sup>) (after Owen et al., 2008)

Type of Landslide	Number of Failures	Percentage of Total Failures
Rock fall	922	71.3
Debris fall	243	18.8
Earth fall	3	0.2
Rotational Rock Slide	14	1.1
Translational Rock Slide	39	3.0
Debris Slide	23	1.8
Rock Flow	1	0.1
Debris Flow	10	0.8
Human Induced Failures	93 Sites	53

Landslides that were triggered by the earthquake were concentrated in specific areas that were associated with geomorphology, lithology and human factors. More than half of landslides were in some way associated with road dam and tunnel constructions and human activity. According to Keefer (1984) and Barnard et al., (2001), the modification of landscape by humans is the most essential factor for generating landslides in tectonic areas.

The number and extent of landslides in case of Kashmir earthquake exceeds that of 1991 Garhwal earthquakes (Owen et al., 2008). This shows that a specific earthquake magnitude threshold needs to be achieved in Himalayan setting to produce landslides in wide area and this threshold was achieved during Kashmir earthquake.

Monsoonal climate persists in Muzaffarabad with annual precipitation of ~1500 mm. Snow falls at altitudes of >1500 mm during winter. The fissuring that was caused by Kashmir earthquake resulted in more land sliding in 2006 during monsoon period. The debris produced as a result of landslides was re-deposited by floods resulting in landscape modification.

The relationship of landslides (LS) to elevation within the study area of the 2005 Kashmir Earthquake (after Kamp et al., 2008)

Elevation (m asl)	Area (km <sup>2</sup> )	Area (%)	LS area (km <sup>2</sup> )	LS area (%)	LS area in elevation (%)
0-500	0.2	> 0.0	> 0.0	0	5.7
500-1000	311	12.2	11.5	19	3.7
1000-1500	710	27.9	29.3	48	4.1
1500-2000	667	26.2	13.0	21	1.9
2000-2500	443	17.4	3.6	6	0.8
2500-3000	263	10.3	2.4	4	0.9
3000-3500	106	4.2	1.3	2	1.2
3500-4000	35	1.4	> 0.0	0	> 0.0
4000-4446	14	0.5	> 0.0	0	> 0.0



<b>Elevation (m asl)</b>	<b>Area (km<sup>2</sup>)</b>	<b>Area (%)</b>	<b>LS area (km<sup>2</sup>)</b>	<b>LS area (%)</b>	<b>LS area in elevation (%)</b>
All	2549	100	61.1	100	2.4

Areas that are underlain by Muzaffarabad, Murree and Panjal formations show highest landslide susceptibility to future failures. Formations that are in proximity to faults are also prone to future land sliding.

It is highly likely that the sites of earlier landslides may be activated and new landslides can occur along fissures especially after heavy rainfall. The ASTER 2005 Land Cover classification that was carried out by Kamp et al., (2008) showed that more than 50% of landslides (almost eight fold) occurred in grass/shrub lands which are more susceptible to land sliding. Destruction in Muzaffarabad city resulted directly from earthquake and land sliding. As a result, the alluvium of which the city is made of has a low vulnerability to future land sliding. Hazara formation has a low to moderate landslide susceptibility whereas the Murree formation has a moderate to high landslide susceptibility. Muzaffarabad formation and sites near the fault are prone to more landslides.

According to Kamp et al. (2010), a six-fold increase was observed in landslides from 2001 to 2009 and an eight fold increase was observed in landslide area. An inventory and susceptibility zoning map for landslides was prepared for the year 2001, which was considered as reference representing baseline landsliding. Studies conducted in 2001 and 2005 showed that the largest number of landslides occurred in Murree Formation with a nine-fold increase whereas the limestone and Marble of Salkhala Formation and Panjal Formation showed second largest number of landslides with a six-fold increase. Tanawal Formation showed a threefold increase in landslides with a highest increase in landslide density.

According to Sato et al., (2007) and Kamp et al., (2008); the total numbers of landslides produced as a result of Kashmir Earthquake were significantly less, as will be expected by an earthquake of similar magnitude. This is an alarming caution for the future strategy in controlling the landslides like in Lohar Gali and adjacent to powerhouse at Alda in Muzaffarabad

Large extent of slopes was cracked within 5 km of the fault. In the years that followed, the amount of land sliding in Kashmir increased due to increase in precipitation. The rise in groundwater caused many slope failures. Many tension cracks were developed in the vicinity of the fault and have developed complex interlocking pattern of high density arrays with both bedrock and colluviums. Extensive slope cracking developed as a result of Kashmir earthquake. Prior to 2005 earthquake, the seismic activity in the area was less significant due to which there were fewer cracks in slopes. After Kashmir earthquake, many tension cracks were developed in slopes. With more precipitation, the newly developed cracks will be filled with water and slope failure will occur. Extensive cracking on the hanging wall side of the fault shows that there will be many landslides in coming years. The slope cracks due to human activity also play a vital role in the land sliding as has been observed in the case

of tunnel construction and blasting carried out in area clearance in the cases of Patrind Hydro Power Project and Neelum and Jhelum Hydro Power project. The landslides appeared during and after the earthquake of 2005 have expanded with accelerated rate of erosion.

According to Kausar et al., (2010), the earthquake resulted in deep seated and cut-slope failures and rock falls. The earthquake caused many cracks along hill slopes which are potential areas for future landslides. Landslides can occur by the increasing infiltration of water and generation of pore water pressures. Muzaffarabad, Bagh and Balakot were the largest cities that were affected by the earthquake. Landslides, rock falls, rock slides and debris flows were triggered in Jhelum, Kaghan and Neelum Valleys, some of which temporarily dammed the rivers. The white dolomites of Muzaffarabad formation failed in conjunction with red Murree formation silt and sandstones.

According to Dellow et al., (2007), the size and distribution of landslides due to Kashmir Earthquake was highly asymmetric. Three different areas of landslides can be classified;

1. The first type of landslides was formed over/adjacent to the fault rupture
2. The second type of landslides which extend about 10-20 km from fault trace were formed on hanging wall side of the fault
3. The third type of landslides were formed on the footwall side of the fault and were rare except within 2-3 km of fault trace

Studies by Saba et al. (2010) show that even before the earthquake, landslide activity was high. Although, landslides intensity increased after 2006 monsoon, the slope achieved stability afterwards and their intensity decreased.

The earthquake caused thousands of landslides and made many slopes unstable. The landslides were triggered by the main shock and later by aftershocks. Slope failure as a result of earthquake can only occur when a critical magnitude and peak ground acceleration is achieved as in case of Kashmir Earthquake. Muzaffarabad was the worst area affected by the earthquake. The earthquake resulted in deep seated cut slope failures and rock falls. The distribution of landslides was concentrated along precise areas related with geology and human impacts. Almost 90% of landslides were small and were in the form of rock and debris fall. More than half of landslides occurred in Miocene sandstones and siltstones of Murree formation. The dolomites and siliciclastic rocks of Muzaffarabad formation were extensively fissured. Landslides mostly occurred on steep slopes with gradient from 25°-35° like in case of Patrind Hydro Power project area and area adjacent to it like Lohar Gali. Major landslides occurred at elevation of around 3000 meters. The Precambrian metamorphic and sedimentary rocks in the vicinity of Balakot showed highest landslide density. Muzaffarabad, Murree, Panjal formations and formations that are in proximity to the fault are prone to future landslides. Most of landslides occurred on hanging wall side of the fault and large extent of slopes were cracked in the vicinity of the fault. As 2005 was generally a dry year, groundwater was lacking and the cracked slopes could not develop into full failure but are susceptible to failure in case of another earthquake activity or under

extreme weather conditions. The total number of landslides that occurred due to Kashmir Earthquake was significantly less as will be expected by a similar magnitude earthquake.

Slope instability will increase with an increase in the rate of deforestation. The area is exposed and rain water splashes the barren ground and erode it. This instability during the event of an earthquake can cause more land sliding. Ground shaking and structural failure were main reasons for triggering of Lohar Gali and Alda slides.

## **CONCLUSION**

Kashmir earthquake caused thousands of landslides and made many slopes unstable. The Kashmir area is highly prone to landslide hazards due to its geology and structures. Mass movements can easily be triggered by slight tremors in the region. Shaking from any major future earthquake will cause liquefaction of soil, hence causing the slope to lose cohesion. Older landslides can also be activated from earthquake induced landslides. Undercutting of slopes by river erosion and human activities like dam and tunnel constructions for power or roads are the main reasons for secondary failures. More than 50% of landslides were caused by human impacts like conversion of forest land, occupancy on exposed slopes and construction of roads and dams. The landslides patterns are quantifiably related to ground motions. Co-seismic landslides occurred at regions with steep slopes and high roughness under the influence of strong ground motion. The study show that co-seismic landslides increases in regions close to epicenter and with increasing earthquake intensity. It is also worth noting that fissures and ground crack which were induced by main shock are still present and pose a potential threat for future landslides in case of another earthquake activity or under extreme weather conditions. The debris produced as a result of landslides was re-deposited by floods resulting in major landscape modification.

Proper identification of various types of these movements is very essential for proposing their mitigation and preventing future loss of life and property. People may be warned not to construct in the vicinity of the rupture and avoid living at the foot of the mountains. If landslides hazards are not adequately mapped and mitigated with increasing commercialization and urbanization, the problems of landslides will greatly affect life and economy.

The slide adjacent to the Powerhouse at Allarra is prone to increase as the cracks in the area have further deepened due to the construction of tunnel and water is continuously penetrating into these cracks. The area is in the process of erosion with a low to high intensity depending on the rate of intensity of rainfall.

## **VEGETATIVE COVER:**

The area around the weir at Patrind has comparatively thick vegetative cover as compared to area around the Powerhouse at Allarra. The species found are as listed below:

***Environmental & Social Monitoring Report (July-September 2017)***

<b><u>Common Name</u></b>	<b><u>Botanical Name</u></b>	<b><u>Type of Tree</u></b>	<b><u>Status</u></b>
Phagwarr	<i>Ficus Palmata</i>	soil binder	common
Anjeer	<i>Ficus carica</i>	Fruit	rare
Dhaman	<i>Grewia oppositifolia</i>	Fodder	common
Drawa	<i>Ailanthus anus</i>	firewood	common
Robinia	<i>Robinia pseudoacacia</i>	firewood	common
Drek	<i>Melia azadrach</i>	firewood	common
Batculd	<i>Celtis australis</i>	soilbinder	rare
Kangarr	<i>Pistacia khunjak</i>	soil binder	rare
Talli (shisham)	<i>Dalbergia sisso</i>	furniture wood	common
phulai	<i>Acacia modesta</i>	firewood	common
Sherol	<i>Alnus nitida</i>	Firewood	common
Shahtoot	<i>Morus alba</i>	Fruit	common
Akhrot (Wallnut)	<i>Juglans regia</i>	Fruit	common
Nim	<i>Azadirachata indica</i>	Firewood	common
Kau	<i>Olea cuspidate</i>	Firewood	common
Chir	<i>Pinus roxburglii</i>	Timber	common
Pipal	<i>Ficus religiosa</i>	Firewood	common
Kiker	<i>Acacia nilotica</i>	Firewood	common
Beence	<i>salix spp</i>	Firewood	common
Batang	<i>Prunus patia</i>	fruit	common
Ber	<i>Zizyphus mauritiana</i>	fruit	common
Snatha	<i>Dodonaea viscosa</i>	soil binder	common
Narri	<i>Arundo donax</i>	Hedge	common

The main contributor grass species are *Heteropogon contortus* (Sariala), *Cenchrus ciliaris* (Dhaman), *Desmostachya bipinnata* (Dab ghaas), and *Cynodon dactylon* (Khabbal).

Agricultural land is restricted to terraces towards Patrind village side, its surroundings and alluvial fans along the valleys bases, and terraced less steep slopes. The lower site of the project is the part of urban areas which mainly occur along the rivers. In our analysis the majority of land sliding occurred in shrub land/grassland and on agricultural land. However, few land sliding occurred in forested areas.



**Figure: Suggested interventions in the landslide adjacent to powerhouse**

## **Slope Failure and Risk Analysis of Landslides**

The occurrence of landslides in study area is a function of direct and indirect natural and human factors. These include, for example, lithology, structure, tectonics, geomorphology, topography, precipitation, temperature, infiltration, runoff, land cover, road construction and human induced vibrations including other developmental engineering interventions. These are commonly referred to as event-controlling parameters.

### **Slope**

Slope aspect has an effect on land sliding because it is related to such factors as insulation (weathering), weather conditions (precipitation, snow melt and free flowing water), land cover (forest, grassland, brush land, agricultural land), and soil conditions (infiltration capacity).

Slope gradient is one of the most important factors in mass wasting: movement and is extremely common when slopes are steeper than the natural angle of repose of the substrate and when there is not enough cohesion to inhibit slope failure. The angle of repose is typically 25–40° for unconsolidated materials. The most of the land sliding occurred on slopes of 25–35°.

Elevation in the land sliding area ranges from a minimum of 650m asl in some river beds and surrounding flood plains to a maximum of 1128 asl in the surrounding top hills of the area on both of sides.

Most of the land sliding (N70%) occurred on slopes facing southeastern directions. Precipitation might be higher on southern slopes due to the higher monsoon rainfall and on western slopes as a result of the western lies, which enhances slope instability.

### **Methodology for Landslides and Slopes Monitoring:**

Like the previous year, this monitoring survey was carried in November 2017 during the dry spell and the monsoon spell was over.

Our study builds on field photographs taken to assess slope conditions at certain selected locations and onsite observations after comparing those with the data collected last year to evaluate on- ground status.

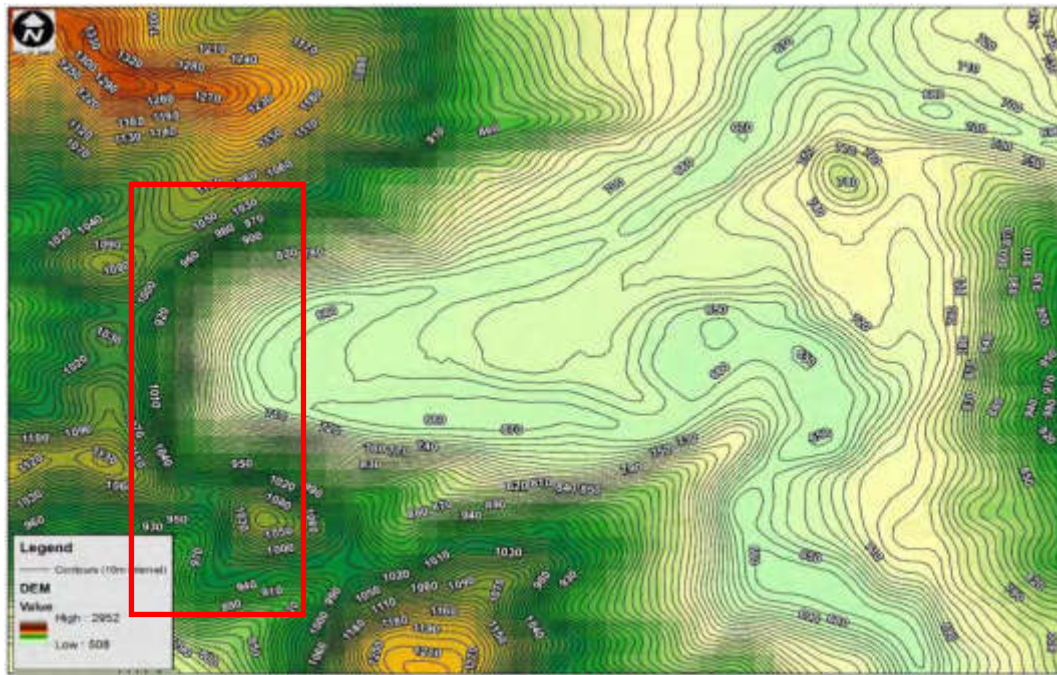


Figure: Soil sample collection from the eroded area.

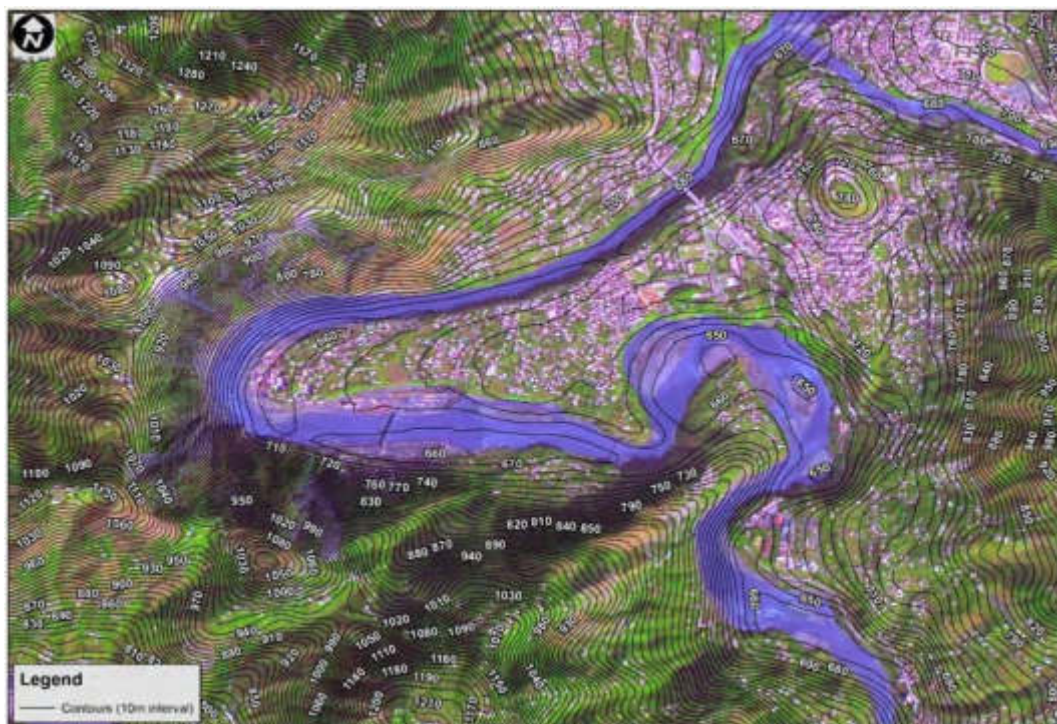
### **Data Source Preparation**

In this study, same remote sensing images were used for the landslide inventory preparation. The DEM was extracted from topographic sheet which was obtained from the SUPARCO Pakistan. The contours were generated from SRTM 90m DEM at an interval of 10m. Contours give a fairly good idea about the slope of an area. The closer the contours, the higher the slope and the more it is susceptible to land-sliding. Slope of the land-sliding area shown in the red box approximately ranges from 75-85% slope.





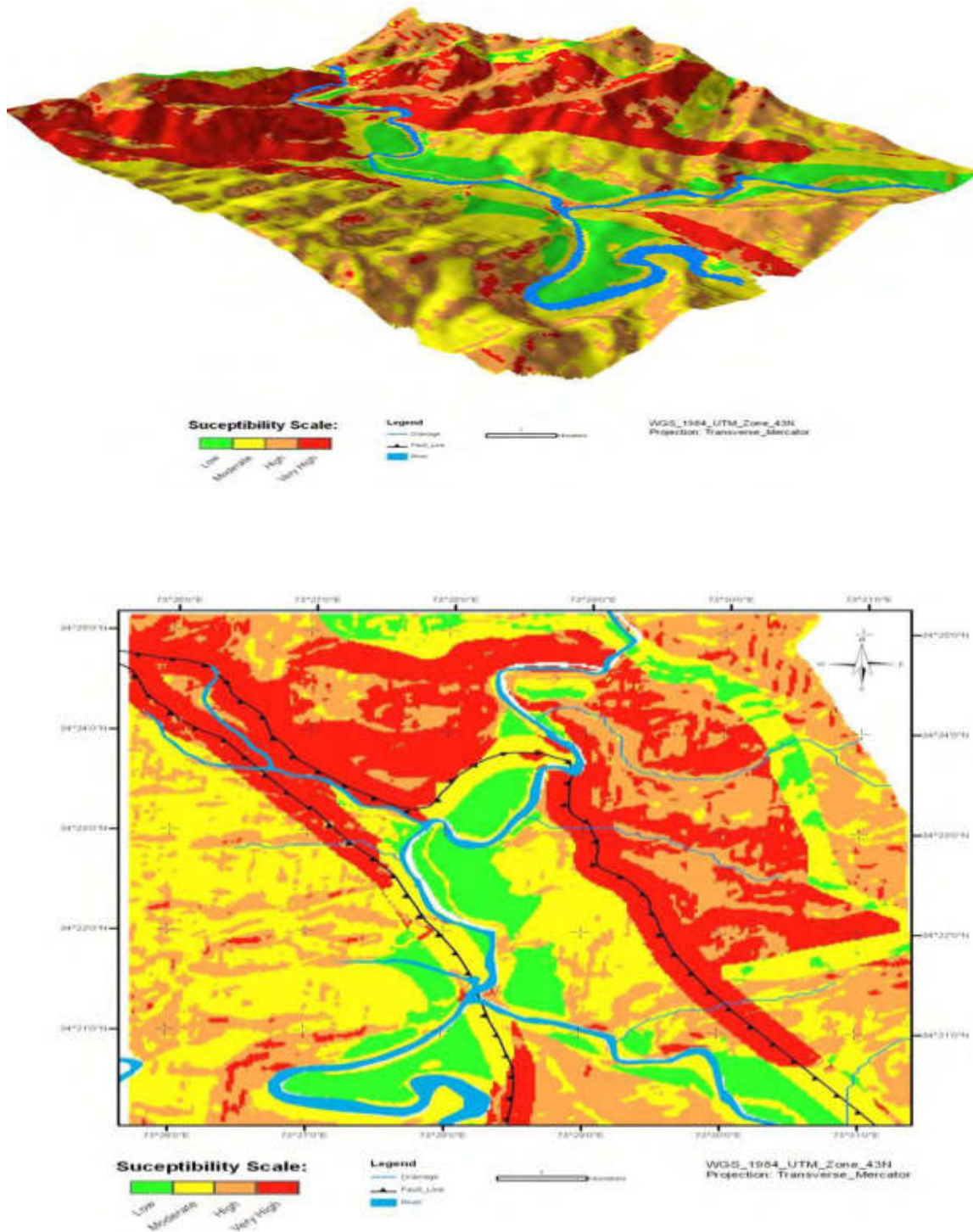
Contours overlaid on SPOT 2.5m image.



## **Landslide Susceptibility Map**

Following susceptibility map can provide a cheap and comprehensive assessment of the likelihood of future failures, which can be useful to planners for the rebuilding process and future zoning issues





A notable proportion of landslides in the area were caused by human- induced factors, especially deforestation, poor terracing and habitations located on exposed slopes, and road construction. The negative impact of road construction, tunnel for power generation and other developmental engineering works on slope stability resulting in land sliding causing physical, socio-economic and environmental losses.

### **Findings and Observations:**

The individual increase in the freshly triggered landslides after each monsoon and winter rainfall is increasing if compared to the previous period landslide area. The results demonstrate an abrupt increase in freshly triggered landslides after the winter rainfalls and monsoon seasons of last few years.

The following images show the changes in the landslide area through time



*Fig: The slide area in 2015*



*Picture: Showing position of landslide during December 2014*



*Figure: The slide during 2017*

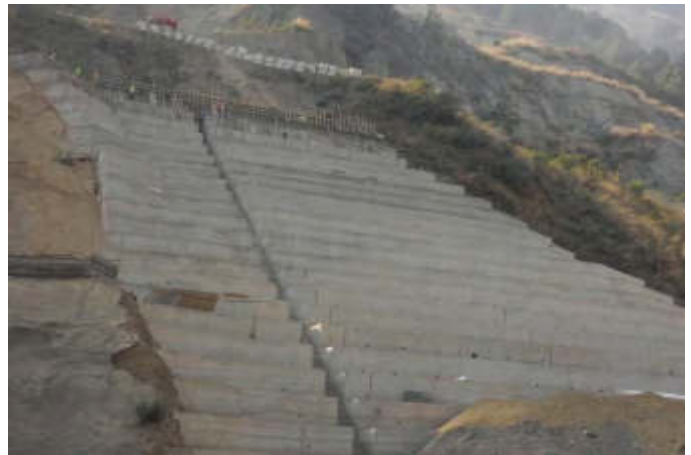
Most of these are old landslides occurred in highly fractured shale, slate, clastic sediments, limestone and dolomite on slopes along river and roads.

The increase in landslides area for the past few years, showing a very slight change in landslide activity except one massive landslide triggered right at the head of under-constructed power house site.



Certain steps taken by EPCC to tackle the issue of Soil erosion and Land slide are:

- 1) Construction of small drains around the affected area some diversion drains are also prepared to control the flow of water.
- 2) Constructed retain walls in the project area to stop the sliding area. Some walls are under construction and this activity is continuous from the start of the project.
- 3) EPCC in coordination with EPA & Forest department has already planted more than 3-4 thousand trees and have plan to plant more trees in the affected area during the operations of the complex, Species Robinia Pseudoacacia will be planted having characteristics of soil binding which will help in decreasing erosion.
- 4) Soft Gabion walls on affected side to stop erosion and landslide.
- 5) Stone pitching to avoid landslide and Grass pitching was also done around the surge shaft area to avoid soil erosion & Land slide. Some of the remedial measures which are taken by EPCC on site are.



Step walls constructed by EPCC on site to stop Landslide & Erosion



Soft Gabion walls on site



Stone pitching on site





Grass Pitching and drainage on site

Site requires appropriate biological, Bio-engineering and engineering mitigation measures and these are strongly advised without any delay to stabilize the slope and avert the likelihood disastrous situation. The appropriate season for biological and bio-engineering works is December-January and it is up to the administration of the project to get benefit of this season. Any major disaster can appear in the coming season which can damage the project's valuable structures.

However, on the other site of the hill slope (weir house site) the fragile and loose area dueland vibration and engineering factors has been made protected and stabilized by carrying out certain structural mitigation measures like shortcreting, wire stone gabions and surface cover etc.



*Figure strengthened weir side of the project*



Although some more work is required to completely make the area protected from slope failure and erosion but in general that area can be considered safe from massive erosion as lot of land cover and vegetation prevents it to erode or completely wash away.



On Muzaffarabad–Abbottabad road linking Muzaffarabad District to KPK at Lohargali point, massive landslides present along the right bank of river Jehlum in semi-circle shape in close pockets and are major irritant which remained always a source of disruption and hazardous where half kilometer portion is turned into permanent slide and slippage. This is the main supply artery for the transportation of heavy supplies to different ongoing projects including Patrind Hydro Power Project, which often remains suspended over the days. At least 2 to 3 villages having considerable population also located at the back of slide area who are also threatened due to persistent and excessive land sliding being reached to the toes of the inhabitant areas. Like the previous years, a number of vehicle-accidents have been reported at this slide during the current year as well causing the deaths and injuries to several people.



*Figure: Lohar gali Landslide*

Although this is an old landslide but frequency of slippage during last five years suggests the vibratory factor due to blasting and construction of tunnels are among the major cause of massive erosion at this part. This massive land/mud slide is a potential hazard that can be further triggered anytime which is a serious threat to the precious lives and public property and may increase the sediment load in the Jhelum River. Area opposite to this slide on the back is also prone to land sliding. Very high susceptibility to ongoing land sliding is predicted due to the steepness of the terrain, and the road itself.

The C shaped semi-circle mountain strip across the river Jehlum at lower site is unsafe and it is likely that future land sliding will continue in this region. These unsafe areas require immediate mitigation actions. This point needs special arrangements to keep safe and out of danger.



### **Discussion/ Conclusions:**

Factors that contribute to slope failure are generally complex and difficult to assess with confidence but in general a steep sloop, high intensity of rain falls, undercutting of slopes by river erosion and human activities such as road construction, engineering interventions, deforestation, terracing and



agricultural activities are probably the main reasons for these slope failures and have to be reached for triggering landslides.

We assumed that the ground conditions and the amount of rainfall received during monsoon and winter season is sufficient enough reasons to initiate any new or secondary landslides. The extensive fissuring still poses a potential hazard in the region as the slopes are susceptible to future land sliding under wetter conditions. Many settlements and major roads are still at risk to future land sliding, and future planning must account for this long-term potential threat.

Our study of the region showed that the bedrock lithology is the most influential and important land sliding-controlling parameter. Most of the landslides occurred in highly fractured shale, slate, clastic sediments, and limestone and dolomite.

Slope gradient is the second highest influence as an event-controlling parameter, and most of the failures occurred at moderate elevations on southern slopes facing the summer monsoon precipitation. Shrub land, grassland, barren land and also agricultural land are highly susceptible to land sliding and landslide susceptibility in the area.

Reactivation of existing landslide sites and new land sliding, particularly along fissures, occurs following monsoon and winter season rains and a number of deep-seated landslides will continue to pose severe threat to main road and adjacent villages.

It signifies the fact that most of the rainfall-induced landslides are still related to the earthquake rooted disturb topography and human induced vibratory factors. The most abundant types of landslide are debris fall and slide (translational slides), which are increasing in the area and also causing occurrence of few new landslides which were observed just at the top of tunnel constructed at power house site.

In conclusion, it is established that areas around the lower site of project are still “highly” to “very highly” susceptible to future land sliding and warned of future land sliding hazard, especially after the summer monsoon seasons.

However, we agree with the fact that those slopes that still show fissures should be further investigated or monitored for management purposes.

We need to focus on

1. The spatiotemporal variations in landslide types, and
2. The influence of each subsequent monsoon on the landslide changes and new occurrences.

The monitoring and quantification of destabilized slopes after each consecutive monsoon seasons will provide evidence to conclude that disaggregated material and unstabalized slope masses, eroded by rainwater and flash floods.

## **Recommendations**

To manage and mitigate the potential impacts of landslide hazard, some recommendations are given as follow:

1. During the construction vast plantation has been done. Similarly, in future, close spacing plantation of selected deep and web rooted plants and appropriate bio-engineering and engineering measures are recommended to mitigate the landslide hazard in future under the supervision of the technical expert.
2. Proper drainage pattern has been constructed during the construction of Project to reduce the instability of the area but it requires maintenance of drainage during the operations of the project.
3. Monitoring of slope movement and ground-water levels are required to assess potential movement of landslides.
4. Individual landslide areas can be remediated by employing engineering techniques, such as, the use of retaining wall as in construction phase, and need continuous monitoring in future to overcome the erosion and landslide issues.
5. Changes of landslide types and spatial distribution of slope failures are required to determine after each monsoon.
6. Increase in vegetation cover can help in reducing the chances of landslide & erosion. In future seasonal plantation is recommended.

# **Annex-9**

## **Compliance Approval**



**DIRECTOR GENERAL,**  
Phone: 05822-921082  
Fax: 05822-921686  
Email: dgeps.ajk@gmail.com



Protection of Environment is our  
Moral and Legal Obligation

**Azad Jammu & Kashmir**  
**Environmental Protection Agency**

Ref #: EPA/2656-60/2017  
Date: 18-08-2017

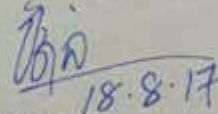
- |                                  |  |
|----------------------------------|--|
| a. Name & Address of Proponent : | Star Hydropower Limited (SHPL, A company of K-water)   |
| b. Description of project:       | Construction of 147 MW Patrind Hydropower Project  |
| c. Location of project:          | Diversion weir on River Kunhar, at Patrind village and Power House at Alda Lower Chatter Muzaffarabad. |

**CONFIRMATION OF COMPLIANCE**

In response to request (case) filed by Star Hydropower Limited (SHPL) under regulation (2) (b) of "AJK-EPA Review of IEE/EIA Regulations, 2009" to seek Written Confirmation of Compliance from the Agency (EPA-AJK)—that the Conditions of the Approval and the requirements given in EIA relation to Design, Construction, Adoption of mitigation and other relevant matters have been duly complied with. AJK-EPA, after review of the Compliance Report submitted by SHPL and subsequent upon in the light of findings of sites verification, hereby confirms under regulation 14 (3) *ibid* that during Construction of 147 Patrind Hydropower Project, the proponent (SHPL) has adequately complied with the Conditions of Environmental Approval granted by the Agency and requirements in relation thereto given in the EIA. However, the concerns of EPA to the extent of shifting of Switchyard from left bank of the river to right bank, without securing prior approval, as required by the Conditions No. 22, are reiterated and validly stands.

2. For the Construction Phase of the project, the proponent shall be liable to carryout Environmental Audit through 3<sup>rd</sup> Party. The proponent shall also be liable to prepare and execute the plan for the remaining activities of Corporate Social Responsibility (CSR) and submit a report within one month of issuance of this confirmation. This confirmation of compliance should also be read with the Environmental Approval issued herewith by the Agency on Environmental Management Plan (EMP), for the Operational Phase (life) of 147 MW Patrind Hydropower Project.

**Chief Executive Officer,**  
**Star Hydro, K-water Global,**  
**534, Margalla Road, Sector F-10/2,**  
**Islamabad, Pakistan.**

  
(Raja Muhammad Razaque)

**CC.-**

1. ACS (Dev)/Secretary Environment,
2. Secretary PDO,
3. Secretary Electricity,
4. Master File.

Govt. of AJ&K, Muzaffarabad.