Environmental Monitoring Report

PUBLIC

July to December 2024 Report
January 2025

Pakistan: Balakot Hydropower Development Project

Prepared by the Project Implementation Unit of the Pakhtunkhwa Energy Development Organization, for the Islamic Republic of Pakistan and the Asian Development Bank (ADB).

ABBREVIATIONS

ADB	Asian Development Bank
AIIB	Asian Infrastructure Investment Bank
AQMS	Air Quality Monitoring System
CO	carbon monoxide
dB	decibel
DFO	Divisional Forest Officer
EE	Environment Expert
EEM	External Environmental Monitor
EIA	Environmental Impact Assessment
EPC	engineering, procurement and construction
GHG	greenhouse gases
HPP	hydropower project
HSE	health, safety, and environment
IRRE	Institute for Research on River Ecology
km	kilometer
KP	Khyber Pakhtunkhwa
MW	megawatt
NEQS	National Environmental Quality Standards
NOC	No Objection Certificate
OHS	occupational health and safety
PD	Project Director
PEDO	Pakhtunkhwa Energy Development Organization
PIU	Project Implementation Unit
PM	particulate matter
PMC	Project Management Consultant
SAEMR	Semi-Annual Environmental Monitoring Report
SDFO	Sub-Divisional Forest Officer
SO_2	Sulphur dioxide
SSEMP	Site-Specific Environmental Management Plan
WHO	World Health Organization

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1. INTRODUCTION

1.1. Preamble

1. This is the seventh Semi-Annual Environmental Monitoring Report (SAEMR) for the Balakot Hydropower Project (HPP,300 megawatt [MW]) covering the reporting period from July to December 2024.

1.2. Headline Information

2. During the reporting period, the detailed engineering design, including the design of muck disposal areas and sedimentation tanks; and review of the engineering, procurement, and construction (EPC) Contractor's method statements/technical reports remained in progress. On-site, construction activities continued robustly at the dam site, residential colony, access roads, and the headrace tunnel. Also, protection works and the establishment of a camp at the powerhouse sites remained in progress during the reporting period.

3. Following comprehensive due diligence and design review of the muck disposal sites at the A2 and A3 adit tunnel locations, the Project Management Consultant (PMC) granted approval for both sites in November 2024. The approved detailed design report includes numerous measures aimed at mitigating negative environmental impacts related to the muck disposal operations, as well as strategies for land restoration.

4. After the meeting held with officials of the Fisheries Department at the Project Director (PD) office on July 31, 2024, in connection with the establishment of the fish hatchery in the project area, the Director General (DG) of the Fisheries Department submitted a proposal containing details of equipment/materials felt necessary for the upgradation of existing Shino-Jared fish hatchery in Balakot. The proposal submitted in November 2024, remained under discussion between the Fisheries Headquarter (HQ) and the Project Implementation Unit (PIU) till the end of the reporting period.

5. On August 8, 2024, the External Environmental Monitor (EEM) conducted a site audit of the project facilities, including the camps. Major observations recorded during the visit included an oil spillage at the A-3 Batching Plant and delays in the design of proper sedimentation tanks at all three adits. Additionally, minor observations were noted, such as poor housekeeping, missing signage, deficiencies in record keeping, and improper storage of materials. The EPC Contractor promptly addressed the oil spillage and submitted a report within two days of the EEM visit. The minor observations, shared with the EPC Contractor in the form of a Corrective Action Plan (CAP), were mostly rectified by the end of the reporting period.

6. During September 2024, the EPC Contractor shifted his main camp, also known as A2 camp, to the existing camp facility previously used by the Sukki Kinari HPP (884 MW) construction staff. This new camp facility is located in the Paras village between the left bank of the Kunhar River and the N-15 (Balakot- Naran Road). The PMC conducted an environmental audit of the camp in November 2024 and furnished an environmental audit report whereby the gaps identified were reported to the EPC Contractor for necessary rectification.

7. On October 10, 2024, the Environmental Expert of the PMC presented the health, safety, and environment portfolio progress (January to September 2024) to the ADB midterm review (MTR) mission at the PEDO House in Peshawar. Following this, on October 16, 2024, the ADB safeguard team, along with relevant staff from the PIU, PMC, and EPC Contractor, visited the construction sites and camps, and observed several gaps in implementation of the HSE aspect of the works . These observations were subsequently shared with the EPC Contractor in the form of a CAP for necessary rectifications.

8. During the reporting period, the ADB and AIIB reviewed the updated EIA report submitted in August 2024. They conveyed their review comments in writing and during a virtual meeting held on October 31, 2024. The PMC then revised the EIA report based on these comments and submitted it to the PIU on December 25, 2024, for further review and subsequent transmission to the relevant quarters in the ADB and AIIB.

9. The EPC Contractor's six-month vocational training program for eligible candidates from the project-affected community, which began in May 2024 at the Government Skill Development Centre Hassa Balakot, was completed in October 2024. A total of 18 students (7 male and 11 female) were trained in various trades, including tailoring, beautician services, computer operation, and electrician work.

10. To fulfil the requirements of the project's environmental management plan (EMP), the EPC Contractor organized a two-day annual occupational health and safety (OHS) training on November 27 and 28, 2024, at the site. The training included presentations at the camp and field demonstrations at the site, conducted by professionals from Rescue 1122 of District Mansehra.

11. On December 5, 2024, an incident occurred due to the collapse of the crown inside the headrace tunnel while the EPC Contractor's workforce was fixing and installing wire mesh as part of support work. The accident resulted in injuries to three labors, who were quickly rushed to the hospital. Unfortunately, one of the labors succumbed to the injuries and died the following day. Of the remaining two, one was discharged from the hospital on the same day, while the other remained hospitalized in stable condition until the end of the reporting period.

12. During the reporting period, the EPC Contractor conducted a regular health, safety, and environment (HSE) champion program. Awards were distributed to the Contractor's staff who adhered to HSE provisions, followed safety protocols, and trained other workers while performing their assigned duties.

13. Organizing a champion program is one of the tools to encourage workers to consistently follow safety protocols and implement safety measures at work sites. During this reporting period, the HSE champion award ceremony was held on December 27, 2024, where cash prizes were awarded to 18 champions for July through December 2024. Typically, three skilled or unskilled labors/staff from the EPC Contractor's workforce, who regularly adhered to safety protocols and motivated other staff to do the same, were selected as HSE champions of the month.

2. PROJECT DESCRIPTION AND CURRENT ACTIVITIES

2.1. Project Description

14. Balakot HPP (300 MW) is a run-of-the-river scheme to be constructed on the Kunhar River in its 12-kilometer (km) stretch from Paras to Sangar village in District Mansehra of Khyber Pakhtunkhwa (KP) province. Upon completion, 1,143 gigawatt hours of clean energy will be delivered to the national grid yearly.

15. The Project dam site is located in Paras village, around 2 km downstream of the Sukki Kinari HPP (884 MW) tailrace, while the powerhouse site is proposed in Ganhool village of Balakot. The 9.1 km-long headrace tunnel of 8-meter (m) diameter will divert 154 m^3/second design flow of the Kunhar River water to the powerhouse to generate 300 megawatts of electricity. The Project residential colony is identified in Sangar village.

16. Access road to the dam and power intake is proposed to off-take from National Highway (N-15) on the left side of the Kunhar River in Paras village.

17. As exhibited in the EPC Contract, the following is the brief scope of works:

- Project basic and detailed design
- Temporary works
- Diversion works
- Construction of dam
- Intake structures
- Adit tunnels (adits-1,2 and 3)
- Headrace tunnel
- Surge shaft
- Powerhouse
- Access roads (temporary and permanent)
- Residential colony
- Switchyard
- Transmission line

18. The Project brief salient features are in **Table 2.1** followed by location maps and the Project setting in **Figures 2.1** to **2.5.**

Table 2.1: Brief Salient Features

S/NO	DESCRIPTION	UNIT	DETAIL
1	**HYDROLOGY AND DESIGN FLOWS**		
1.1	River		Kunhar
1.2	Catchment area of the dam site	km^2	1939
1.3	(Average) flow at the intake	m^3/s	87
1.4	Design Discharge	m^3/s	153.9
1.5	Design Flood T=10,000 years	m^3/s	3706
1.6	Probable Maximum Flood	m^3/s	5043
2	**RESERVOIR**		
2.1	Normal Operating Level (NOL)	masl	1288.0
2.2	Minimum Operating Level (Min. OL)	masl	1283.0
2.3	Surface area (at NOL)	km^2	0.28
2.4	Reservoir length (at NOL)	km	2.2
2.5	Gross storage capacity (at NOL)	$X10^6\ m^3$	3.65
2.6	Regulating storage capacity (NOL)	$X10^6\ m^3$	1.2
3	**DAM STRUCTURE**		
3.1	Dam type		Curved Concrete Gravity Dam
3.2	Dam crest elevation	masl	1292.0
3.3	Maximum height above the riverbed	m	35.0
3.4	Maximum height above foundation	m	49.0
3.5	Crest length	m	146.0
4	**SPILLWAYS AND LOW-LEVEL OUTLETS/FLUSHING SLUICES**		
4.1	Spillway type		Upper WES spillway + bottom outlet
4.2	Upper spillway crest elevation	masl	1278.0
4.3	Upper spillway gates no. and type		3 (radial gates)
4.4	Upper spillway gates size (W x H)	mxm	11 X 10
4.5	Bottom outlet invert elevation	masl	1253.0
4.6	Bottom outlet gates no. and type		2 ~~3~~ sluice gate + 2 radial gate
4.7	Low-level spillway size (W x H)	mxm	6x8
5	**RIVER DIVERSION**		
5.1	Construction Flood	m^3/s (T=20 years)	900
5.2	Diversion type		Diversion tunnel + bottom outlet, with cofferdam
5.3	Upstream Coffer dam type		CSG cofferdam
5.4	Upstream coffer dam crest elevation	masl	1272.0
5.5	Downstream coffer dam type		CSG cofferdam
5.6	Downstream coffer dam crest elevation	masl	1252.5
5.7	Diversion tunnel type		Archway
5.8	Diversion tunnel no. (-)		1
5.9	Diversion tunnel size (W x H)	mxm	Archway (7,5 x 8,0)
5.10	Diversion tunnel length	m	650
5.11	Diversion tunnel slope	%	1.5

S/NO	DESCRIPTION	UNIT	DETAIL
5.12	Diversion tunnel inlet invert elevation	masl	1261.0
5.13	Diversion tunnel outlet invert elevation	masl	1248.0
6	**POWER INTAKE STRUCTURE**		
6.1	Intake type		Bank-type intake
6.2	Trash racks no.		4
6.3	Trash rack size (W x H)	mxm	8 x 1 0
6.4	Service gates no.		2 (1 emergency gate)
6.5	Service gate size (W x H)	mxm	4 x 8
6.6	Intake crest elevation	masl	1271.0
7	**HEADRACE TUNNEL**		
7.1	Tunnel section		Circular concrete lined (8.0 m inner diameter)
7.2	Length up to surge tank	m	9137
7.3	Tunnel slope		0.56%、0.00%、1.11%
8	**UPSTREAM INCLINED SURGE TUNNEL**		
8.1	Type		Concrete lined circular surge shaft+inclined surge tunnel
8.2	Internal diameter	m	14.5
8.3	Length of surge tunnel	m	568
8.4	Bottom elevation of surge shaft	masl	1203
9	**PRESSURE TUNNEL/SHAFT & PENSTOCK**		
9.1	Pressure tunnel/shaft main section type and size		Steel-lined circular cross-section (5.6 m internal diameter)
9.2	Pressure tunnel/shaft length	m	375
9.3	Penstock length	m	88
9.4	Branch Section Type		Manifold (3 branches)
9.5	Size of each branch	m	2.2m internal diameter conduits
9.6	Max. Length of branch	m	～30
10	**POWERHOUSE AND SUBSTATION**		
10.1	Powerhouse type		Conventional underground cavern
10.2	Main cavern general dimensions (L x W x H)	m	89.28x20.40x37.86
10.3	Turbine type		Francis
10.4	Number of units		3
10.5	Turbine axis elevation	masl	1054,0
10.6	Transformer/Substation type		Underground cavern (adjacent to the main powerhouse cavern)
10.7	Transformer cavern general dimensions (L x W x H)	m	94.82 x17.40 x31.79
11	**DOWNSTREAM INCLINED SURGE TUNNEL**		
11.1	Type		Concrete-lined inclined surge tunnel
11.2	Internal diameter	m	7.5x9.125
11.3	Length of surge tunnel	m	505
11.4	Surge tunnel bottom elevation	masl	1028.0
12	**TAILRACE**		

S/NO	DESCRIPTION	UNIT	DETAIL
12.1	Type		Circular tunnel with transition to an archway section at the final length and Outlet portal
12.2	Tunnel section		Circular concrete lined (8.0 m diameter)
12.3	Length up to the final transition section	m	1646.5
12.4	Tunnel slope up to the final transition section	%	0.122%, -18.45% (ascending slope)
12.5	Tunnel final section		Archway concrete lined section (8.0 W x 8.0 H)
12.6	Length from transition to outlet	m	50
12.7	Tunnel slope up to the outlet portal	%	0.23 (ascending slope)
13	**POWER AND ENERGY**		
13.1	Gross Head	m	229.0
13.2	Design Net Head (m)	m	217.6
13.3	Installed plant capacity	MW	300 (at the generator)
13.4	Average annual energy production	GWh	1144（average of 55 years）
14	**PROJECT ACCESS FACILITIES**		
14.1	Access road to dam Left side R1 (length)	m	512 m (from Sharan Road, connection to National Highway N-15 at the left side of Kunhar River, nearby Paras village)
14.2	Access road to Diversion tunnel R2 (length)	m	138m (from the dam bridge deck up to the Sediment by-pass tunnel intake)
14.3	The access road to the Main Access tunnel Power House R3 (length)	m	3254m (From Sangar connection from National Highway N-15 to Main Access tunnel Power House
14.4	The access road to Surge tank R4 (length)	m	290m (from National Highway N-15 to access road Surge tank
14.5	The access road to Tailrace Tunnel R5 (length)	m	823m (from R3 connection to tailrace tunnel
14.6	Access road to Permanent staff Residential Colony R6 (length)	m	611m (from N15 connection to Resident colony
14.7	Permanent Staff Residential Colony	m^2	Covered area= 11995.5 m^2

Figure 2.1: Project Location in Pakistan

Figure 2.2: Project Location in District Mansehra

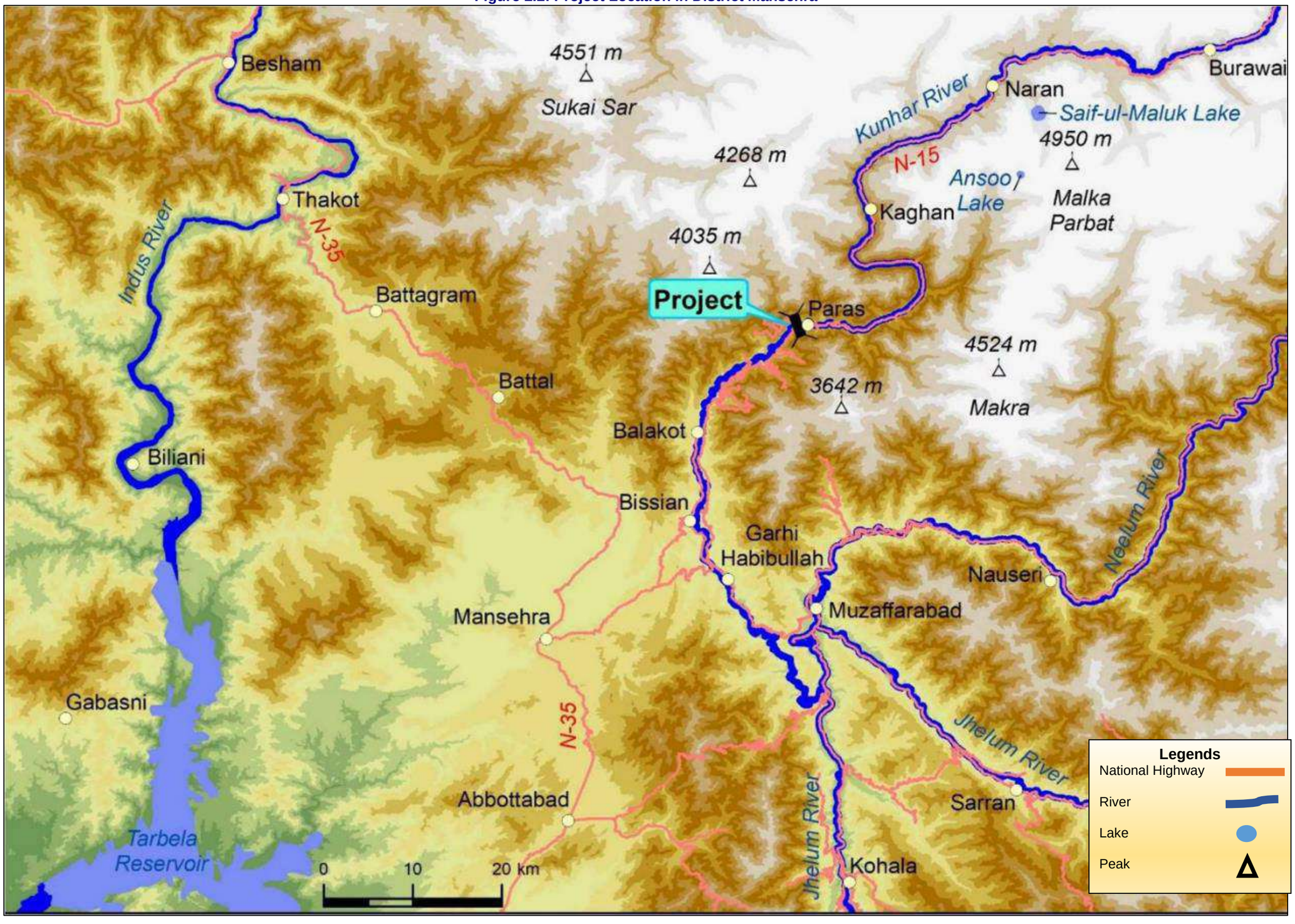


Figure 2.3: Project Layout Map

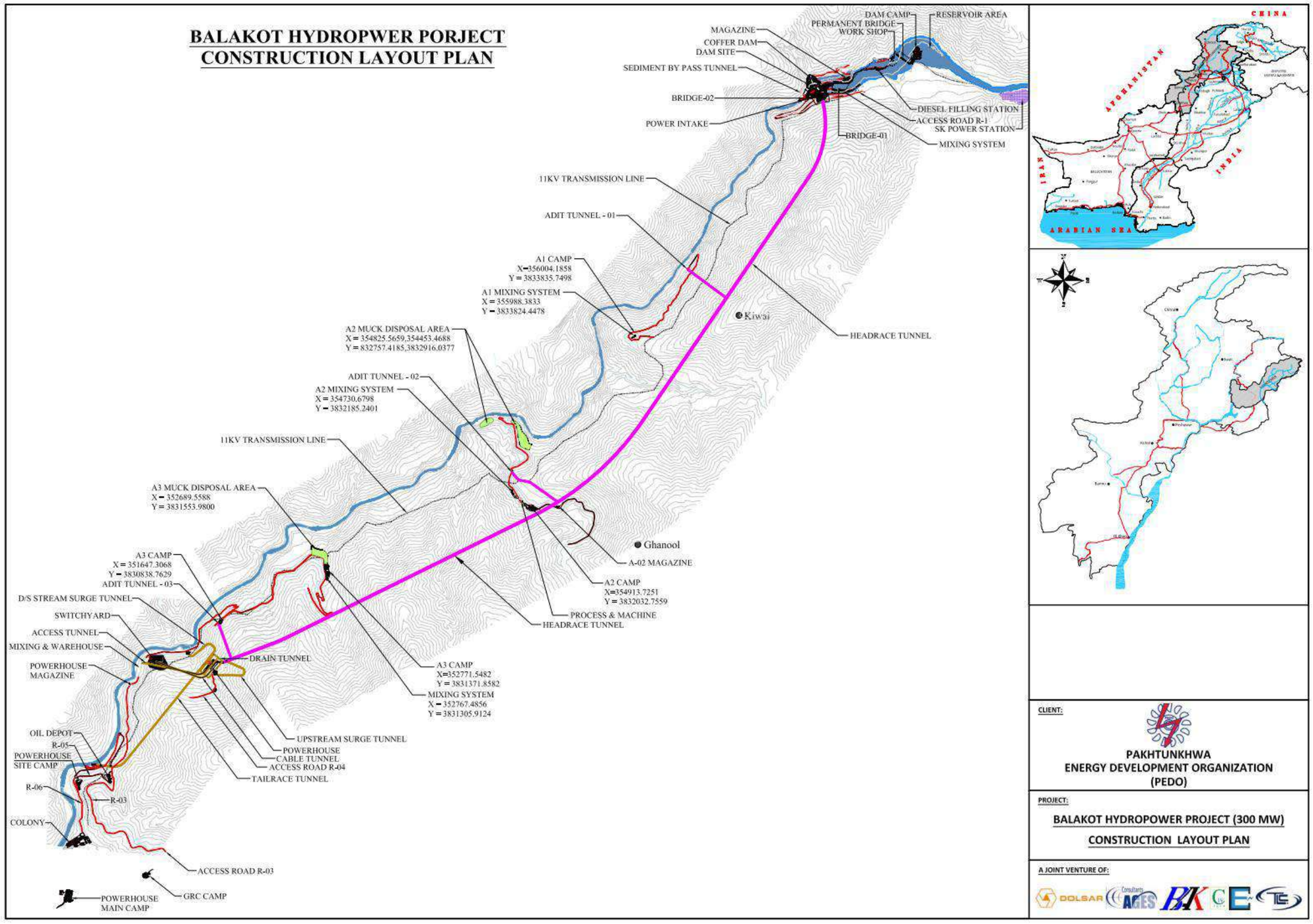
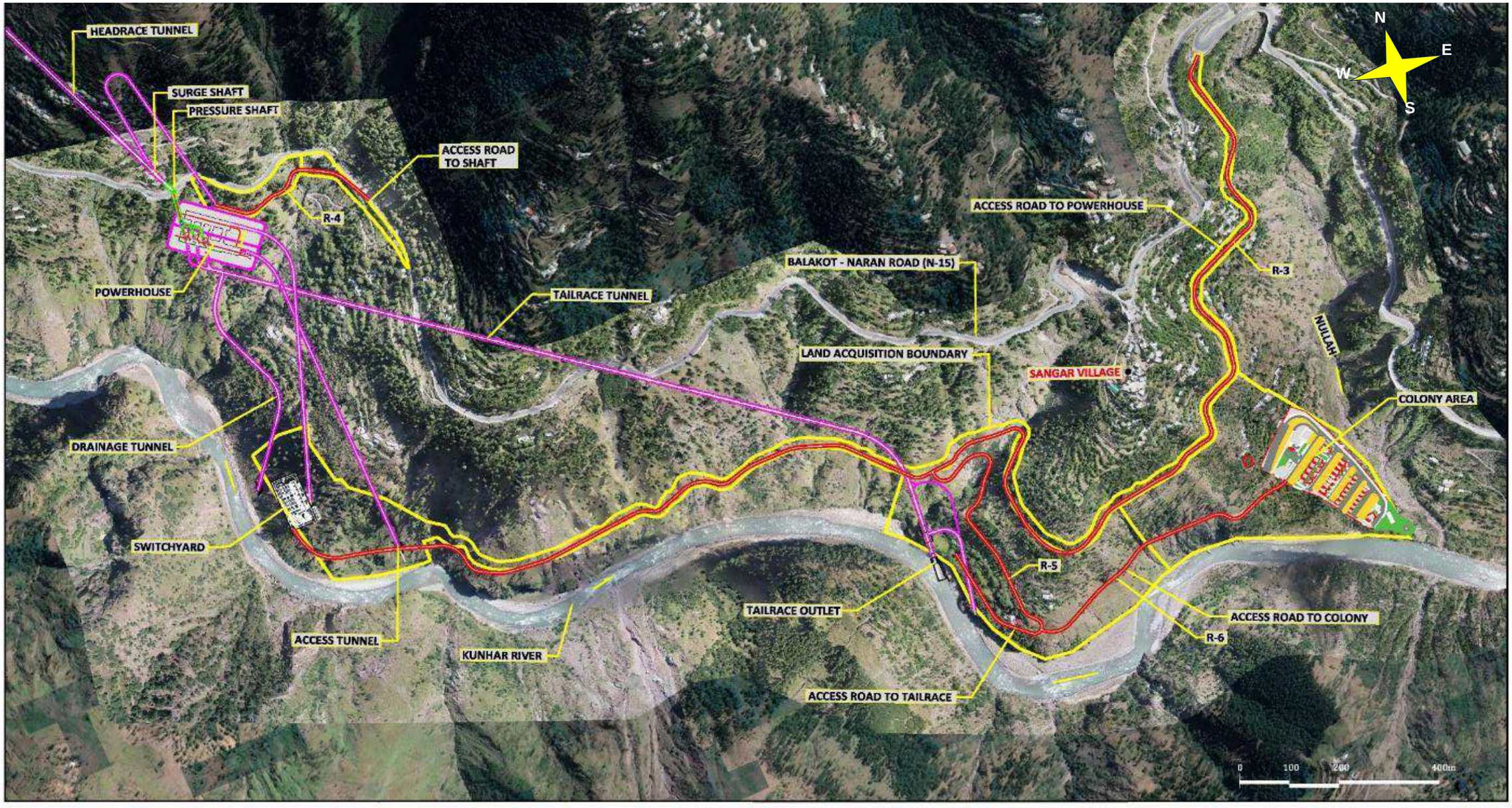


Figure 2.4: Project Setting-Dam site

Figure 2.5: Project Setting-Powerhouse and Colony sites



2.2. Project Contracts and Management

2.2.1. Project Implementation Arrangements

19. Balakot HPP (300 MW) is being implemented through the arrangements in **Table 2.2**.

Table 2.2: Project Implementation Arrangement

Arrangement	Organization/Agency
Funding Sources	• Asian Development Bank (ADB) and Asian Infrastructure Investment Bank (AIIB) through a loan to the Government of Pakistan (Loan No: 4057/8397 (AIIB)-PAK) • Government of Khyber Pakhtunkhwa
Executing Agency	Energy and Power Department, Government of Khyber Pakhtunkhwa
Implementing Agency	Pakhtunkhwa Energy Development Organization (PEDO), Government of Khyber Pakhtunkhwa
Project Management Consultant	Joint Venture of: • DOLSAR Engineering Inc. Co. (Turkey) Lead Firm • AGES Consultants • BAK Consulting Engineers • CivTech Associates • Electra Consultants • Techno Legal Consultants (Pvt.) Limited from Pakistan
EPC Contractor	Joint Venture of China Gezhouba Group Company (CGGC), China & Ghulam Rasool and Company Pvt. Ltd (GRC), Pakistan

20. For the Project development, the government of KP signed a loan agreement with ADB on May 21, 2021, which became effective on July 7, 2021.

21. As AIIB is the co-financier of the Project, the loan agreement was also signed with AIIB which is effective from October 25, 2021.

Consultancy Services Contract Award (2020)

Construction Contract Award (2021)

22. Brief details of the PIU, PMC, and the EPC Contractor are given hereunder.

23. **PIU.** The PIU of Balakot HPP (300 MW), responsible for procurement and supervision of the Project, is currently under establishment by the Implementing Agency (IA), i.e. Pakhtunkhwa Energy Development Organization (PEDO).

24. **Figure 2.6** shows the organogram of the PIU wherein, as exhibited in **Table 2.3,** the PD, deputy directors, and assistant directors along with some of the support staff are already on board, while procurement of the remaining personnel will be initiated when need arise.

Figure 2.6: PIU Organogram

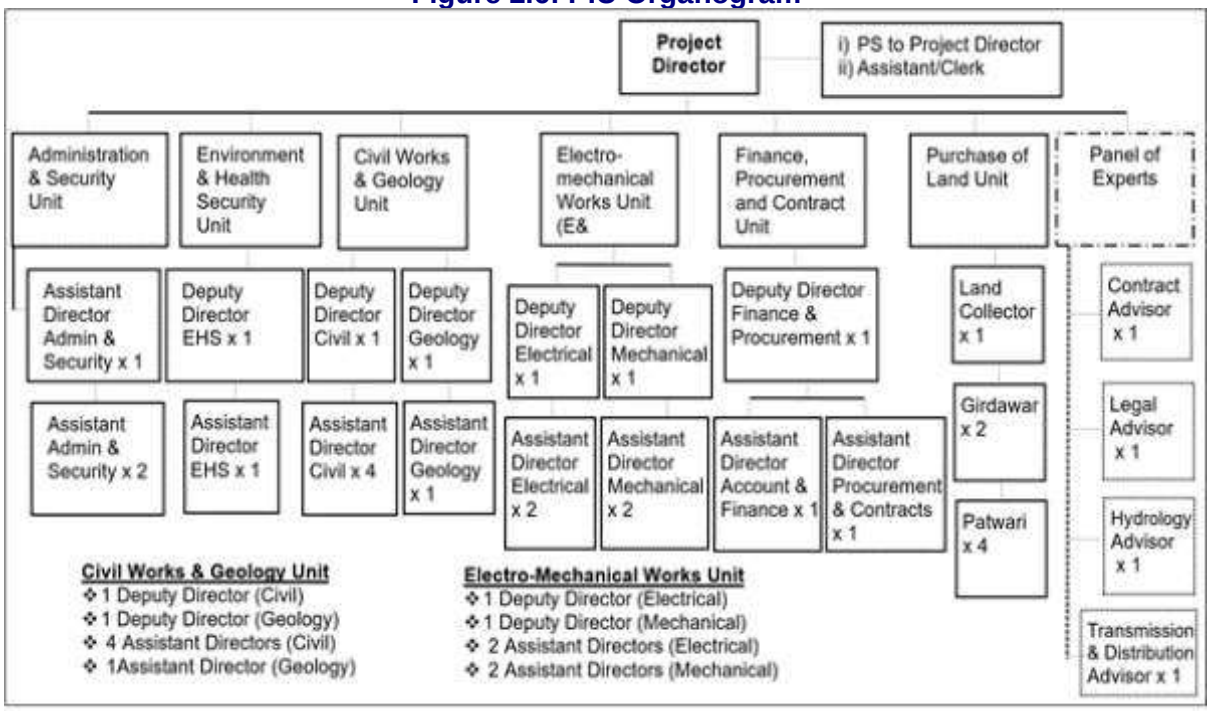


Table 2.3: PIU Staff Deployed During the Reporting Period

Staff Designation	Male/Female	No
Project Director (PD)	M	1
Deputy Director (Civil)	M	2
Deputy Director (Social & Resettlement)	M	1
Deputy Director (Environment Health, Safety, and Gender)	F	1
Deputy Director (Finance)	M	1
Deputy Director (Geology)	M	1
Deputy Director (Monitoring and Evaluation)	M	1
Assistant Director (Finance)	M	1
Assistant Director (Electrical)	M	2
Account Assistant	M	1
Land Patwari	M	1
Assistant Director (Social and Resettlement)	F	1

25. As evident from the table above, PIU is headed by the PD with whom the overall responsibility of environmental management and monitoring rests. He is assisted by the Environment and Health Security Unit in matters about the environmental, health, and safety (HSE) aspects of the Project. In this regard, Ms. Ibtesaam Zaima, the Deputy Director, HSE and Gender is on board since March 2022 with full-time inputs and can be reached via:

Phone No: +92-3319844851
Email ID: ibtesaamzaima3@gmail.com

26. The Deputy Director, HSE and Gender will be assisted by an Assistant Director (Social and Resettlement) who joined PIU in the last week of December 2022.

27. Under the provisions of the EPC Contract, the PIU project office was established in Balakot at the address given below and has been operational since June 2022.

PIU Balakot HPP (300 MW) Site Office
County Hotel, Shohal Najaf Khan
Kaghan Road Balakot
District Mansehra
Khyber Pakhtunkhwa, Pakistan
Phone No. 0997-360003

28. **PMC.** On September 3, 2020, PEDO entered into a Management Consultancy Service Agreement for Balakot HPP (300 MW) with the joint venture (JV) of DOLSAR Engineering Inc. Co. (Turkey), AGES Consultants, BAK Consulting Engineers, CivTech Associates, Electra Consultants, and Techno Legal Consultants (Pvt.) Limited from Pakistan. The JV is led by DOLSAR Engineering Inc. Co. (Turkey).

29. Consultancy services have been effective for 84 months since the commencement of services on September 11, 2020. During this period, the JV will provide services specified in the consultancy contract as PMC, and will act on behalf of PEDO as the "Project Manager/Engineer".

30. **Table 2.4** shows the chronological order of the procurement of consultancy services.

Table 2.4: PMC Procurement Milestones

S/No	Description	Date
1	Expression of Interest	July 29, 2019
2	Technical & Financial Proposals	November 29, 2019
3	Opening of Financial Proposals	May 19, 2020
4	Contract Negotiation Meetings	August 6 and 07, 2020
5	ADB Comments on / Concurrence to Negotiated Contract	August 25, 2020
6	Signing of Contract for Consultancy Services	September 3, 2020
7	Commencement of Services	September 11, 2020

31. **Table 2.5** exhibits details of the PMC's personnel deployed during the reporting period.

Table 2.5: PMC's Personnel Deployed to the Project

S/No	Designation	Inputs
Key Staff (International)		
1.	Project Manager - Team Leader	Full Time
2.	Procurement Expert	Intermittent
3.	Contract Manager	Intermittent
4.	Geotechnical Expert	Intermittent
5.	Hydraulics Expert	Intermittent
6.	Sediment Management Expert	Intermittent
7.	Hydro-Mechanical Expert	Intermittent
8.	Electrical Expert	Intermittent
Key Staff (National)		
1.	Deputy Team Leader	Full Time
2.	Contract Specialist	Full Time
3.	Document Controller (Monitoring)	Full Time
4.	Chief Engr. (Dam & Surface Works)	Full Time
5.	Chief Engr. (Underground Works)	Full Time

S/No	Designation	Inputs
6.	Civil Engineer (Other Surface Works)	Full Time
7.	Quality Assurance Engr. (Dam & Surface Works)	Full Time
8.	Civil Engineer (Tunnel)	Full Time
9.	Quality Assurance Engr. (Underground Works)	Full Time
10.	Health and Safety Monitor	Full Time
11.	Geologist - A	Full Time
12.	Electricity Tariff and PPA Expert	Intermittent
13.	Transmission Line Engineer	Intermittent
14.	Resettlement Expert	Intermittent
15.	Gender/Community Mobilization Expert	Intermittent
16.	Environmental Expert	Intermittent
17.	Structural Engineer	Intermittent
Non-Key Staff (National)		
1.	Planning Engineer	Full Time
2.	Cost / Time Controller	Full Time
3.	Environmental Officer	Full Time
4.	CAD Operators	Full Time
5.	Resettlement Assistant	Full Time
6.	Office Assistant	Full Time
7.	Accounts Assistant	Full Time
8.	Computer Operator	Full Time
9.	Office Manager	Full Time
10.	Inspectors (Dam & Surface Works)	Full Time
11.	Inspectors (Dam & Surface Works)	Full Time
12.	Inspectors (Dam & Surface Works)	Full Time
13.	Inspectors (Underground Works)	Full Time
14.	Inspectors (Underground Works)	Full Time
15.	Inspectors (Underground Works)	Full Time
16.	Inspectors (Underground Works)	Full Time
17.	Inspectors (Underground Works)	Full Time
18.	Lab. Technician	Full Time
19.	Lab. Technician	Full Time
20.	Lab. Technician	Full Time
21.	Lab. Technician	Full Time
22.	Junior Engineer	Full Time
23.	Junior Engineer	Full Time
24.	Junior Engineer	Full Time
25.	Junior Engineer	Full Time
26.	Junior Engineer	Full Time
27.	Architecture	Intermittent
28.	Junior Geologist	Full Time
29.	Junior Geologist	Full Time
30.	Junior Geologist	Full Time
31.	Junior Geologist	Full Time
32.	Office Assistant	Full Time
33.	Accountant	Full Time

S/No	Designation	Inputs
34.	Computer Operator	Full Time
35.	Patwari-1	Full Time
36.	Patwari-2	Full Time

32. Since the commencement of the consultancy services, Engineer Assad Ali Khan, the PMC's Environmental Expert (EE) is on board with intermittent inputs. The EE can be approached through:

Phone No: +92-3369555505
PMC official email ID: dtlbalakothpp@yahoo.com

33. Najm-u-Saqib, an Environmental Officer, joined the PMC environmental team on December 12, 2024, and is now stationed at the PMC's field office in Paras village (Dam site). He is supervising the environmental portfolio activities at the site and can be reached via:

Phone No: +92- 3469750663
PMC official email ID: dtlbalakothpp@yahoo.com

34. Also, the Health and Safety Monitor, Mr. Syed Ali Fawad Shah, who joined PMC on December 27, 2022, can be reached via:

Phone No: +92- 3331162119
PMC official email ID: dtlbalakothpp@yahoo.com

35. The PMC has established two offices in the project area and at the site at the address given below. These offices are operational since June 2022 and August 2023, respectively.

PMC Office in the Project Area
Four Seasons Hotel, Near PTCL Exchange
Kaghan Road Balakot
District Mansehra
Khyber Pakhtunkhwa, Pakistan
Phone No: +92-997-360155

PMC Site Office
Royal Paras Hotel, Opposite Sohail Filling Station,
Kaghan Road Paras, Tehsil Balakot
District Mansehra
Khyber Pakhtunkhwa, Pakistan
Phone No: +92-997-360155

36. **EPC Contractor.** The construction contract of Balakot HPP (300 MW) was awarded to the JV of China Gezhouba Group Company (CGGC), China & Ghulam Rasool and Company Pvt. Ltd (GRC), Pakistan on March 9, 2021.

37. Consequent to fulfillment of the requisite conditions of the EPC Contract, PEDO notified September 27, 2021, as the Effective Date for the EPC Contract.

38. Various milestones achieved during the procurement process of the EPC Contract are in **Table 2.6.**

Table 2.6: EPC Contract Procurement Milestones

S/No	Description	Date
1.	Invitation for Bids	November 23, 2019
2.	Site visit to Bidders	December 10, 2019
3.	Pre-Bid Meeting	December 13, 2019
4.	Bid Submission	June 15, 2020

S/No	Description	Date
5.	Technical Bid Opening	June 15, 2020
6.	Financial Bid Opening	December 15, 2020
7.	Notification of Award	February 10, 2021
8.	Contract Signing	March 09, 2020
9.	Effective Date	September 27, 2021

39. The EPC Contractor's environmental obligations are mainly specified in Volume-01 of 07 (Appendix-9) and Volume-03 of 07 (GCC & SCC) of the EPC Contract.

40. Under the provisions of the conditions of the contract, preparation of the SSEMP is one of the EPC Contractor's contractual obligations. Accordingly, the EPC Contractor prepared SSEMP which is primarily based on the essence of the approved EIA report and site requirements, with due emphasis given to the Safeguard Policy Statement 2009 guidelines and conditions contained in the "Environmental Approval" granted by the Khyber Pakhtunkhwa Environmental Protection Agency (KPEA) on July 6, 2021. The Employer approved the SSEMP on December 30, 2022, before the initiation of the construction activities at the site.

41. In the last week of December 2024, after the EPC Contractor had finalized the locations for camps, batching plants, access roads, sedimentation tanks, and magazines, and had obtained approval for two muck disposal sites, the PMC instructed the EPC Contractor to update the approved SSEMP by January 15, 2025.

42. During all three phases of the project i.e. pre-construction, construction, and the defects liability period (DLP), the EPC Contractor will manage the health, Safety, and Environment (HSE) portfolio by implementing the measures outlined in the SSEMP, adhering to good practices, following issued instructions, and addressing gaps identified in monitoring reports throughout the duration of the contract.

43. **Figure 2.7** exhibits the EPC Contractor's HSE organogram followed by **Table 2.7** showing details of the HSE team on board so far.

Figure 2.7: EPC Contractor' HSE Team Organogram

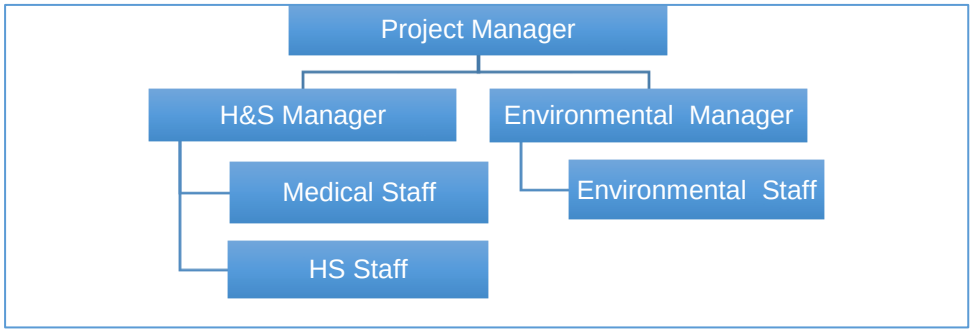


Table 2.7: EPC Contractor's HSE Team

S/NO	Name	Designation	Duty Station	Contact Number
1.	Qi Xiu Feng	H & S Manager	Site and Office	+92-345-5386888
2.	Li Yong	QHSE Director	Site and Office	+92-344-1789770
3.	Hai Xinglong	Quality and Environment Engineer	Site and Office	+92-341-407665
4.	Irshad Saeed	Environmental Manager	Site and Office	+92-305-9028481
5.	Zul Qarnain	HSE Manager	Site and Office	+92-331-9025035
6.	Wang Chaowei	QHSE Officer	Site and Office	+92-344-1783042
7.	li Zhen Ning	HSE Officer	Site and Office	+92-344-1787845

S/NO	Name	Designation	Duty Station	Contact Number
8.	Wu Qiaojin	HSE Officer	Site and Office	+92-341-0407671
9.	Saeedul Haq	HSE Officer	Dam Site	+92-346-8292024
10.	Momin Khan	HSE Officer	A3 Adit Tunnel	+92-315-1855378
11.	Syed Hassan Shah	HSE Officer	Dam Site	+92-343-2152402
12.	Rashid Hussain	HSE Officer	A3 Adit Tunnel	+92-341-9304247
13.	Muhammad Ajmal	HSE Officer	A2 Adit Tunnel	+92-301-3381622
14.	Syed Ahsan Ali	HSE Officer	A2 Adit Tunnel	+92-341-4351519
15.	Syed Ubaidullah	HSE Officer	Dam Site	+92-342-5870825
16.	Ali Haider Shah	HSE Officer	Site and Office	+92-310-5005803
17.	Naeem Yousaf	HSE Officer	Site and Office	+92-345-3845827
18.	Tayyab Ur Rehman	HSE Officer	Dam Site	+92-343-9560113
19.	Zeeshan Siddique	HSE Officer	Powerhouse	+92-349-5323408
20.	Zeeshan Ahmed	HSE Officer	Powerhouse	+92-347-2229888
21.	Saddam Hussain	HSE Officer	Powerhouse	+92-345-6321546
22.	Shahmeer	Assistant HSE Officer	A3 Adit Tunnel	+92-342-7274498

2.2.2. Project HSE Safeguard Team

44. From the details given above, the HSE personnel responsible for the HSE safeguards are detailed in **Table 2.8**.

Table 2.8: Details of HSE Personnel

Organization	Job Title	Name	Contact Details
ADB	Principal Environmental Specialist (Country Environment Focal)	Nurlan Djenchuraev	ndjenchuraev@adb.org
	Environment Specialist (Consultant) Pakistan Resident Mission	Shazia Shahid	sshahid.consultant@adb.org
PIU	Deputy Director HSE and Gender	Ibtesaam Zaima	ibesaamzaima3@gmail.com
PMC	Environmental Expert	Assad Ali Khan	dtlbalakothpp@yahoo.com
	Health and Safety Monitor	Fawad Ali Shah	
	Environmental Officer	Najm-u-Saqib	
EPC Contractor	H & S Manager	Qi Xiu Feng	cggcgrcjvbk@gmail.com
	QHSE Director	Li Yong	
	Quality and Environment Engineer	Hai Xinglong	
	Environmental Manager	Irshad Saeed	
	HSE Manager	Zul Qarnain	
	QHSE Officer	Wang Chaowei	
	HSE Officer	li Zhen Ning	
	HSE Officer	Wu Qiaojin	
	HSE Officer	Saeed-ul-Haq	
	HSE Officer	Momin Khan	
	HSE Officer	Syed Hassan Shah	
	HSE Officer	Rashid Hussain	
	HSE Officer	Muhammad Ajmal	
	HSE Officer	Syed Ahsan Ali	
	HSE Officer	Syed Ubaidullah	
	HSE Officer	Ali Haider Shah	
	HSE Officer	Naeem Yousaf	
	HSE Officer	Tayyab Ur Rehman	
	HSE Officer	Zeeshan Siddique	
	HSE Officer	Zeeshan Ahmed	
	HSE Officer	Saddam Hussain	
	Assistant HSE Officer	Shahmeer	

2.3. Project Activities during the Current Reporting Period

45. During the reporting period, the detailed engineering design, including the design of muck disposal areas and sedimentation tanks; and review of EPC Contractor's method statements/technical reports remained in progress. On-site, construction activities continued robustly at the dam site, residential colony, access roads, and the headrace tunnel. Also, protection works and the establishment of a camp at the powerhouse sites remained in progress during the reporting period.

46. **Table 2.9** summarizes the EPC contract and overall works progress achieved so far. **Table 2.10** exhibits component-wise progress achieved till the end of the reporting period against planned targets.

Table 2.9: Summary of Overall Works Progress till End of the Reporting Period

Contract Signing	SSEMP[1] Approval	Personnel		Civil Works[2]		Progress as of	
		Environmental Manager	Health and Safety Manager	Start	End	June 30, 2024	December 31, 2024
March 9, 2020	December 30, 2022	Irshad Saeed	Qi Xiu Feng	September 28, 2022	January 1, 2027	10.87%	13.83

Table 2.10: Component-wise Summary of Works Progress till End of the Reporting Period

Description	Planned Start	Planned Finish	Planned %age	Achieved % Progress
Preparatory works	28-Aug-21	27-Feb-23	100%	83.3% / 16.7%
Basic Design	21-Sep-21	27-Sep-22	100%	100.0% / 0.0
Detail Design	29-May-22	26 Dec-27	60%	23.2% / 76.8%
Procurement & Production & Test & transportation	29-Jul-22	30-May-26	63%	0.0% / 100.0%
River Diversion	1-Oct-22	27-Nov-23	100%	6.0% / 94.0%
Concrete Dam	19-Jun-23	27-Jan-27	42%	0.0% / 100.0%
Power Intake Works	28-Jan-23	28-Jul-24	100%	0.0% / 100.0%
Headrace Tunnel	13-Oct-22	27-Jun-26	60%	12.2% / 87.8%
Upstream Surge Tank, Pressure Shaft & Penstocks	23-Apr-23	28-Jul-25	75%	0.0% / 100.0%
Main Access Tunnel & Ventilation and Cable Tunnel	16-Nov-22	18-Oct-26	57%	5.0% / 95.0%
Powerhouse Works	4-Jun-23	20-Dec-25	52%	0.0% / 100.0%
Tailrace Tunnel Downstream Surge Shaft	29-Jul-23	27-Feb-26	55%	0.9% / 99.1%
Switchyard	16-Apr-23	15-Jan-24	100%	0.0% / 100.0%
Transmission Line Works	28-Sep-22	27-Aug-25	78%	0.0% / 100.0%
Main transformers and other equipment installation	1-Mar-25	30-Nov-26	0%	0.0% / 100.0%
Road and Bridge	1-Oct-22	3-Oct-26	56%	56.2% / 43.8%
Permanent Staff Residential Colony	28-Jun-23	28-Dec-25	60%	40.9% / 59.1%
Erection of Unit1,2,3	29-Apr-26	28-May-27	0%	0.0% / 100.0%
Completion &Taking-over	29-Sep-27	28-Dec-27	0%	0.0% / 100.0%

Planned
Actual

47. The manpower deployed at the site during the reporting period is in **Table 2.11**, followed by the staff deployment trend in the current reporting period in **Figure 2.8.** The comparison between the staff deployment trends in the current and previous reporting periods is exhibited in in **Figure 2.10**.

[1] The SSEMP, approved by the Employer, contained requisite plans.
[2] The start and end dates of the civil works are those contained in the last approved Work Schedule.

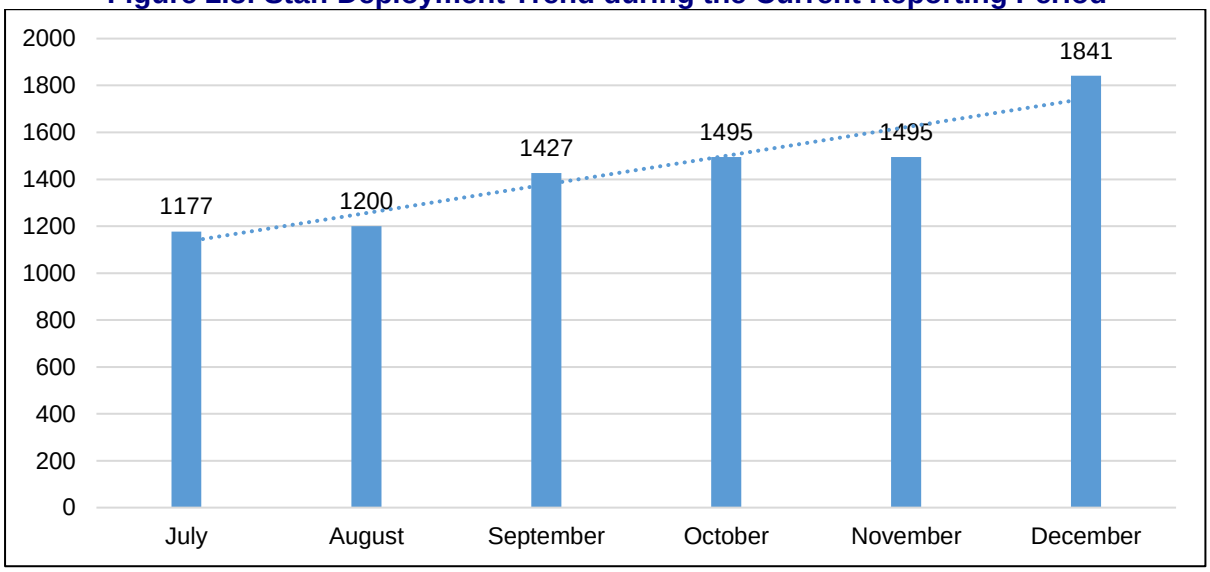
Table 2.11: Manpower Deployed to the Project during the Reporting Period

S/No	Staff	Reporting Month					
		Jul	Aug	Sep	Oct	Nov	Dec
1	Project Manager	1	1	1	1	1	1
2	Planning, Engineering &Technical Director (DPM)	2	2	2	2	2	2
3	QHSE Director (DPM)	1	1	1	1	1	1
4	Contract & Commercial Director (DPM)	1	1	1	1	1	1
5	Equipment and Material Director (DPM)	1	1	1	1	1	1
6	Deputy Director of Technical & Planning	1	1	1	1	1	1
7	Deputy Director of Contract & Commercial	1	1	1	1	1	1
8	Deputy Director of Administrative	1	1	1	1	1	1
9	Environmental Manager	1	1	1	1	1	1
10	Contract & Commercial Management Department	10	10	10	11	11	11
11	Planning, Engineering, &Technical Management Department	21	26	32	34	34	34
12	QHSE Management Department	24	29	32	37	37	37
13	Equipment and Materials Department	17	19	21	24	24	32
14	Financial Management Department	5	6	8	9	9	9
15	Administration & Human Resources Department	45	48	49	50	50	50
16	Mechanical Operators &Driver Team	167	187	198	203	203	269
17	Survey Team	10	15	15	15	15	15
18	Laboratory Team	14	20	21	21	21	41
19	General Team Electricity, water supply, A2 and A3 and Dam	54	54	54	55	55	70
20	Powerhouse Camp Skilled &unskilled Labors	48	48	48	48	48	60
21	Batching Plant team A2	16	16	16	16	16	16
22	Steel factory team A2	21	21	21	21	21	21
23	Grouting team at Dam	0	0	17	27	27	34
24	Design &Geological Management	5	7	8	8	8	8
25	Adit#2 team Skilled and unskilled Labors	103	85	86	88	88	88
26	Adit #3 team skilled and unskilled labors	115	75	75	75	75	75
27	Batching Plant team A3	25	25	25	25	25	28
28	Main Access Tunnel & Sanghar Camp	27	27	127	122	122	143
29	Batching Plant Powerhouse skilled and unskilled	0	17	17	17	17	50
30	Dam Site and Diversion tunnel skilled and unskilled	99	116	172	214	214	250
31	Operators, Driver& mechanic at powerhouse	0	0	20	20	20	57
32	Site Manager	1	1	1	1	1	1
33	Planning Engineer	3	3	3	3	3	3
34	Construction Manager	1	1	1	1	1	1
35	Admin Manager	2	2	2	2	2	2
36	Quantity Surveyor	1	1	1	1	1	1
37	Site Engineer	3	3	3	3	3	3
38	Site Engineer	4	4	4	4	4	4
39	Chief Surveyor	2	2	2	2	2	2
40	Land Surveyor	4	4	4	4	4	4
41	Assistant Surveyor	1	1	1	1	1	1
42	Material Engineer	1	1	1	1	1	1
43	Senior Engineer Technical	1	1	1	1	1	1
44	Structure Engineer	1	1	1	1	1	1
45	Senior Planning Engineer	3	3	3	3	3	3
46	Senior Accountant	1	1	1	1	1	1
47	Lab technician	2	2	2	2	2	2
48	Electrical Engineer	1	1	1	1	1	1
49	Health &Safety	1	1	1	1	1	1
50	Geologist	4	4	4	4	4	4
51	Store Keepers	2	2	2	2	2	2
52	Quantity Surveyor	1	1	1	1	1	1
53	Mechanical Purchaser	1	1	1	1	1	1
54	Senior Engineer	1	1	1	1	1	1
55	Skilled Labor	160	158	163	163	163	224

S/No	Staff	Reporting Month					
		Jul	Aug	Sep	Oct	Nov	Dec
56	Unskilled Labor	139	139	139	139	139	175
Total (No)		**1177**	**1200**	**1427**	**1495**	**1495**	**1841**
Out of Total, Local Employed Workforce (No)		**671**	**711**	**878**	**982**	**982**	**1161**

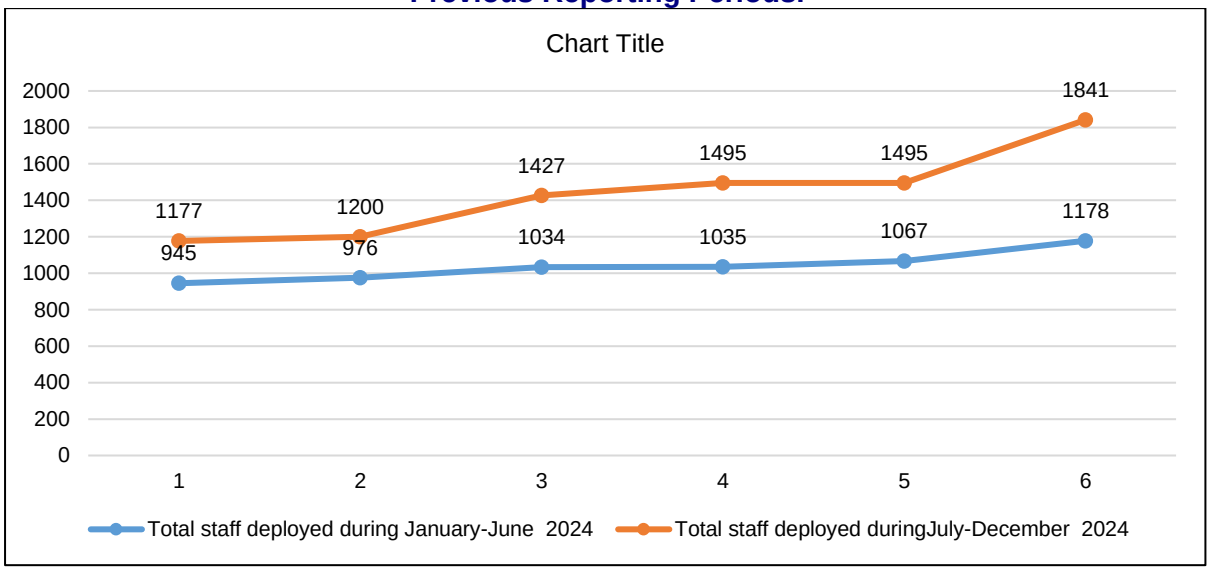
Source: Data provided by the EPC Contractor

Figure 2.8: Staff Deployment Trend during the Current Reporting Period



48. As shown in the figure above, there is a steady increase in the EPC Contractor's workforce. This growth reflects both an uptick in ongoing construction activities and the commencement of new activities at various sites, especially at the tunnel, dam, and powerhouse locations. Notably, the workforce increase in December is higher compared to any other month during the reporting period.

Figure 2.9: Comparison between the Staff Deployment Trends in the Current and Previous Reporting Periods.



49. When comparing staff deployment trends, although a noticeable increase can be observed in June 2024 however, there is a sharp increase in December 2024, where the EPC Contractor increased the workforce by 346 persons including 179 local staff **(Figure 2.11)** as compared to the workforce in November 2024. This surge is primarily attributed to the rise in underground construction activities. Unfortunately, this sharp increase in workforce led to 13

incidents in the same month, which suggests a lack of essential training for the newly inducted workers.

50. Statistics of locals employed by the EPC Contractor during the reporting period are in **Figure 2.10** followed by comparison of trends between the two reporting periods.

Figure 2.10: Local People Employed during the Reporting Period

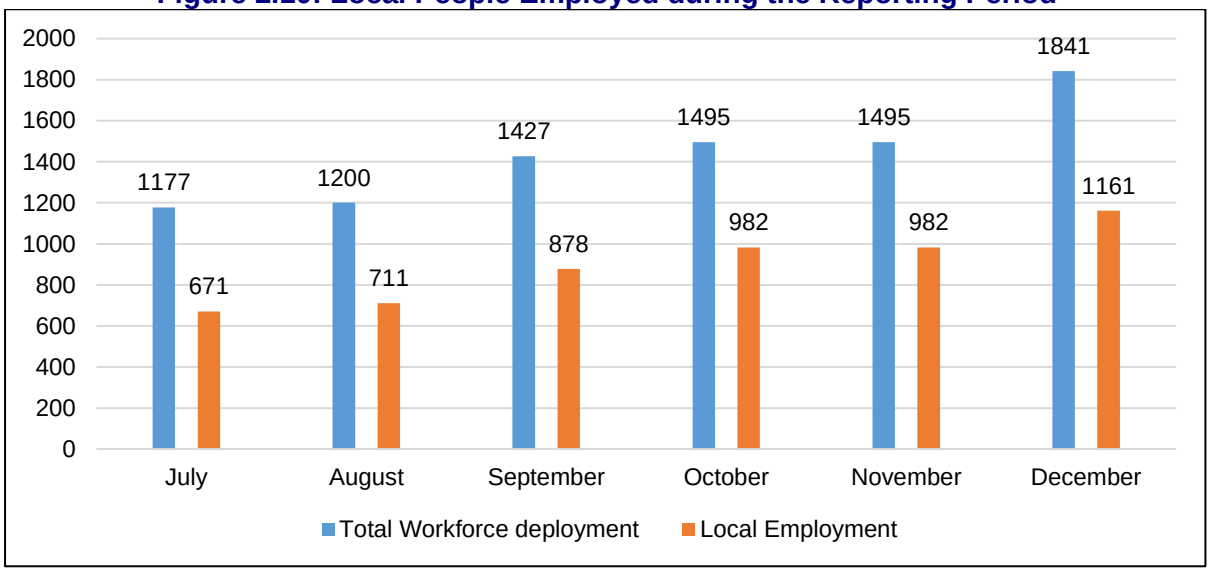
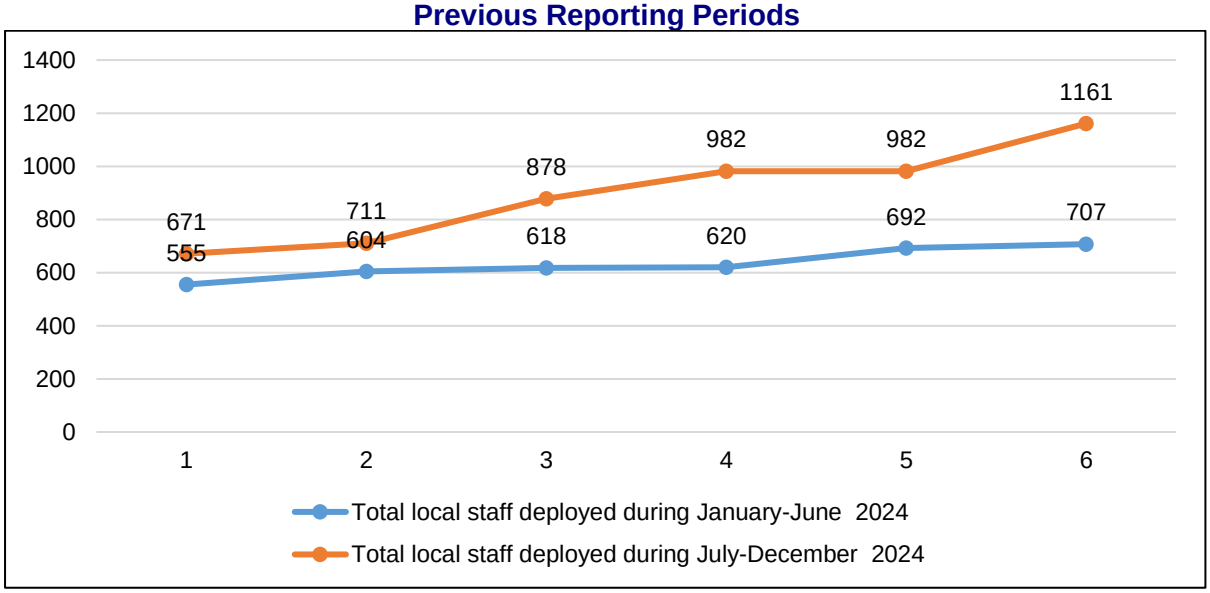


Figure 2.11: Comparison betweel Local Staff Deployed during the Current and Previous Reporting Periods



51. As evident from the presentation, there is a vivid increase in the local employment during the current reporting period.

52. **Table 2.1** exhibits the EPC Contractor machinery and major equipment deployed to the site. The heavy machinery was mainly deployed for underground earthwork activities and transporting materials, including concrete to the construction sites. Due to the initiation of construction activities at new sites, there is a significant increase in the EPC Contractor's equipment and construction machinery at the site.

Table 2.12: Machinery Deployed to Project during the Current Reporting Period

S/No	Machine	Model	Total No. Deployed	Deployment Month					
				Jul	Aug	Sep	Oct	Nov	Dec
1.	Excavator	HITACHI 200	1	1	1	1	1	1	1
2.	Excavator	Hyundai	1	1	1	1	1	1	1
3.	Crawl Excavator	CDM 6225	1	1	1	1	1	1	1
4.	Excavator	HITACHI 200	5	5	5	5	5	5	5
5.	Excavator	Doosan 210,225	4	4	4	4	4	4	4
6.	Excavator	CAT, HYUNDAI	4	4	4	4	4	4	4
7.	Excavator	Volvo 145, Sunny	5	5	5	5	5	5	5
8.	Crawl Excavator	HITACHI 200	4	4	4	4	4	4	4
9.	Loader		2	2	2	2	2	2	2
10.	Mini Dumper		2	2	2	2	2	2	2
11.	Dump Truck	FAW 280	5	5	5	5	5	5	5
12.	Roller		1	1	1	1	1	1	1
13.	Generator	200, 200, 65 KV 15 KV,250	6	6	6	6	6	6	6
14.	Batching plant	0.5m3	1	1	1	1	1	1	1
15.	Double Cabin	Revo, Tiger 2002	2	2	2	2	2	2	2
16.	Car Corolla	Toyota	1	1	1	1	1	1	1
17.	Transit Mixer	Nissan, Hino	2	2	2	2	2	2	2
18.	Compressor /12Bar		2	2	2	2	2	2	2
19.	Jeep		2	2	2	2	2	2	2
20.	Trolley Crane		1	1	1	1	1	1	1
21.	Drilling Equipment		14	14	14	14	14	14	14
22.	Shotcrete Pump		2	2	2	2	2	2	2
23.	Ventilation Fan		1	1	1	1	1	1	1
24.	Power Generator	375KVA	1	1	1	1	1	1	1
25.	Air Compressor		1	1	1	1	1	1	1
26.	Peter Engine	25HP	2	2	2	2	2	2	2
27.	Bulldozer		2	2	2	2	2	2	2
28.	Fortuner	Toyota	1	1	1	1	1	1	1
29.	Excavator	Mobile Sunny/SAY155UU	1	1	1	1	1	1	1
30.	Skid Dumper		1	1	1	1	1	1	1
31.	Water Bozer		1	1	1	1	1	1	1
32.	Concrete Silo		1	1	1	1	1	1	1
33.	Mobile Shotcrete Pump		1	1	1	1	1	1	1
34.	Vigo Hilux		1	1	1	1	1	1	1
35.	Dumper skid Fiori		1	1	1	1	1	1	1
36.	Power Generator 200 KVA		1	1	1	1	1	1	1
37.	Dumper	Mini Hino	1	1	1	1	1	1	1
38.	Generator	Cat	1	1	1	1	1	1	1
39.	Air Compressor		1	1	1	1	1	1	1
40.	Tractor		1	1	1	1	1	1	1
41.	Jeep		1	1	1	1	1	1	1
42.	Batching Plant	0.5m3	1	1	1	1	1	1	1
43.	Transit Mixer		1	1	1	1	1	1	1
44.	Weighing Bridge		1	1	1	1	1	1	1

S/No	Machine	Model	Total No. Deployed	Deployment Month					
				Jul	Aug	Sep	Oct	Nov	Dec
45.	Dumper		1	1	1	1	1	1	1
46.	Loader	420	1	1	1	1	1	1	1
47.	Ventilator Fan		1	1	1	1	1	1	1
48.	Shotcrete Pump		1	1	1	1	1	1	1
49.	Hand mixing machine		1	1	1	1	1	1	1
50.	Air Compressor		1	1	1	1	1	1	1
51.	Frequency Inverter		1	1	1	1	1	1	1
52.	Dump truck		1	1	1	1	1	1	1
53.	Grader		1	1	1	1	1	1	1
54.	Water Bozer		1	1	1	1	1	1	1
55.	Double cabin	Toyota Vigo	1	1	1	1	1	1	1
56.	Double cabin	Toyota Hilux	1	1	1	1	1	1	1
57.	Crawl Excavators	PC200-8	1	1	1	1	1	1	1
58.	Dump Trucks	SCHMAN	7	7	7	7	7	7	7
59.	Excavator	Hitachi 200, Hitachi 220	2	2	2	2	2	2	2
60.	Excavator	CATN320D, Hyundai 210	2	2	2	2	2	2	2
61.	Excavator	Komatsu 200, Komatsu 100	2	2	2	2	2	2	2
62.	Loader	LW500	1	1	1	1	1	1	1
63.	Crawler bulldozer	SD22	2	2	2	2	2	2	2
64.	Side dump loader	WA380-6	1	1	1	1	1	1	1
65.	Jeep		1	1	1	1	1	1	1
66.	Loader	LW500FN, LW300FN	3	3	3	3	3	3	3
67.	Diesel generators	V550C2,HDG22	2	2	2	2	2	2	2
68.	Diesel generators	Perkins 121hp,1106A-70TG1	2	2	2	2	2	2	2
69.	Water tank	SCS5160GSS	2	2	2	2	2	2	2
70.	Concrete Mixture Machine		2	2	2	2	2	2	2
71.	Diesel tank	Foton Daimler,M600	1	1	1	1	1	1	1
72.	Water truck	DLQ5161GSSZ4	1	1	1	1	1	1	1
73.	Flatbed truck	FG1JKPB	1	1	1	1	1	1	1
74.	Concrete Mixture Machine		3	3	3	3	3	3	3
75.	GPS-RTK Survey System Brand	Nan fang S82	4	4	4	4	4	4	4
76.	Total station Brand	GPT-4002LN	1	1	1	1	1	1	1
77.	Digital Levelling Instruments	Trimble DINI03	1	1	1	1	1	1	1
78.	Pickup	4X4	4	4	4	4	4	4	4
79.	Prado		3	3	3	3	3	3	3
80.	Car	MJ	1	1	1	1	1	1	1
81.	Road Roller	XS183JPD	1	1	1	1	1	1	1
82.	Air Compressors		2	2	2	2	2	2	2
83.	Crawler Drilling machine	T35	1	1	1	1	1	1	1
84.	Diesel Air Compressor	XRHS666CD,XAHS750	2	2	2	2	2	2	2
85.	Mobile truck crane 25ton	QY25K5-I	1	1	1	1	1	1	1
86.	Concrete Pump	HBT80.13.112RSD, HBT60.16.110SU	2	2	2	2	2	2	2

S/No	Machine	Model	Total No. Deployed	Deployment Month					
				Jul	Aug	Sep	Oct	Nov	Dec
87.	Power Transformer	500,800KV,100,1200KV&1250	5	5	5	5	5	5	5
88.	Single Arm Rock Drilling Rig	D7	1	1	1	1	1	1	1
89.	Binding Machine		1	1	1	1	1	1	1
90.	Shaper	BC6063	1	1	1	1	1	1	1
91.	Jib crane	BZD-2	2	2	2	2	2	2	2
92.	Digital Underground Scale	SCS-60	1	1	1	1	1	1	1
93.	Low voltage switch box	380V 1600A	2	2	2	2	2	2	2
94.	low voltage switch box	UAN111-354-111	1	1	1	1	1	1	1
95.	Ordinary lathe	C6160C	1	1	1	1	1	1	1
96.	Vertical lifting table milling machine	ZX7045	1	1	1	1	1	1	1
97.	Shaper	BC6063	1	1	1	1	1	1	1
98.	Sewage pump	TS200-125-365	1	1	1	1	1	1	1
99.	Oil storage tank	5170 Gallon 19500L	1	1	1	1	1	1	1
100.	Lathe	CY6166B-3000	1	1	1	1	1	1	1
101.	Shaper	B6065	1	1	1	1	1	1	1
102.	Vertical lifting table milling machine	XQ6232W-B	1	1	1	1	1	1	1
103.	Radial drilling machine	Z5140A	1	1	1	1	1	1	1
104.	Single column press	YX41-100T	1	1	1	1	1	1	1
105.	Other hydraulic presses (pipe crimping machines)	XM91-C1	1	1	1	1	1	1	1
106.	Lathe		1	1	1	1	1	1	1
107.	Dump truck		1	1	1	1	1	1	1
108.	Excavator	210,323&323	3	3	3	3	3	3	3
109.	Mazda		1	1	1	1	1	1	1
110.	Pickup double cabin		1	1	1	1	1	1	1
111.	Lifter		1	1	1	1	1	1	1
112.	Batching Plant	1.0m3	1	1	1	1	1	1	1
113.	Ventilation Fan		1	1	1	1	1	1	1
114.	Electric Air Compressor	XAMS850E	1	1	1	1	1	1	1
115.	Transit Mixer Machine	ZZ1257N3641W	4	4	4	4	4	4	4
116.	Wheel Excavator	Doosan DX210W	1	1	1	1	1	1	1
117.	Wet Spray Trolley	TSR 2010	1	1	1	1	1	1	1
118.	Loader	LW300FN	1	1	1	1	1	1	1
119.	Robotic Arm Wet Spray Machine	Sika Alive 272	1	1	1	1	1	1	1
120.	Screw Air Compressor	XAS 186	1	1	1	1	1	1	1
121.	Large Axial Flow Fan	AVH140.90.4	1	1	1	1	1	1	1
122.	Dynamo	V550C2	1	1	1	1	1	1	1
123.	Dynamo	J110 kva	1	1	1	1	1	1	1
124.	Wet spray trolley	TSR2010	1	1	1	1	1	1	1
125.	Loader (robot arm)	LW300FN	1	1	1	1	1	1	1
126.	Robotic arm wet spray concrete pump	Sika aliva702+Aliva302.1	1	1	1	1	1	1	1

S/No	Machine	Model	Total No. Deployed	Deployment Month					
				Jul	Aug	Sep	Oct	Nov	Dec
127.	Robotic arm wet spray concrete pump	Sika aliva702+Aliva302.1	1	1	1	1	1	1	1
128.	Dump truck	SX3255DR384R	2	2	2	2	2	2	2
129.	Diesel generators	1106A-70TG1/UCI274F	1	1	1	1	1	1	1
130.	Diesel generators	SDMO MODEL J110KVA	1	1	1	1	1	1	1
131.	Dynamo	CUPP640(S)	2	2	2	2	2	2	2
132.	Electric air compressor	XAMS850E	1	1	1	1	1	1	1
133.	Screw compressor	XAS186	1	1	1	1	1	1	1
134.	Electric air compressor	XAMS850E	4	4	4	4	4	4	4
135.	Axial Fan	2*AVH125.90.4.8	1	1	1	1	1	1	1
136.	Three arm Trolley	BOOMER XL3D	1	1	1	1	1	1	1
137.	Geological drilling rig	XY-2	1	1	1	1	1	1	1
138.	Concrete Mixer truck	8M3	2	2	2	2	2	2	2
139.	Van Type Transformer	500 KVA	1	1	1	1	1	1	1
140.	Electric Air Compressor	$20m^3$	1	1	1	1	1	1	1
141.	Punching Machine	CCHJ70/50C	1	1	1	1	1	1	1
142.	Concrete Mixer Truck	FYG5253GJBC	2	2	2	2	2	2	2
143.	Concrete Mixer Truck	LZZ5BLNB3KD575216	1	1	1	1	1	1	1
144.	Truck Crane	XCT8L4	1	1	1	1	1	1	1
145.	Carter Excavator	CAT320	1	1	1	1	1	1	1
146.	Concrete Mixer Truck	ZZ5257GJBM3247C/LB2	1	1	1	1	1	1	1
147.	Wheeled Excavator	DX210W-9C,W-90	2	2	2	2	2	2	2
148.	Loader	LW300FN	2	2	2	2	2	2	2
149.	Robotic Arm Wet Spray Machine	Sika aliva702+Aliva302.1	1	1	1	1	1	1	1
150.	Mini truck	VIGO CHAMP GX TRD	2	2	2	2	2	2	2
151.	Power transformer	ETO800/11	1	1	1	1	1	1	1
152.	Low voltage switch box	380V 1000A	1	1	1	1	1	1	1
153.	Mobile homes (containers)		1	1	1	1	1	1	1
154.	Crawler single bucket excavator	PC-200,335	2	2	2	2	2	2	2
155.	Tank-type special vehicle	Foton Daimler, M600	1	1	1	1	1	1	1
156.	Cantilever jib crane	SQ8SK3Q	1	1	1	1	1	1	1
157.	Ordinary lathe	C6140C	1	1	1	1	1	1	1
158.	Forklift	CPSCD50	1	1	1	1	1	1	1
159.	Land Cruiser V8		1	1	1	1	1	1	1
160.	Small Crane	806	1	1	1	1	1	1	1
161.	Power transformers	YBP-11/0.4-315	2	2	2	2	2	2	2
162.	Dump truck	SX3255DR384R	3	3	3	3	3	3	3
163.	Automatic grouting recorder	GJY-VI	4	4	4	4	4	4	4
164.	Geological drilling rigs	XY-2	2	2	2	2	2	2	2
165.	Bolt grouting machine	EVMP	7	7	7	7	7	7	7
166.	Grouting pumps	3SNS-A	1	1	1	1	1	1	1
167.	Grouting pumps	3SNS-A	1	1	1	1	1	1	1

S/No	Machine	Model	Total No. Deployed	Deployment Month					
				Jul	Aug	Sep	Oct	Nov	Dec
168.	Double-walled mixing drum	YJ-200A	2	2	2	2	2	2	2
169.	Slurry storage barrels	YJ-1200	2	2	2	2	2	2	2
170.	Down-the-hole drilling rigs	KSZ100	2	2	2	2	2	2	2
171.	Diesel generators	KPG 275K VA L8	1	1	1	1	1	1	1
172.	Loader	LW300FN	2	2	2	2	2	2	2
173.	Dump truck	SX3255DR384R	2	2	2	2	2	2	2
174.	Wheeled excavators	DOOSAN DX210W-9C	1	1	1	1	1	1	1
175.	Side dump loader	WA380-6	1	1	1	1	1	1	1
176.	Hydraulic drilling rigs	FT35	1	1	1	1	1	1	1
177.	Power transformers	YBP-11/0.4-315	1	1	1	1	1	1	1
178.	Transit Mixture	636, 625,6981,6982,6983,6942	6	6	6	6	6	6	6
179.	Transit Mixture	69,416,952	2	2	2	2	2	2	2
180.	Vigo	ABV-865	1	1	1	1	1	1	1
181.	Batching Plant at main access tunnel Powerhouse		1	0	0	1	1	1	1

2.4. Material Resource Utilization

53. During the reporting period, several major construction materials were utilized in constructing permanent works. These materials include reinforced steel, cement, sand, and coarse aggregates. All these materials were sourced from approved suppliers to ensure their quality and compliance with the Project standards. The EPC Contractor procured construction materials from the approved sources mentioned against each type of construction material.

i. Coarse aggregate: Black Dimond, Ghuman, and Bhangian Kasi
ii. Fine aggregate: Lawrencepur, Maira, and Thakot
iii. Cement: Askari, Fauji
iv. Reinforced steel: FF Steel, Amreli , Siraj, SJ and Pak steel

54. Water used for concrete production was supplied from the local water sources with prior written permission from the owner(s) of the source/users.

55. **Table 2.13** and **2.14** show month-wise and cumulative details of the materials used in the Project construction activities including those stored at the site. During the current reporting period, due to an increase in construction activities, there is a vivid increase in the quantum of construction materials.

Table 2.13: Month-wise and Cumulative Details of Construction Materials

S/No	Month	Steel (Ton)	Cement (Bag)	Sand (cft)	Aggregates (cft)
1	July	63.9	14723	57473	53255
2	August	69.2	5793	72693	48778
3	September	85	21973	55287	32769
4	October	303.457	51018	100546	63792
5	November	132.451	46760	154554	109399
6	December	152.88	73714	279050	437514
Total for Reporting Period (July-December 2024)		806.888	213981	719603	745507

S/No	Month	Steel (Ton)	Cement (Bag)	Sand (cft)	Aggregates (cft)
Total for Previous Reporting Period (January-June 2024)		620.725	104819	287301	309567
Cumulative for the Project		1752.583	364774	1144202	1153712.4

Table 2.14: Month-wise and Cumulative Details of POL and Water Used (in litters)

S/No	Month	Diesel	Petrol	Water
1	July	156133	684	1591304
2	August	150347	1335	1684800
3	September	180067	1542	1829100
4	October	286261	867.34	2021240
5	November	256946	973.65	2060110
6	December	365311	1391	2536898
Total for Reporting Period (July-December 2024)		1395065	6792.99	11723452
Total for Previous Reporting Period (January-June 2024)		799235.4	10613.3	8685650
Cumulative for the Project since Commencement of Works		2780333.4	21989.289	15065245

Glimpses of the Construction Activities

Construction of Inlet Concrete Cofferdam at the Dam site

Construction of main Access tunnel at the Powerhouse site

Concrete batching plant installation work at the Dam site

Aggregate storage area of batching plant at the Powerhouse site

Overview of the Employer Colony

Diversion tunnel inlet portal work

2.5. Description of Any Changes to the Project Design

56. There were no design changes in the reporting period.

2.6. Description of Any Changes to the Agreed Construction Methods

57. Since the approval of the basic engineering design on March 31, 2023, the EPC Contractor has been regularly submitting method statements for the PMC's review and approval. Although no changes have been proposed in the approved method statements so far, the approved changes will be reported in the corresponding SAEMR.

3. ENVIRONMENTAL SAFEGUARD ACTIVITIES

3.1. General Description of Environmental Safeguard Activities

58. During the reporting period, construction activities remained continued at the dam site, residential colony, access roads, and the headrace tunnel. Also, protection works and the establishment of a camp at the powerhouse sites remained in progress during this period. HSE aspects of these activities were regularly monitored and supervised by the PMC and PIU staff. Also, during the reporting period, the PMC supervisory staff monitored quarterly instrumental environmental monitoring conducted by the KPEPA approved laboratory at the pre-identified locations at the site and period trainings imparted by the third party and the EPC Contractor's experienced staff.

59. During the reporting period, PMC's HSE team conducted site visits as part of the due diligence survey for the muck disposal sites (A2 and A3) identified by the EPC Contractor. Review comments addressing the environmental aspects of these sites were exchanged with the Contractor for incorporation into revised submissions. Additionally, an environmental audit of the Contractor's main camp was performed, and a report highlighting gaps was submitted to the PIU and the Project financiers for review and feedback. The identified gaps from the environmental audit report were communicated to the EPC Contractor in the form of a Corrective Action Plan (CAP) for necessary rectifications.

60. The ADB safeguard team and the EEM also conducted HSE audit of the construction activities and identified gaps in implementations of the environmental and safety protocols. These gaps were accordingly recorded and CAPs were transmitted to the EPC Contractor for rectification within time frame mentioned against each observation.

61. To fulfil the requirements of the project's environmental management plan (EMP), the EPC Contractor organized a two-day annual occupational health and safety (OHS) training on November 27 and 28, 2024, at the site. The training included presentations at the camp and field demonstrations at the site, conducted by professionals from Rescue 1122 of District Mansehra. Also, the EPC Contractor conducted a regular health, safety, and environment (HSE) champion program whereby awards were distributed to the Contractor's staff who adhered to HSE provisions, followed safety protocols, and trained other workers while performing their assigned duties.

62. Completion of the vocational training is yet another milestone achieved by the EPC Contractor during the current reporting period. The training, which began in May 2024 at the Government Skill Development Centre Hassa Balakot, was completed in October 2024. A total of 18 students (7 male and 11 female) were trained in various trades, including tailoring, beautician services, computer operation, and electrician work.

63. Subsequent to finalization of the camps, batching plants, magazines locations and sedimentation tanks locations and design of two of the muck disposal sites, the EPC Contractor initiated updation of the SSEMP exhibiting refined details of the aforementioned facilities. Also, the PMC environmental team updated the EIA report and submitted to the PIU for further review and onward transmission to the ADB and AIIB for further review and concurrence.

64. Also, during the reporting period, the matter of establishment of the fish hatchery in the project area remained under discussion between the PIU and the Fisheries Department. In this regard, several meetings were held which resulted in the submission of the Fisheries Department's proposal for the upgradation of the Shino-Jared fish hatchery. The proposal is under the review of the PIU.

65. Despite the vigorous supervision by PMC's HSE team and the deployment of approximately 15 HSE officers by the EPC Contractor to oversee the health and safety aspects

of the construction activities, an accident occurred on December 5, 2024. The crown inside the headrace tunnel collapsed while the Contractor's workforce was fixing and installing wire mesh as part of the support work. The accident resulted in injuries to three workers, who were quickly rushed to the hospital. Unfortunately, one of the workers succumbed to the injuries and passed away the following day. Findings of the fatal incident-as given in the final incident report-indicate that negligence on the part of the EPC Contractor's workforce led to the injuries and the loss of life.

66. Regular weekly HSE progress review meetings among PIU, PMC, and EPC Contractor, were held wherein HSE activities were prioritized, action plans were furnished, and targets were set for rectifying non-complied activities observed during HSE supervision by the PMC/PIU supervisory staff. A copy of the minutes from one of such meetings is in **Annexure 1**.

67. Another significant activity undertaken by the EPC Contractor during the reporting period was the third-party quarterly instrumental environmental monitoring. This monitoring covered air quality, sound levels, water quality, and soil analysis.

68. Toolbox talks, training on induction, capacity building training on explosive handling and usage, and champion programs were regularly held during the reporting period.

69. The following is a brief description of the major safeguard activities undertaken during the reporting period.

3.1.1. HSE Meetings

70. **HSE progress review meetings.** As apprised in the preceding paras, to ensure consistent implementation of the HSE provisions at the site and construction camp(s), and to resolve non-complied issues, regular tripartite meetings among PIU, PMC, and EPC Contractor are being held since the commencement of Works at the site. The agenda items for such meetings usually remained the same, i.e. item-wise review of the HSE progress; review of targets set in the previous meeting(s); furnishing weekly plan for pending issues; and identifying impediments in implementation of measures proposed in the EMP/SSEMP.

71. So far, these meetings have largely been proved effective in resolving HSE-related issues and pushing the EPC Contractor to swiftly resolve pending non-compliances. These fortnightly meetings also enable the supervisory staff to quickly fill the gaps identified and decide on matters requiring PMC/PIU's decision.

72. **Meeting with the Fisheries Department on the establishment of fish hatchery:** The Fisheries Department officials, designated by the department vide Office Order No.437-40 DGF/GS dated July 22, 2024, held a joint meeting with the PIU and PMC on July 31, 2024, at the PD office Balakot to identify a site for the establishment of fish hatchery. In the meeting, the DD Fisheries department Mansehra office opined that the construction of a new fish hatchery appears to be of no significant avail instead, PIU should finance the upgradation of the existing fish hatchery located at Shino-Jared. Through such upgrades, hatchery production and hatching capacity will increase several times. He also highlighted an array of challenges, difficulties, and financial constraints faced by the Fisheries Department in the efficient operation and maintenance of the existing hatcheries throughout the KP province.

73. As a result of the meeting, the DG Fisheries submitted a proposal to the PIU on December 3, 2024. This proposal contains details of the essential equipment and materials required for the upgrade of the existing hatchery at Shino-Jared. The proposal is currently under discussion between the PIU and Headquarter (HQ) Fisheries for finalization.

74. **Meeting with the ADB safeguard midterm review mission.** On October 10, 2024, the EE of the PMC presented the HSE portfolio progress (January to September 2024), to

the ADB midterm review mission at the PEDO House Peshawar. During the presentation, the EE also highlighted various milestones achieved and apprised the participants on the updated status of the EIA report. With the consensus of the ADB safeguard team, it was decided that a separate meeting among the PMC, PIU, and biodiversity and aquatic experts would be held in the third or last week of October 2024 wherein experts will present their study while review comments will be discussed in detail.

75. **Virtual meeting with the ADB safeguard team on the updated EIA report.** As agreed on the occasion of the presentation to the ADB midterm review (MTR) mission at PEDO House Peshawar, a virtual meeting among the ADB, PIU, and PMC experts was held on October 31, 2024, wherein the review comments on the updated EIA report were discussed in detail. After discussion on the review comments, it was agreed that the PMC will submit the EIA, updated in light of the review comments, by the first week of December 2024.

76. The PMC accordingly updated the EIA report and submitted it to the PIU on December 25, 2024, for review and further transmission to the relevant quarters in the ADB and AIIB. Till the end of the reporting period, the EIA remained under the PIU review.

77. **Meeting with the EPC Contractor on the HSE milestones.** On December 12, 2024, a joint meeting was held at the EPC Contractor's main camp in Paras village, involving the HSE team from the PMC, the PIU, and the HSE team of the EPC Contractor. During this meeting, the Contractor's team was informed of the main reasons for the deductions made up to IPC 19. The two primary reasons were the lack of documentary evidence supporting the claimed amounts in each IPA and the EPC Contractor's failure to address the HSE gaps identified by the PMC. Additionally, it was emphasized to the EPC Contractor that implementing the CAP should be prioritized and completed as soon as possible.

78. The EPC Contractor's team agreed to the PMC's clarifications and assured that necessary documents will be provided in the upcoming interim payment applications. Also necessary arrangements will be made to rectify gaps identified in the CAP.

Meeting with the Deputy Director Fisheries in connection with the establishment of fish hatchery

Meeting with the EPC Contractor's on the HSE milestones

3.1.2. Due diligence of the Muck Disposal Sites

79. In continuation of the due diligence of the A2 and A3 muck disposal sites under taken by the PMC on May 2 and 16, 2024, and to address/clarify the issues identified as result of the due diligence activity from July 10 to 11, 2024, a joint visit of the PMC and the EPC Contractor and his Design Consultant was undertaken to both the sites. During the visit, the EPC Contractor and his Design Consultant clarified observations and responded queries.

80. Upon updating the environmental risk mitigation matrices in the design documents for the A2 and A3 muck disposal sites, the PMC granted environmental consent for both sites.

81. On December 26, 2024, the EE of the PMC and the EPC Contractor's jointly visited the newly identified sites for the surge tunnel muck disposal. The matter however, remained in correspondences with EPC Contractor till end of the reporting period.

Joint visit to the muck disposal site (A2)

The PMC's due diligence of the EPC Contractor's proposed muck disposal site for surg tunnel

3.1.3. Annual OHS Training

82. In pursuance of the EMP/SSEMP requirements, the EPC Contractor arranged annual OHS training on November 27 and 28, 2024. The two-day training was imparted by professionals of the Rescue 1122 of District Mansehra. The training was participated by relevant staff from PIU, PMC, and the EPC Contractor's HSE staff and supervisors from work sites, workshops, batching plants, etc. For further details on the annual OHS and other trainings, refer to **Section 5.7** of the report.

3.1.4. Instrumental Environmental Monitoring

83. The KPEPA certified laboratory, namely Integrated Environment Laboratory (IEL) conducted quarterly instrumental environmental monitoring for air quality, noise level, water quality, and soil analysis at the locations pinned in the SSEMP where baseline instrumental monitoring was done in December 2022, and at locations near sensitive receptors at A3 Adit site.

84. In addition to the aforementioned locations, samples of drinking water used by the EPC Contractor's workforce on-site, as well as effluent from the Contractor's main camp in Paras village, were also collected and analysed at the IEL laboratory. The analysis encompassed physical, chemical, and biological parameters. The results obtained for the EPC Contractor's main camp show compliance with the National Environmental Quality Standards (NEQS) guiding values. Also, at work sites, though there happened increase in CO, Sox and Nox concentration, still the result obtained fall within the World Health Organization (WHO) and NEQS guiding values.

85. Details of the instrumental environmental monitoring and discussion on results have been given under **Section 5.2** while signed copies of the results are in **Annexure 2.**

3.2. Site Audit

86. **Table 3.1** exhibits the site visits undertaken by the EEM, PIU, PMC, EPC Contractor's environmental staff, and the ADB safeguard mission as part of the site audit. Since the PMC's HSE team visit the site on an almost daily basis, hence, their routine inspection and supervision visits are not reflected herein.

87. During these visits, HSE aspects of the construction activities at permanent access roads, Employer's residential colony, camp facilities, batching plants, adit tunnels, and dam sites were audited.

Table 3.1: Site Audit Conducted during the Reporting Period

Visit Date	Auditor		Purpose of Audit	Summary of Findings
	Title	Name		
August 8, 2024	**PIU:** Deputy Director HSE and Gender	Ibtesaam Zaima	HSE compliance audit of Site and identification of gaps	**Major observation:** i. Oil spillage at the A3 batching plant site.

Visit Date	Auditor		Purpose of Audit	Summary of Findings
	Title	Name		
	PMC: i. Environmental Expert ii. Health and Safety Monitor	i. Assad Ali Khan ii. Fawad Ali Shah	in implementation of measures proposed in SSEMP/EMP	ii. Delay in construction of properly designed sedimentation tanks at adit tunnels sites. **Minor Observations:** i. Poor housekeeping ii. Missing signboards iii. Deficiency in record keeping at sites iv. Unplanned storage of materials at construction sites.
	EEM	Dr. Abdul Qayyum		
	EPC Contractor: i. Environmental Manager	i. Irshad Saeed and site HSE officers		
October 16, 2024	**ADB:** i. Environment Specialist (Consultant) Pakistan Resident Mission	Shazia Shaid	HSE compliance audit of construction works at the site	Although, no major non-compliance was recorded however, following gaps were identified for rectification. i. Exposed electrical wiring ii. Small-sized (6kg) fire extinguishers at batching plants iii. Low-quality safety helmets are used by the laborers engaged in construction and earthwork activities iv. Improper storage of admixtures containers v. Oil spillage at workshops/batching plant sites and disposal of oily rags along the Ganhool Nullah vi. Construction of retaining wall and channelization of water at the junction of R3 and R4 access roads vii. No provision for hard barricading at the road leading to the EPC Contractor's main camp and fugitive dust on the approach road viii. Structural cracks in washrooms in the EPC Contractor's Sangar site camp In addition to the above, environmental audit of the EPC Contractor's new main camp was also instructed by the auditing team.
	PIU: i. Deputy Director HSE and Gender	Ibtesam Zaima		
	PMC: i. Environmental Expert ii. Health and Safety Monitor	i. Assad Ali Khan ii. Syed Ali Fawad Shah		
	EPC Contractor: i. Environmental Manager ii. H&S Manager	i. Irshad Saeed ii. Qi Ziu Feng		
November 6, 2024	**PMC:** i. Environmental Expert	i. Asad Ali Khan	Environmental audit of the EPC Contractor's main camp.	From an environmental, health and safety perspective, following gaps were identified in the EPC Contractor's main camp. i. No hard barricading and lighting on the access road to the camp. ii. Dust generation due to vehicle movement on the access road.
	EPC Contractor: i. Environmental Manager	i. Irshad Saeed		

Visit Date	Auditor		Purpose of Audit	Summary of Findings
	Title	Name		
				iii. Soil erosion from the access roadside slopes iv. No fence to isolate part of the camp outside of the camp boundary wall. v. Deficient signage in the camp. vi. Surface runoff from the camp to the Kunhar River. vii. Discharge of effluent to the Kunhar River. viii. No color-coded solid-waste bins. ix. Improper storage of materials. x. Poor housekeeping in a residential facility for Pakistani staff.

88. The CAPs furnished as result of the site audits and subsequently transmitted to the EPC Contractor for rectification are in **Annexure 6** to the report.

89. The observations noted by the EEM during his site audit on August 8, 2024, were mostly addressed however, the EPC Contractor has not fully resolved the gaps identified by the ADB visiting team and those recorded during the environmental audit of the main camp.

Glimpses of Site Audit and Environmental Audit of the EPC Contractor's Main Camp

EEM Visit to the Employer's Colony Site on August 8, 2024

ADB Safeguard team visit to the Colony Site on October 15, 2024

Improper storage of material at the main camp and poor housekeeping in Pakistani staff residential facility (November 6, 2024)

3.3. Issues Tracking Based on Non-conformance Notices

90. As reported in the previous SAEMR for the period from January to June 2024, out of 47 minor non-compliances, 2 remained open at the end of that reporting period. However, during the current reporting period, both of these issues were resolved. This included the sedimentation tank design by the EPC Contractor and the provision of PPE to all skilled and unskilled labor of the sub-contractors. The PMC's Health and Safety Monitor is continuously monitoring progress and compliance on the PPE issue.

91. The minor non-compliances recorded during the current reporting period include the following.

- Delayed replacement of expired fire extinguishers.
- Non-installation of reflectors and barriers on N-15 road.
- Improper housekeeping on the site.
- Dealy in partially damaged drain system in the tunnel at Adit-3.
- Unavailability of flagmen on N-15 road.
- Improper storage of gas cylinders.
- Maintenance of defaced safety sign boards.
- Unavailability of a confined space attendant at the access to diversion tunnels.
- Unavailability of permits and method statements in the permit boxes.
- Ineffective or insufficient incident investigations at the part of the EPC Contractor.
- Helpers sitting with excavator operators during activity.
- Fire extinguishers not hung in fixed locations.

92. Major non-compliances recorded during the current reporting period include; (i) providence of the permanent platform at diversion tunnel; (ii) lifting conducted near the 11 kV PESCO lines; and (iii) heavy dust production near N-15 road due to drilling of micro pile.

93. **Table 3.2** exhibits the status of major issues surfaced during the current reporting period.

Table 3.2: Tracking of Non-Compliances for the Current and Previous Reporting Periods

Issue	Reporting Period		Remarks
	January- June 2024	July-December 2024	
Number of open issues	2	3	
Number of closed issues	45	58	
Total number of non-compliances	47	61	
Total number of major non-Compliances	0	3	Out of the three major non-compliances, the issue of: 3.3.1.1.1.1. permanent platform at diversion tunnel has been resolved; 3.3.1.1.1.2. the EPC Contractor has approached PESCO for re-location of 11 kV transmission line; and

Issue	Reporting Period		Remarks
	January- June 2024	July-December 2024	
			3.3.1.1.1.3. the dust issue associated with drilling of micro pile has partially been resolved as the Contractor has provided the essential respirators and PPE to the workers involved in the operation however, regular suppression of dust has not been ensured yet.
Percentage of issues closed	96%	95%	

94. **Table 3.2** shows that out of 61 minor and major non-compliances observed, 58 (95%) were resolved till the end of the reporting period, while rectification of the remaining non-compliances is in progress. The issues under observation for rectification or where improvement is needed include an effective and timely incident reporting and investigation process; improvement in the permit to work certificate and in the confined space log sheet; development of several inspection checklists and assignment of the responsibilities; capacity building of the skilled and unskilled labors; and arrangement of the third-party training for blasters, drillers, electricians crane operators, forklift operators , first aiders, rescue teams, etc.

3.4. Trends

95. As evident from **Table 3.2,** the number of non-compliances recorded during the current reporting period exceeds that of the previous reporting span. This increase is primarily attributed to the rise in inexperienced workforce and additional activities compared to the last reporting period. The PMC's HSE team has conducted several training sessions to address the elevation of non-conformances and held stand-down sessions with the HSE team of the EPC Contractor to educate them on managing the effective implementation of HSE procedures.

96. Additionally, to reverse the trend, PMC has scheduled several trainings in January and February 2025 with emphasis on the training of the newly inducted workforce of the EPC Contractor.

3.5. Unanticipated Environmental Impacts or Risks

97. No unanticipated environmental impacts or risks were observed during the reporting period.

4. STATUS OF COMPLIANCE WITH COVENANTS

98. **Table 4.1** exhibits the compliance status of the environmental safeguards-related covenants in the Project Agreement signed on May 21, 2021, between ADB, and the KP government.

Table 4.1: Compliance Status with Environmental Covenants[3]

Covenant	Reference in Project Agreement	Compliance Status
Procurement. PEDO shall not award any Works contracts which involves environmental impacts until: (a) Khyber Pakhtunkhwa Environmental Protection Agency (KPEPA)_has granted the final approval of the EIA; and (b) the Borrower has, or has ensured that PEDO has, incorporated the relevant provisions from the EMP and BAP into the Works contract.	Para. 3, page 8	**Complied** (a) KPEPA granted "Environmental Approval" to the project EIA report on July 6, 2021. (b) The EHS safeguards-related provisions have mainly been incorporated in (i) Volume-01 of 07 (Appendix-9), and (ii) Volume-03 of 07 (GCC and SCC) of the EPC Contract.
Environment. Khyber Pakhtunkhwa and PEDO shall ensure that the preparation, design, construction, implementation, operation and decommissioning of the Project and all Project facilities comply with (a) all applicable laws and regulations of the Borrower and Khyber Pakhtunkhwa relating to environment, health and safety; (b) the Environmental Safeguards; and (c) all measures and requirements set forth in the EIA, the EMP, the BAP, and any corrective or preventative actions set forth in a Safeguards Monitoring Report.	Para. 5, page 9	**Compliance in progress** (a) KPKEPA granted "Environmental Approval" to the project EIA report on July 6, 2021. Requisite NOCs, from the Forest, Fisheries, Wildlife, and Mining & Mineral departments of the government of KP were obtained. (b) SSEMP, based on the EMP, site data, and the project requirement, was approved by the Employer on December 30, 2022. In the last week of December 2024, after the EPC Contractor had finalized the locations for camps, batching plants, access roads, sedimentation tanks, and magazines, and had obtained approval for two muck disposal sites, the PMC instructed the EPC Contractor to update the approved SSEMP by January 15, 2025. (c) During the reporting period, the ADB and AIIB reviewed the updated EIA report submitted in August 2024. They conveyed their review comments both in writing and during a virtual meeting held on October 31, 2024. The PMC then revised the EIA report based on these comments and submitted it to the PIU on December 25, 2024, for further review and subsequent transmission to the relevant quarters in the ADB and AIIB
Human and Financial Resources to Implement Safeguards Requirements Khyber Pakhtunkhwa and PEDO shall make available necessary budgetary and human resources to fully implement the EMP, the BAP and the RP.	Para. 9 page 10	**Complied.** The requisite human and financial resources are available with the PIU, PMC, and EPC Contractor. During the reporting period, the PMC HSE team was strengthened by the induction of an Environmental Officer (EO) who is stationed at the site full-time. The EO supervises the environmental field activities

[3] Project Agreement for Loan 4057-Pak: Balakot Hydropower Development Project (https://www.adb.org/sites/default/files/project-documents/49055/49055-007-pra-en.pdf)

Covenant	Reference in Project Agreement	Compliance Status
		on a daily basis and provides support to the EE. For BAP implementation, budgetary provision exists in Project PC-1, whereas for the EMP implementation, the EPC Contractor has allocated a lump sum amount in his bid. This allocation is also reflected in the EPC Contract, where it has been segregated across various milestones.
Safeguards – Related Provisions in Bidding Documents and Works Contracts. PEDO shall ensure that all bidding documents and contracts for Works contain provisions that require contractors to: (a) comply with the measures relevant to the contractor set forth in the EIA, the EMP, the BAP and the RP (to the extent they concern impacts on affected people during construction), and any corrective or preventative actions set forth in a Safeguards Monitoring Report; (b) make available a budget for all such environmental and social measures; (c) provide the Borrower, Khyber Pakhtunkhwa and PEDO with a written notice of any unanticipated environmental, resettlement or indigenous peoples risks or impacts that arise during construction, implementation or operation of the Project that were not considered in the EIA, the BAP, EMP and the RP; (d) adequately record the condition of roads, agricultural land and other infrastructure prior to starting to transport materials and construction; and (e) reinstate pathways, other local infrastructure, and agricultural land to at least their pre-project condition upon the completion of construction.	Para. 10, page 10	**Compliance in progress** The EHS safeguards-related provisions have mainly been incorporated in (i) Volume-01 of 07 (Appendix-9), and (ii) Volume-03 of 07 (GCC and SCC) of the EPC Contract. (a) Implementation of the SSEMP provisions is in progress at the site for the protection of the environment, health and safety of the construction crew, community, etc. (b) Budgetary provision exists in the EPC Contract for implementation of HSE related mitigation/preventive measures proposed in the SSEMP, EMP, BAP, or those identified in periodic safeguards monitoring reports. (c) So far, no unanticipated risk(s) have been identified, but provisions of the covenant, SSEMP, and conditions of the contract will strictly be followed if any unforeseen risk is identified. (d) Construction activities were mostly undertaken within the permanently acquired land. Under the EPC Contract provisions, any damage to the private/public property or utilities due to the EPC Contractor's works will be reinstated/compensated at the EPC Contractor's cost. Nevertheless, the covenant will be taken care of before initiating permanent works at the site. (e) The temporary land acquired by the EPC Contractor for his facilities will be reinstated under the conditions of the temporary lease contract(s), and in full compliance with the requirements of the EPC Contract. In this regard, copies of the lease agreements have been made part of the SSEMP.
Safeguards Monitoring and Reporting PEDO shall: (a) submit semi-annual Safeguards Monitoring Reports to ADB and disclose relevant information from such reports to affected persons promptly upon submission; (b) if any unanticipated environmental and/or social risks and impacts arise during construction, implementation or operation of the Project that were not considered in the EIA, the EMP, the BAP and the RP, promptly inform ADB of the occurrence of such risks or impacts, with detailed	Para. 11, pages 10 and 11	**Compliance in progress.** (a) This is the seventh SAEMR furnished in compliance with the mentioned loan covenant. The previous six reports were disclosed on the ADB website. (b) Till the reporting period, no unanticipated environmental risks identified. (c) EEM has been onboard since September 2022 whose external environmental monitoring report for the previous reporting period was approved and disclosed by the ADB on its website.

Covenant	Reference in Project Agreement	Compliance Status
description of the event and proposed corrective action plan; (c) no later than the commencement of works by the Works contractor, engage qualified and experienced external experts under a selection process and terms of reference acceptable to ADB, to verify information produced through the Project monitoring process, and facilitate the carrying out of any verification activities by such external experts; (d) no later than the commencement of works by the Works contractor, engage external experts to monitor and report upon Project implementation, and facilitate the carrying out of any monitoring activities by such external experts; and (e) report any actual or potential breach of compliance with the measures and requirements set forth in the EMP, the BAP or the RP promptly after becoming aware of the breach.		(d) External experts specified in the PAM are on board in compliance with the covenant provisions. (e) No breach of compliance has occurred so far.
Prohibited List of Investments Khyber Pakhtunkhwa and PEDO to ensure, that no proceeds of the Loan are used to finance any activity included in the list of prohibited investment activities provided in Appendix 5 of the Safeguard Policy Statement.	Para. 12, page 11	**Complied.** Loan proceeds are solely being used for developing the Balakot HPP (300 MW).
Grievance Redress Mechanism Khyber Pakhtunkhwa and PEDO shall ensure that a joint safeguards grievance redress mechanism acceptable to ADB is established and functional in accordance with the provisions of the EIA, the EMP, the BAP and the RP no later than the date of award of the Works contract to consider safeguards complaints. The safeguards grievance redress mechanism referred to in paragraph 13 above will function to: (a) review and document eligible complaints of project stakeholders; (b) proactively address grievances; (c) provide the complainants with notice of the chosen mechanism and/or action; and (d) prepare and make available to ADB upon request periodic reports to summarize (i) the number of complaints received and resolved, (ii) chosen actions, and (iii) final outcomes of the grievances.	Paras. 13 and 14, page 11	**Complied** PEDO has notified the Grievance Redress Mechanism (GRM) contained in the approved EIA for the Balakot HPP (300 MW), which is operational since September 2022. The EPC Contractor's internal GRM has also been notified and is operational since the commencement of works. The notified GRM is effectively performing the intended functions.
Labor Standards, Health and Safety Khyber Pakhtunkhwa and PEDO shall ensure that the core labor standards and the Borrower's applicable laws and regulations are complied with during Project implementation. Khyber Pakhtunkhwa and	Para. 15, page 11	**Compliance in progress.** Provisions from law of the land dealing with labor have appropriately been made part of the EIA report and EPC Contract.

Covenant	Reference in Project Agreement	Compliance Status
PEDO shall include specific provisions in the bidding documents and contracts financed by ADB under the Project requiring that the contractors, among other things: (a) comply with the Borrower's applicable labor law and regulations and incorporate applicable workplace occupational safety norms; (b) do not use child labor; (c) do not discriminate workers in respect of employment and occupation; (d) do not use forced labor; (e) allow freedom of association and effectively recognize the right to collective bargaining; and (f) disseminate, or engage appropriate service providers to disseminate, information on the risks of sexually transmitted diseases, including HIV/AIDS, to the employees of contractors engaged under the Project and to members of the local communities surrounding the project area, particularly women.		

5. RESULTS OF ENVIRONMENTAL MONITORING

5.1. Overview of Monitoring Conducted during the Current Period

99. The prime objectives of environmental monitoring are to:
   i monitor project impacts on physical, biological, and socio-economic indicators, and assess the adequacy of the EMP/SSEMP in identifying and mitigating the project's adverse impacts;
   ii recommend mitigation measures for any unforeseen impact, or where the impact level exceeds those anticipated in EMP/SSEMP; and
   iii ensure legal compliance including the safety of the workforce and community.

100. During the project execution, two types of monitoring activities were undertaken.
   i **Compliance Monitoring:** To ensure that mitigation/preventive measures proposed in EMP/SSEMP are adhered to; and
   ii **Effect Monitoring:** To monitor the effect of construction activities on various components of the environment such as air, water, noise, soil, etc.

101. Compliance with the specifications and implementation of the mitigation measures proposed in the EMP/SSEMP were regularly supervised by the PMC. Effect monitoring-which includes air pollution, noise level, water, and soil analysis-was carried out by the EPC Contractor through third-party services. It should be noted that the PMC not only supervises the field activities of the third-party laboratory but also regularly reviews their instrumental environmental monitoring reports.

102. The instrumental environmental monitoring carried out during the reporting period is detailed in the succeeding paras.

5.2. Instrumental Environmental Monitoring

103. The quarterly instrumental environmental monitoring under the Balakot HPP (300 MW) was carried out by the KPEPA certified laboratory, namely the Integrated Environment Laboratory at the locations pinned in the SSEMP. The third quarter monitoring was conducted in September 2024, while the fourth quarter monitoring was undertaken in December 2024.

104. The KPEPA certified laboratory, namely Integrated Environment Laboratory (IEL) conducted quarterly instrumental environmental monitoring for air quality, noise level, water quality, and soil analysis at the locations pinned in the SSEMP where baseline instrumental monitoring was done in December 2022, and at locations near sensitive receptors at A3 Adit site. Also, samples of drinking water used by the EPC Contractor's workforce on-site, as well as effluent from the Contractor's main camp in Paras village, were also collected and analysed at the IEL laboratory. The analysis encompassed physical, chemical, and biological parameters.

105. The third quarter monitoring was conducted in September 2024, while the fourth quarter monitoring was undertaken in December 2024

106. The instrumental environmental monitoring points and the monitoring plan are in **Figure 5.1** and **Table 5.1** respectively.

Figure 5.1: Instrumental Monitoring Points

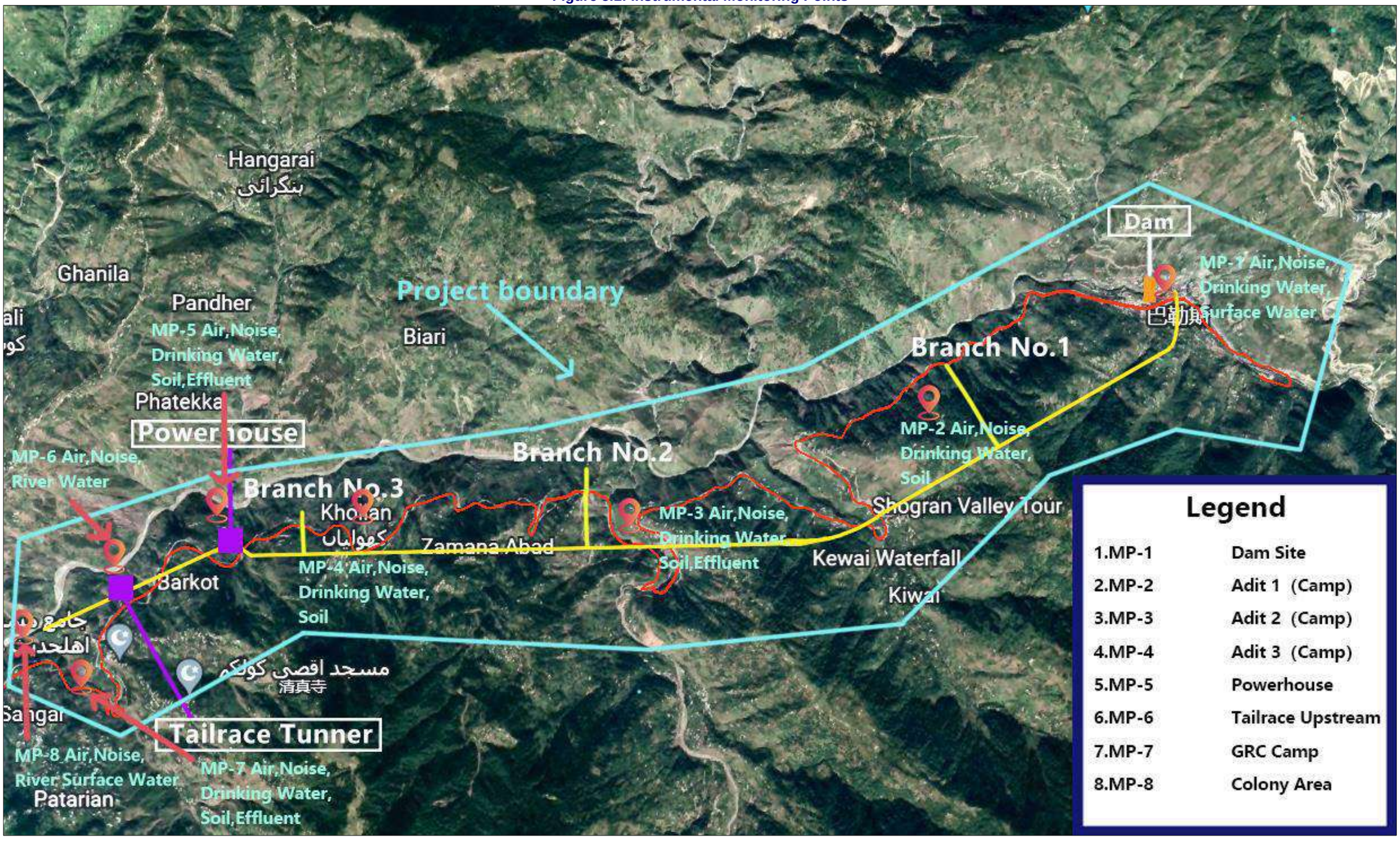


Table 5.1: Instrumental Environmental Monitoring Plan

Environmental Quality	Parameters	Standards/ Guidelines	Location	Monitoring Period/Frequency/ Sampling No/Year	Responsibility	
					Implementation	Monitoring
Pre-Construction Phase						
Air quality, noise level, water quality (drinking, and surface water of the Kunhar River), soil and effluent	The same as given for the construction phase	The same as given for the construction phase	Same as shown on the map	Once	EPC Contractor	PIU and PMC
Construction Phase						
Air quality	SO_2, NOx, CO, O_3, SPM, PM_{10}, $PM_{2.5}$, humidity, wind direction, wind speed, temperature etc.	Air quality standards by NEQS, WHO	Same as shown on the map	Quarterly (24-hour Duration)	EPC Contractor	PIU and PMC
Dust	Dust control	Air quality standards by NEQS, WHO		Quarterly (24-hour duration)	EPC Contractor	PIU and PMC
Noise level	dB(A)	Noise pollution control NEQS, WHO		Quarterly (24-hour duration)	EPC Contractor	PIU and PMC
Water quality	Surface water, temperature, turbidity, pH, TDS, EC, TSS, DO, COD, BOD_5	Water quality standards by NEQS, WHO		Quarterly	EPC Contractor	PIU and PMC
	Groundwater: color, odor, taste, temperature, turbidity, pH, TDS, EC, TSS, $CaCO_3$, Hardness, potassium, nitrate, nitrite (as NO_2), phosphate, arsenic, COD, DO, TSS, total *coil form*, *fecal coliform* and *e. coli*	Water quality standard by NEQS, WHO		Quarterly	EPC Contractor	PIU and PMC
Soil pollution	Soil texture, pH, EC, available phosphorus and SAR.	NEQS, Government of Pakistan		Twice a year	EPC Contractor	PIU and PMC

107. Comparison of the two quarters instrumental environmental monitoring results with the baseline results, and NEQS, WHO, International Finance Corporation, and United States Environmental Protection Agency standard values (where applicable) are briefly given hereunder. The signed copies of the results are in **Annexure 2**.

5.3. Monitoring of Air, Noise, Water, and Soil analysis

5.3.1. Ambient Air Monitoring

a. Particulate Matter Monitoring

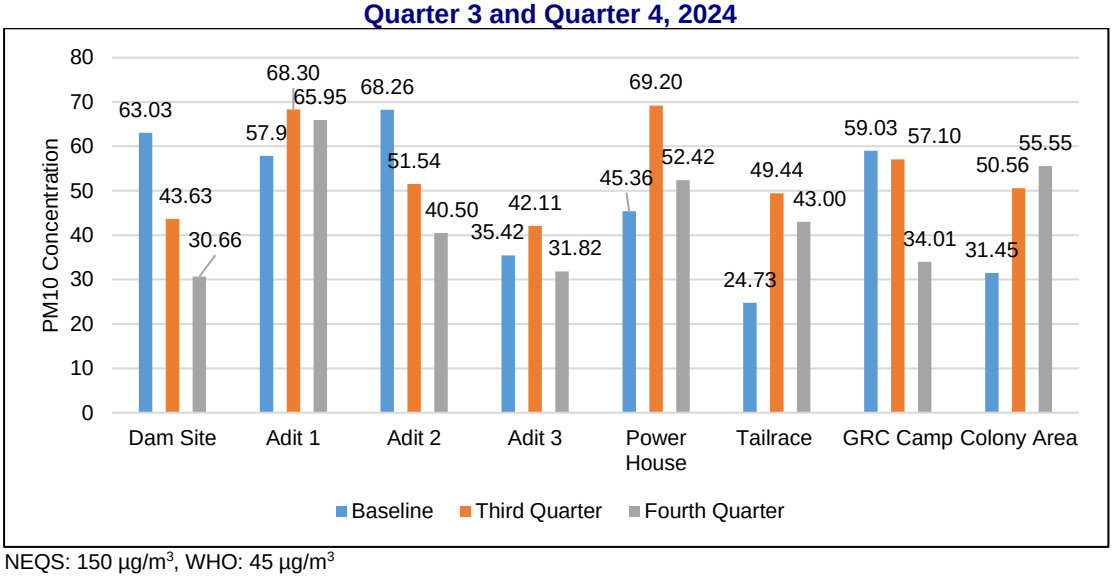
108. **Methodology and instruments used.** Ambient particulate matter (PM) monitoring was carried out to assess PM_{10} and $PM_{2.5}$ concentrations at the pre-identified locations within the Project reach. The Air Quality Monitoring System (AQMS-65) employed for PM_{10} and $PM_{2.5}$ is a fully integrated air monitoring station that delivers 'near reference levels' of performance parameters. With the size of a large suitcase, it can measure up to 20 different gases, particulate pollutants, and environmental parameters simultaneously. The AQMS-65 offers an optimal balance between performance and measuring criteria pollutants.

109. **Comparison of results.** Ambient PM_{10} and $PM_{2.5}$ were monitored for 24 hours at the pre-identified locations as in **Figure 5.1**. **Figure 5.2** exhibits the intended comparison.

110. As evident from the results, the PM_{10} concentration at most of the sampling points exceeded the WHO guideline values but fell below the NEQS. In fact, due to vehicular movement on the unpaved roads leading to Adit 1, powerhouse, and tailrace, the generation of dust caused an increase in particulate matters in the third quarter. Similarly, the decrease in particulate matter concentration at the dam site in the fourth quarter is mainly due to completion of earthwork activities for construction of various access roads. The wet conditions in the fourth quarter at this site also caused reduction in the particulate matter generation.

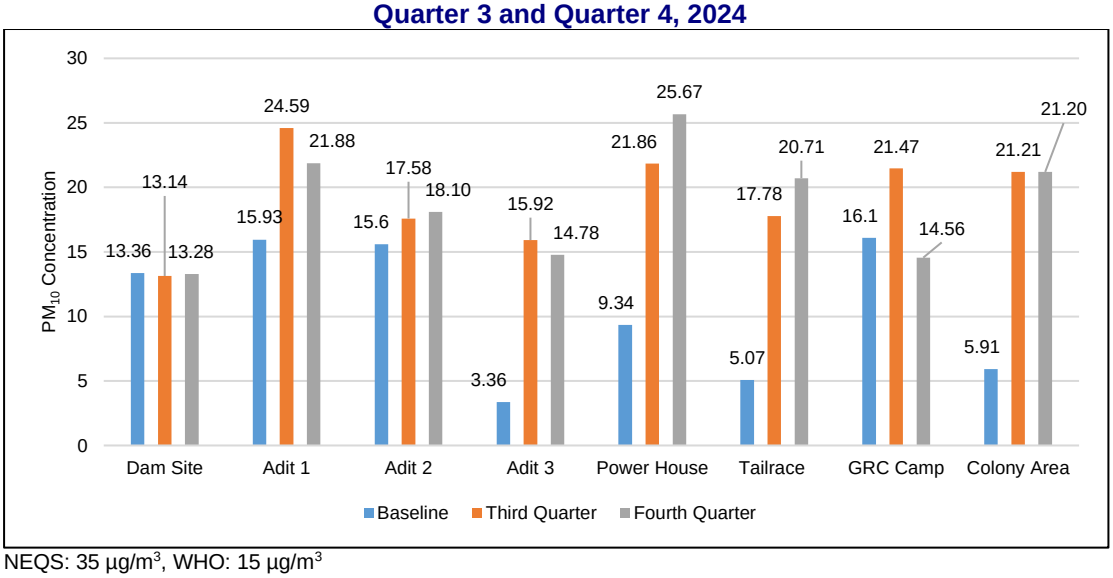
111. The prevailing weather conditions during the monitoring period had a significant impact on dust generation. For instance, the third-quarter monitoring results recorded in September generally exceeded the fourth-quarter results recorded in December.

Figure 5.2: Particulate Matter (PM_{10}) µg/m³ Concentrations in Quarter 3 and Quarter 4, 2024



NEQS: 150 µg/m³, WHO: 45 µg/m³

Figure 5.3: Particulate Matter ($PM_{2.5}$) µg/m³ Concentrations in Quarter 3 and Quarter 4, 2024



NEQS: 35 µg/m³, WHO: 15 µg/m³

112. Although the results obtained for $PM_{2.5}$ show compliance with the NEQS however, exceeded the WHO guideline values at most of the monitoring points. Although the results recorded at dam, Adit 3 and powerhouse sites show compliance with the WHO guiding values however, as evident from **Figure 5.3,** even baseline results recorded at some locations exceeded the WHO guideline values.

113. To mitigate excessive particulate matter concentration and reduce dust generation, the EPC Contractor was instructed to ensure regular sprinkling of water on unpaved access roads. During a meeting held on December 12, 2024, the EPC Contractor was specifically directed to perform regular sprinkling on unpaved roads, and provide documentary evidence to support each Interim Payment Application (IPA). Failure to comply with these PMC instructions will be addressed under the provisions of the contract, potentially resulting in a 10% deduction from each IPC until compliance is achieved.

b. Gas Monitoring

114. **Methodology and instruments used.** The ambient gas monitoring was carried out by assessing carbon monoxide (CO), sulfur dioxide (SO_2), and nitrogen oxide (NO_x) at the pre-determined locations. AQMS-65 was also employed for monitoring.

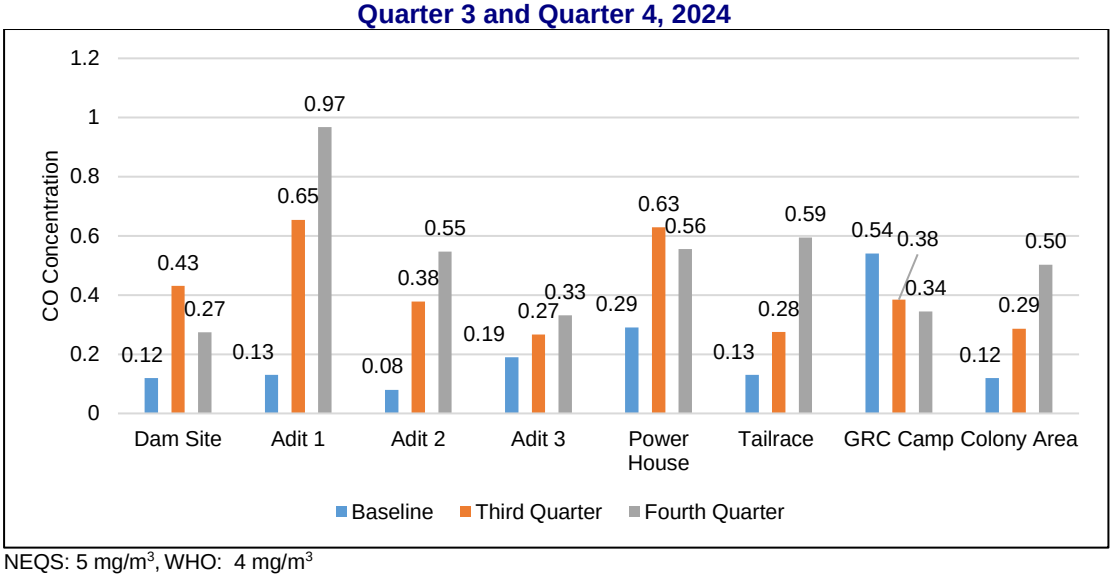
115. **Comparison of results.** The 24-hour ambient gas monitoring for the foregoing gases was carried out during the third and fourth quarters of 2024 at the pre-identified locations in the project area. A comparison of the results obtained is exhibited in **Figure 5.4** to **Figure 5.7.**

116. The results recorded in both quarters generally show an increase in CO, NOx, and SO_2 concentrations compared to the baseline levels. As evident from the **Table 2.12,** this increase is primarily attributed to the rise in the number and concentration of construction machinery and vehicles at these sites, as construction activities were in full swing during the monitoring period.

117. The vivid increase in CO, NOx, and SO_2 concentration at the adit tunnel A1 and powerhouse sites is mainly due to the emissions from the earthwork machinery involved in the underground excavation and operation of the diesel generator at these sites.

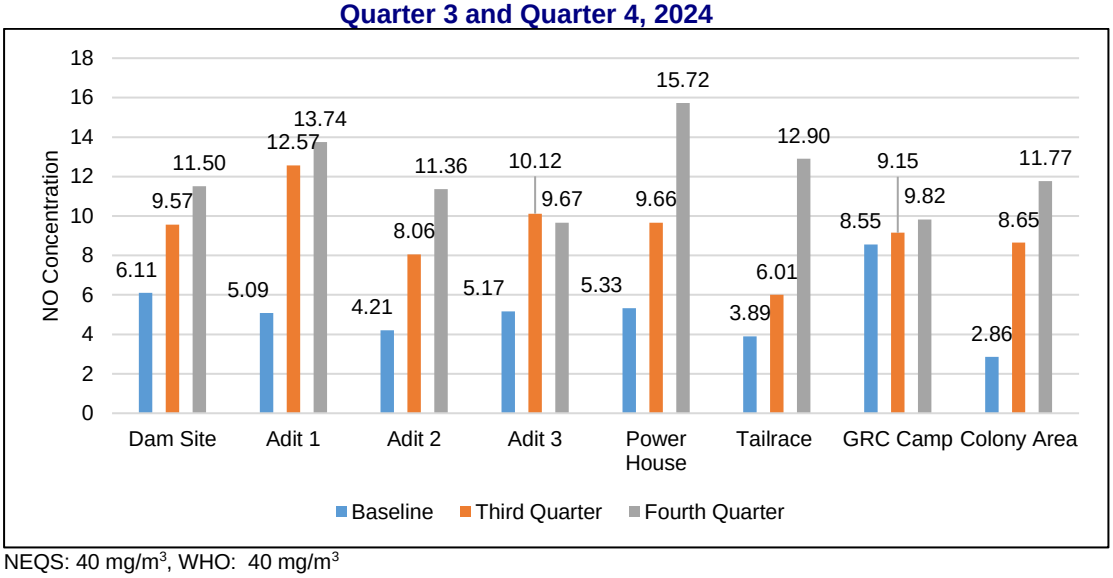
118. Although there is a visible rise in the concentration of the NO_X and SO_2 in the last half of the reporting period however, the results indicate that the increase in emissions still falls well below the NEQS and WHO guideline values.

Figure 5.4: Carbon Monoxide (CO) (mg/m^3) Concentrations in Quarter 3 and Quarter 4, 2024



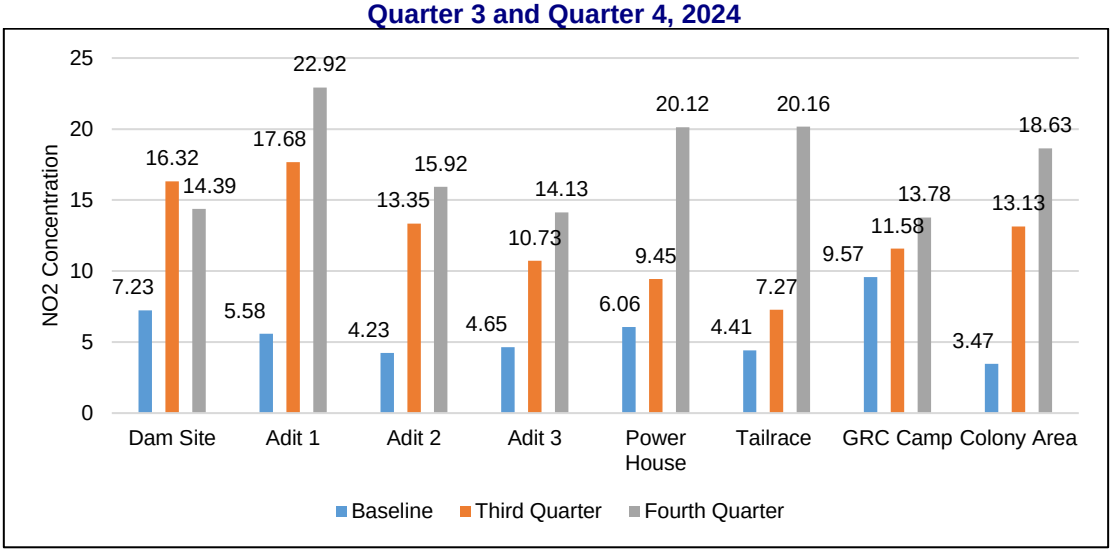
NEQS: 5 mg/m^3, WHO: 4 mg/m^3

Figure 5.5: Nitrogen Oxide (NO) (mg/m^3) Concentrations in Quarter 3 and Quarter 4, 2024



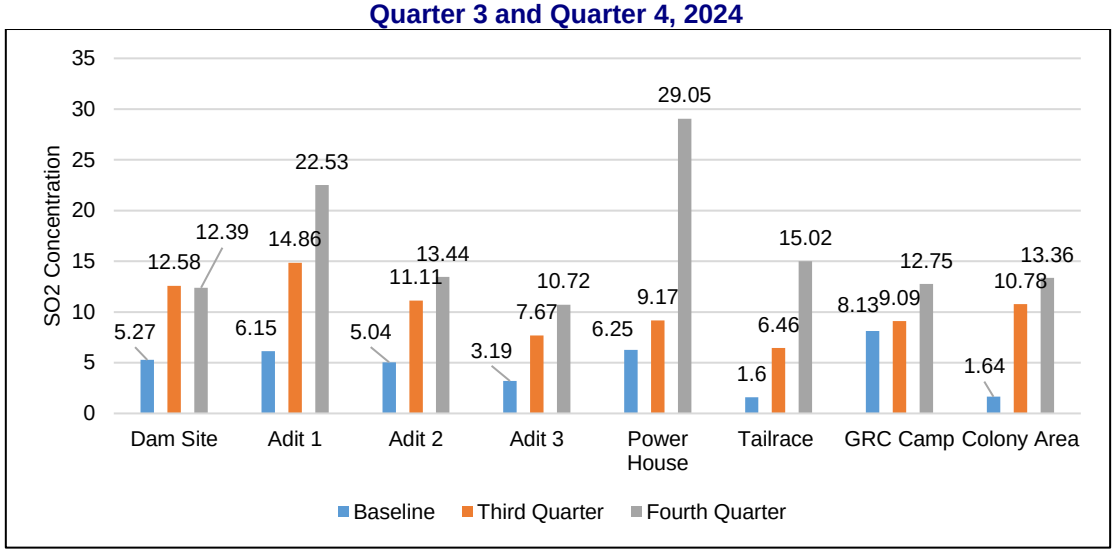
NEQS: 40 mg/m^3, WHO: 40 mg/m^3

Figure 5.6: Nitrogen Dioxide (NO_2) (µg/m^3) Concentrations in Quarter 3 and Quarter 4, 2024



NEQS: 80 µg/m^3, WHO: 25 µg/m^3

Figure 5.7: Sulfur Dioxide (SO_2) (µg/m^3) Concentrations in Quarter 3 and Quarter 4, 2024



NEQS: 120 µg/m^3, WHO: 40 µg/m^3

5.3.2. Noise Monitoring

119. **Methodology.** The 24-hour noise level monitoring was carried out at the pre-identified locations as shown in **Figure 5.1**. It is worthwhile to mention here that the A3 noise monitoring was undertaken at the nearest sensitive receptor (house).

120. A digital sound level meter with the following specifications was employed during the noise monitoring (i) HME® 9011 Sound Levels Meter, and (ii) IEC651 Type 2 & ANISI.4TYPE2 (Japan). The features of the equipment are:

- Accuracy: ± 1.5 dB (under reference condition)
- Frequency range: 31.5 Hz to 8.5K Hz
- Linearity range: 50 dB
- Measuring level: 30 – 130 dB(A), 35 – 130 dB(C)
- Digital display: 4 digits
- Resolution: 0.1 dB
- Display: 0.5 secretary
- Bar graph: 50 dB scale at 1 dB step for monitoring current sound pressure level display period: 50 mS

121. **Comparison of results.**

122. **Table** 5.2 and **Figure 5.8** show noise level monitoring results obtained during the instrumental environmental monitoring carried out in the third and fourth quarters of the reporting period. **Figure 5.8** exhibits a comparison of the two-quarter results with the baseline monitoring results.

123. The 24-hour results for ambient noise level monitoring show that the recorded noise levels at almost all active construction sites exceed the NEQS guideline value of 55 decibels (dB) for residential areas. This increase is attributed to the deployment and operation of heavy construction machinery at sites.

124. Generally, the hourly results indicate that noise levels are higher during working hours, while during off-working hours, noise levels at the monitored sites fall below 65 dB[4]. Also, due to the ongoing night shift works at adit tunnels, at some locations, the noise levels recorded at show exceedance to the NEQS guiding value of 55 dB.

[4] The NEQS guidelines value of Noise for commercial area.

125. The average noise levels recorded at the GRC camp area during the fourth quarter are comparatively less than the third quarter results which is due to decrease in the frequency of the vehicular traffic on the N-15 during the winter season.

126. The results of noise monitoring conducted at the nearest sensitive receptor at the A3 site generally show compliance with the NEQS. In few instances, where the noise level exceeded the NEQS guiding values, is primarily caused by the movement of construction vehicles and equipment on the A3 access road, which passes in front of the sensitive receptors.

Table 5.2: Ambient Noise Monitoring Results in Quarter 3 and Quarter 4, 2024

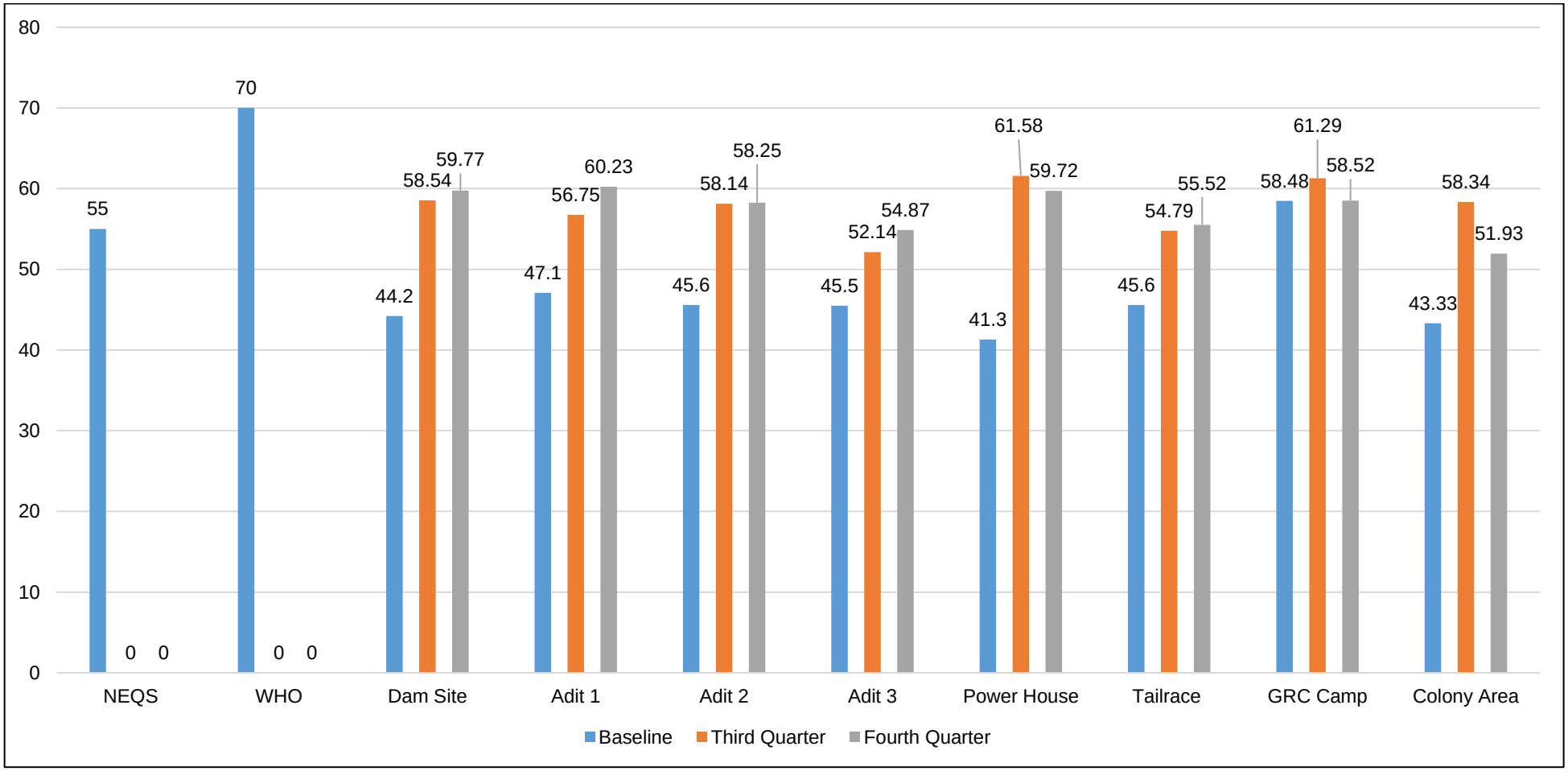
S/No	Monitoring Time	Unit	Sampling Points																					
			Dam Site			Adit -1			Adit-2			Adit-3			Powerhouse			Tailrace Upstream			GRC Camp			Colony Area		
			Results (Leq)																						
			Baseline	Third Quarter	Fourth Quarter	Baseline	Third Quarter	Fourth Quarter	Baseline	Third Quarter	Fourth Quarter	Baseline	Third Quarter	Fourth Quarter	Baseline	Third Quarter	Fourth Quarter	Baseline	Third Quarter	Fourth Quarter	Baseline	Third Quarter	Fourth Quarter	Baseline	Third Quarter	Fourth Quarter
1.	9:00 AM	dB(A)	46.70	61	61.15	49.60	59.55	65.7	48.10	62.3	65.45	48.00	58.2	62.05	43.80	64.75	66.9	48.10	57.60	62.7	61.00	62	59.9	42.50	63.95	62.4
2.	10.00AM		46.50	60.8	63.05	49.40	59.3	65.5	47.90	62.1	67.35	47.80	57.95	61.8	43.60	64.5	66.6	47.90	57.30	62.45	60.80	63.75	61.8	43.60	63.7	62.2
3.	11.00 AM		46.30	60.6	63.4	49.20	59.05	65.3	47.70	61.9	67.7	47.60	57.7	61.55	43.40	64.25	66.4	47.70	57.10	62.2	60.50	64.5	62.15	40.90	63.45	62
4.	12.00AM		46.10	60.4	59.55	49.00	58.85	65.1	47.50	61.7	63.85	47.40	57.5	61.35	43.20	64.05	66.2	47.50	56.90	62	60.30	60.4	58.3	41.70	63.25	61.8
5.	1:00 PM		45.80	60.15	64.9	48.70	58.65	64.8	47.20	61.4	62.1	47.10	57.3	61.15	42.90	63.85	66.0	47.20	56.70	61.8	60.10	65.75	63.65	45.30	63.05	61.5
6.	2:00 PM		45.60	59.9	65.15	48.50	58.45	64.6	47.00	61.2	64.9	46.90	57.1	60.95	42.70	63.65	65.8	47.00	56.50	61.6	59.90	66	63.9	44.20	62.85	61.3
7.	3:00 PM		45.40	59.7	64.9	48.30	58.25	64.4	46.80	56.74	69.2	46.70	54.5	60.75	42.50	61.45	65.6	46.80	56.30	61.4	59.70	65.75	63.65	40.90	62.65	61.1
8.	4:00 PM		45.20	59.5	62.15	48.10	58	64.2	46.60	56.54	66.45	46.50	54.25	60.5	42.30	61.2	65.3	46.60	56.00	61.15	59.50	63	60.9	43.20	62.4	60.9
9.	5:00 PM		45.00	59.3	53.55	47.90	57.75	64.0	46.40	56.34	62.9	46.30	54	59.25	42.10	60.95	64.1	46.40	55.80	59.9	59.20	59.7	52.3	46.40	62.15	60.7
10.	6:00 PM		44.80	59.1	57.8	47.70	57.55	58.8	46.20	56.14	53.2	46.10	53.8	59.05	41.90	60.75	63.9	46.20	55.60	59.7	59.00	63.95	56.55	45.40	61.95	47.5
11.	7:00 PM		44.50	58.85	56.25	47.40	55.35	58.5	45.90	55.84	51.65	45.80	53.6	58.85	41.60	60.55	63.7	45.90	53.40	59.5	58.80	62.4	55	48.70	61.75	47.2
12.	8:00 PM		44.30	58.6	56.65	47.20	55.15	58.3	45.70	55.64	52.05	45.60	53.4	58.65	41.40	60.35	63.5	45.70	53.20	59.3	58.60	56.8	55.4	42.40	61.55	47
13.	9:00 PM		44.10	58.4	58.9	47.00	54.95	58.1	45.50	55.44	54.3	45.40	53.2	58.45	41.20	60.15	63.3	45.50	53.00	59.1	58.40	60.45	57.65	40.20	61.35	46.8
14.	10.00 PM		43.90	58.2	59.6	46.80	54.7	57.9	45.30	55.24	55	45.20	52.95	58.2	41.00	59.9	63.0	45.30	52.70	58.85	58.20	59.75	58.35	44.70	57.5	46.6
15.	11.00 PM		43.70	58	59.25	46.60	55.95	57.7	45.10	55.04	54.65	45.00	42.9	48.15	40.80	59.65	53.0	45.10	54.00	48.8	57.90	59.4	58	42.10	53.75	46.4
16.	12.00 PM		43.40	57.8	61.7	46.30	55.65	57.4	44.80	54.74	57.1	44.70	42.6	47.85	40.50	59.45	52.7	44.80	53.70	48.5	57.70	61.85	60.45	44.00	51.9	46.1
17.	1:00 AM		43.20	57.6	56	46.10	55.45	57.2	44.60	54.54	51.4	44.50	42.4	47.65	40.30	59.25	52.5	44.60	53.50	48.3	57.50	60.4	54.75	46.20	50.55	45.9
18.	2:00 AM		43.00	57.4	58.75	45.90	55.25	57	44.40	54.34	54.15	44.30	48	47.45	40.10	59.05	52.3	44.40	53.30	48.1	57.30	57	57.5	41.70	51.55	45.7
19.	3:00 AM		42.80	57.2	60.1	45.70	55.05	56.8	44.20	57.14	55.5	44.10	47.8	47.25	39.90	58.85	52.1	44.20	53.10	47.9	57.10	60.25	58.85	44.10	50.15	45.5
20.	4:00 AM		42.60	56.95	57.95	45.40	54.8	56.55	44.00	56.89	53.35	43.80	47.55	47	39.70	58.6	51.8	44.00	52.80	47.65	56.90	58.1	56.7	42.90	50.35	45.25
21.	5:00 AM		42.30	56.7	57.05	45.20	54.55	56.3	43.70	60.9	52.45	43.60	47.3	46.75	39.40	58.35	51.6	43.70	52.60	47.4	56.60	57.2	55.8	41.00	49.65	45
22.	6:00 AM		42.10	56.5	58.8	45.00	54.35	56.1	43.50	60.7	54.2	43.40	47.1	46.55	39.20	60.15	51.4	43.50	52.40	47.2	56.40	58.95	57.55	40.40	53	44.8
23.	7:00 AM		41.90	56.3	57.9	44.80	55.5	54.55	43.30	60.5	53.9	43.20	50.6	46.35	39.00	66.05	51.2	43.30	53.50	47	56.20	63.6	56.65	44.30	56.65	43.25
24.	8:00 AM		41.70	56.1	60	44.60	60.1	60.85	43.10	62.05	55.4	43.00	59.85	49.55	38.80	68.3	54.4	43.10	58.10	50.2	56.00	60.15	58.75	43.30	61.2	49.55
Average for 24 hrs			**44.20**	**58.54**	**59.77**	**47.10**	**56.75**	**60.23**	**45.60**	**58.14**	**58.25**	**45.50**	**52.14**	**54.87**	**41.30**	**61.58**	**59.72**	**45.60**	**54.79**	**55.52**	**58.48**	**61.29**	**58.52**	**43.33**	**58.34**	**51.93**

NEQS Guideline Values: 65-55 dB[5], WHO Guideline Value: 70 dB

Leq: Log Equivalent Continuous Sound Level

[5] 65 for day time and 55 for night time (Commercial Area)

Figure 5.8: 24-hour (average) of Ambient Noise Monitoring Results (dB) in Quarter 3 and Quarter 4, 2024



5.3.3. Water Monitoring

a. Drinking Water

127. **Methodology.** During the reporting period, the drinking water quality tests were conducted at the sample points identified in the map in **Figure 5.1,** and those collected from the sources used by the labors at site.

128. American Public Health Association (APHA) standard methods were followed for the sampling and preservation of water, and analysis. The standard methods of the American Water Works Association were also used for analysis.

129. **Comparison of drinking water results.** The two quarters of drinking water monitoring results of the sample points, and their comparison with the baseline results are in **Table 5.3.**

130. As evident from the results of the drinking water analysis in the project area, almost all of the monitored parameters fall within the permissible limits of WHO and the National Standards for Drinking Water Quality (NSDWQ). The minor variation in monitored parameters appears to be due to temperature/seasonal variation as drinking water was mostly extracted from natural streams in the project area.

131. As evident from **Table 5.3,** though there is variation in the results obtained during the third and fourth quarters however, all of the recorded results fall within the WHO and NSDWQ guideline values.

b. Surface Water Results of the Kunhar River

132. For the Kunhar River water monitoring, samples were collected from three locations i.e. dam site (upstream of the temporary diversion dam, just downstream of the Sukki Kinari HPP tailrace), tailrace upstream (Barkot), and downstream side of the Project residential colony area. The purpose of Kunhar River water monitoring is to know the river water quality at these locations, and to make a comparison between the baseline results recorded in December 2022 and the quarterly results, enabling us to evaluate the impact of the construction activities on the river water quality.

133. Due to the non-availability of the surface water parameters under NEQS, the Kunhar River water was compared against the NEQS effluent parameters.

134. The results obtained from the instrumental environmental monitoring carried out in the third and fourth quarters of the reporting period are presented in **Table 5.4.**

135. As evident from **Table 5.4,** the total suspended solids (TSS) results obtained at all three monitoring sites during the third quarter exceed those obtained during the fourth quarter. This is primarily attributed to snowmelt and increased river flow in the summer compared to the lower levels observed during the winter season. It is worthwhile to mention here that the snow melt runoff brings a lot of sediment to the river which causes increase in the total suspended solid.

136. Similarly, the effluent and surface drainage samples collected from the EPC Contractor’s main camp generally fall within the NEQS guideline values, except for the total suspended solids (TSS) in the sample collected from the outlet of the septic tank. The NEQS guiding value for TSS is 200 mg/l, while the results from the septic tank sample show 294 mg/l. Sample from the same point will again be analysed during the upcoming instrumental monitoring.

Table 5.3: Drinking Water Monitoring Results in Quarter 3 and Quarter 4, 2024

S/No	Parameters	Standard Method	Units	WHO	NSDWQ	Sampling Points																	
						Dam Site			Adit-1			Adit-2			Adit-3			Powerhouse			GRC Camp		
						Results																	
						Baseline	Third Quarter	Fourth Quarter	Baseline	Third Quarter	Fourth Quarter	Baseline	Third Quarter	Fourth Quarter	Baseline	Third Quarter	Fourth Quarter	Baseline	Third Quarter	Fourth Quarter	Baseline	Third Quarter	Fourth Quarter
1.	pH	APHA-4500H+ B	--	6.5-8.5	6.5-8.5	7.4	7.3	7.6	7.7	7.4	7.8	7.3	7.5	7.3	7.7	7.8	7.4	7.5	7.6	7.6	7.7	7.6	7.5
2.	Temperature	---	°C	---	----	7	17	12	6	19	11	8	10	9	8	20	9	7	11	10	7	19	11
3.	Taste & Odor	In-house	--	Non-Objectionable	Non-Objectionable	Non-Objectionable	Non-Objectionable	Non-Objectionable	Non Objectionable	Non-Objectionable	Non-Objectionable	Non Objectionable	Non-Objectionable	Non-Objectionable	Non Objectionable	Non-Objectionable	Non-Objectionable	Non Objectionable	Non-Objectionable	Non-Objectionable	Non Objectionable	Non-Objectionable	Non-Objectionable
4.	Color	APHA-2120 B/C	TCU	≤ 15	<15	4	7	7	6	4.7	6	5	6	6	6	4	4	10	4	4	6	7	4
5.	Turbidity	APHA-2130 B	NTU	<5	<5	3	4	4.2	4	3.5	2.6	4	3.4	3.1	4	2	2.3	4	3.8	2.6	3	4	2.2
6.	Total Dissolved Solids (TDS)	APHA-2540 C	mg/l	< 1000	<1000	359	339	276	381	357	202	363	371	279	377	392	278	402	367	268	384	354	273
7.	Total Hardness as $CaCO_3$	APHA-2340 C	mg/l	-------	<500	294	256	152	217	259	162	261	268	139	258	327	144	316	271	133	347	277	124
8.	Nitrate (NO_3)	APHA-4500NO3 B	mg/l	50	≤50	2.2	0.86	3.37	1.9	0.88	3.91	1.03	0.72	1.85	1.06	1.13	7.70	1.2	1.04	1.64	1.46	2.6	1.36
9.	Nitrite (NO_2)	APHA-4500NO2 B	mg/l	3	≤3	0.04	0.006	0.46	0.06	0.09	0.38	0.07	0.66	0.29	0.08	0.42	1.69	0.37	0.003	0.42	0.58	0.45	0.44
10.	Arsenic (As)	APHA-3500As B	mg/l	0.01	≤0.05	N.D.	N.D.	N.D	N.D.	N.D.	N.D	N.D.	N.D.	N.D	N.D.	N.D.	N.D	N.D.	N.D.	N.D	N.D.	N.D.	N.D
11.	Nickel (Ni)	ASTM E3047-16	mg/l	0.02	≤0.02	0.001	N.D.	0.008	0.003	N.D.	0.004	0.005	0.0051	0.004	0.008	0.0027	0.050	0.009	N.D.	0.006	0.006	N.D.	0.004
12.	Antimony (Sb)	APHA-3500Sb B	mg/l	0.005	<0.005	N.D.	N.D.	N.D	N.D.	N.D.	N.D	N.D.	N.D.	N.D	N.D.	N.D.	N.D	N.D.	N.D.	N.D	N.D.	N.D.	N.D
13.	Chloride (Cl)	APHA-4500Cl- B	mg/l	250	<250	128	86.4	144	131	133	128	138	159	138	129	125	141	105	83.9	141	117	161	148
14.	Chlorine	APHA-4500 CL	mg/l		0.5-1.5	0.2	0.52	0.40	0.09	0.52	0.48	0.1	0.47	0.41	0.03	0.59	0.29	0.1	0.47	0.43	0.05	0.33	0.49
15.	Lead (Pb)	APHA-3500 Pb-B	mg/l	0.01	≤0.05	0.006	N.D	N.D	0.001	N.D.	N.D	0.004	N.D.	N.D	0.005	N.D.	N.D	0.003	N.D	N.D	N.D	N.D.	N.D
16.	Fluoride	APHA-4500F- C	mg/l	1.5	≤1.5	0.73	0.42	0.33	0.58	0.82	0.55	0.86	0.53	0.59	0.75	0.76	0.84	0.91	0.47	0.46	0.64	0.59	0.49
17.	Aluminium	APHA-3500 Al	mg/l	≤ 0.2	≤0.2	N.D.	N.D.	N.D	N.D.	N.D.	N.D	N.D.	N.D.	N.D	N.D.	N.D.	N.D	N.D.	N.D.	N.D	N.D.	N.D.	N.D
18.	Manganese (Mn)	APHA-3500 MN-B	mg/l	0.5	≤0.5	N.D.	N.D.	N.D	N.D.	N.D.	N.D	N.D.	N.D.	N.D	N.D.	N.D.	N.D	N.D.	N.D.	N.D	N.D.	N.D.	N.D
19.	Cadmium (Cd)	APHA-3500 Cd-B	mg/l	0.003	0.01	N.D	N.D.	N.D	N.D.	N.D.	N.D	N.D.	N.D.	N.D	N.D.	N.D.	N.D	N.D.	N.D.	N.D	N.D.	N.D.	N.D
20.	Barium (Ba)	APHA-3500 Ba B	mg/l	0.3	0.7	0.16	0.049	0.16	0.08	0.04	0.38	0.12	0.22	0.27	0.16	0.18	0.56	0.11	0.27	0.13	0.2	0.26	0.17

S/No	Parameters	Standard Method	Units	WHO	NSDWQ	Sampling Points																	
						Dam Site			Adit-1			Adit-2			Adit-3			Powerhouse			GRC Camp		
						Results																	
						Baseline	Third Quarter	Fourth Quarter	Baseline	Third Quarter	Fourth Quarter	Baseline	Third Quarter	Fourth Quarter	Baseline	Third Quarter	Fourth Quarter	Baseline	Third Quarter	Fourth Quarter	Baseline	Third Quarter	Fourth Quarter
21.	Mercury (Hg)	APHA-3500 Hg-B	mg/l	0.001	≤0.001	N.D.	N.D.	N.D	N.D.	N.D.	N.D	N.D.	N.D.	N.D	N.D.	N.D.	N.D	N.D.	N.D.	N.D	N.D.	N.D.	N.D
22.	Copper (Cu)	APHA-3500 Cu-B	mg/l	2	2	0.03	0.06	0.32	0.07	0.055	0.13	0.04	0.06	0.27	N.D.	0.03	0.22	0.06	0.19	0.06	0.05	N.D.	0.04
23.	Zinc (Zn)	APHA-3500 Zn B	mg/l	3	5	1.01	1.14	1.74	1.06	1.13	2.21	1.1	1.2	1.58	1.3	0.98	1.47	1.08	1.25	1.13	1.06	1.08	1.16
24.	Boron (B)	APHA 4500 B- C	mg/l	0.3	0.3	N.D.	N.D.	N.D	N.D.	N.D.	N.D	N.D.	N.D.	N.D	N.D.	N.D.	N.D	N.D.	N.D.	N.D	N.D.	N.D.	N.D
25.	Chromium (Cr)	APHA 3500 cr B	mg/l	0.05	≤0.05	N.D.	N.D.	N.D	N.D.	N.D.	N.D	N.D.	N.D.	N.D	N.D.	N.D.	N.D	N.D.	N.D.	N.D	N.D.	N.D.	N.D
26.	Selenium (Se)	APHA-3500 Se C	mg/l	0.01	0.01	N.D.	N.D.	N.D	N.D.	N.D.	N.D	N.D.	N.D.	N.D	N.D.	N.D.	N.D	N.D.	N.D.	N.D	N.D.	N.D.	N.D
27.	Cyanide (CN)	APHA 4500-CN	mg/l	0.07	≤0.05	N.D.	N.D.	N.D	N.D.	N.D.	N.D	N.D.	N.D.	N.D	N.D.	N.D.	N.D	N.D.	N.D.	N.D	N.D.	N.D.	N.D
28.	E-Coli	APHA:9222 D	Number/100 mL	Must not be detectable in any 100 ml sample	0 Number /100 ml	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29.	Total Coliform	APHA:9222 B	Number/100 ml	Must not be detectable in any 100 ml sample	0 Number /100 ml	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

ND = not detected, NSDWQ = National Standards for Drinking Water Quality, WHO = World Health Organization

Table 5.4: Surface Water Results of the Kunhar River in Quarter 3 and Quarter 4, 2024

S/No	Parameters	Standard Method	Units	NEQS	Sampling Points								
					Dam Site			Tailrace			Colony Area		
					Results								
					Baseline	Third Quarter	Fourth Quarter	Baseline	Third Quarter	Fourth Quarter	Baseline	Third Quarter	Fourth Quarter
1.	Temperature	-----	°C	40	5	14	8	6	15	8	4	15	9
2.	pH	APHA-4500H+ B	--	6.5-8.5	8.3	8.7	7.9	7.9	8.3	7.8	8.1	8.2	7.8
3.	Chemical Oxygen Demand (COD)	APHA-5220-D	mg/l	150	113	59	48	108	56	51	86	58	53
4.	Biological Oxygen Demand (BOD5) at 20 °C	APHA, 5210	mg/l	80	62.8	48.2	34.2	54.7	43.7	36.4	42	45.1	37.4
5.	Total Dissolved Solids (TDS)	APHA-2540 C	mg/l	3500	2637	1836	959	2492	2019	1038	1864	2054	938
6.	Total Suspended Solids (TSS)	APHA-2540 D	mg/l	200	129	114	106	108	123	117	117	129	112
7.	Total Hardness	APHA-2340 C	mg/l	--	164	159	97.3	157	177	142	161	182	162
8.	Oil & Grease	Separation Method	mg/l	10	2.8	1.26	1.2	2	1.35	1.29	1.3	1.39	1.24
9.	Chromium (Hexa & Trivalent)	APHA-3500Cr B	mg/l	1	0.61	0.57	0.38	0.55	0.61	0.56	0.41	0.6	0.45
10.	Total Iron	APHA-3500-Fe-B	mg/l	8	3.8	3.24	3.11	3.2	3.38	3.21	2.6	3.1	2.61
11.	Chloride	APHA-4500Cl- B	mg/l	1000	256	183	161	234	209	184	209	219	188
12.	Fluoride	APHA-4500F- C	mg/l	10	2.4	2.05	1.85	1.8	2.14	1.76	1.1	2.2	2.06
13.	Ammonia	ASTM-D1426-15	mg/l	40	4.9	3.66	3.24	3.7	3.9	3.53	2.9	3.83	3.27
14.	Cadmium	APHA-3500 Cd-B	mg/l	0.1	0.01	N.D	N.D	0.008	N.D	N.D	0.006	N.D	N.D
15.	Lead	APHA-3500-Pb B	mg/l	0.5	0.08	N.D	N.D	0.03	N.D	N.D	0.01	N.D	N.D
16.	Arsenic	APHA-3500As B	mg/l	1	N D	N.D	N.D	N D	N.D	N.D	N D	N.D	N.D
17.	Copper	APHA-3500Cu B	mg/l	1	0.27	N.D	N.D	N D	N.D	N.D	N D	N.D	N.D
18.	Barium	APHA-3500Ba B	mg/l	1.5	0.07	0.12	0.06	0.04	0.006	0.002	0.03	0.008	0.006
19.	Selenium	APHA- 3500 Se C	mg/l	0.5	N.D	N.D	N.D	N.D	N.D	N.D	N D	N.D	N.D
20.	Silver	APHA-3500Ag-B	mg/l	1	N.D	N.D	N.D	N.D	N.D	N.D	N D	N.D	N.D
21.	Manganese	APHA-3500-Mn B	mg/l	1.5	0.33	0.37	0.31	0.28	0.4	0.34	0.26	0.38	0.31
22.	Zinc	APHA-3500-Zn B	mg/l	5	0.58	0.57	0.54	0.37	0.6	0.57	0.31	0.54	0.49
23.	Nickel	ASTM E3047-16	mg/l	1	0.15	0.04	0.02	0.11	0.008	0.006	0.08	0.005	0.003
24.	Boron	APHA-4500B-C	mg/l	6	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D
25.	Mercury	APHA-3500 Hg-B	mg/l	0.01	N.D	N.D	N.D	N.D	N.D	N.D	N D	N.D	N.D
26.	Sulphide (S^{-2})	APHA-4500 S_2	mg/l	1	0.35	0.31	0.28	0.31	0.46	0.41	0.29	0.49	0.42
27.	Sulphate (SO_4)	APHA-4500-SO_4 C	mg/l	600	429	381	324	354	399	325	349	405	389
28.	An Ionic Detergent (as MBAS)	----	mg/l	20	1.1	1.13	1.08	0.9	1.25	1.01	0.4	1.19	1.02
29.	Phenolic Compound (as Phenol)	APHA-5530-D	mg/l	0.1	0.06	0.08	0.05	0.02	0.016	0.01	0.01	0.02	0.01
30.	Cyanide (as CN) total	APHA 4500-CN	mg/l	1	N.D	N.D	N.D	N.D	N.D	N.D	N D	N.D	N.D
31.	E-Coli	APHA:9222 D	Number/ 100 ml	---	Uncountable	Uncountable	Uncountable	Uncountable	Uncountable	Uncountable	Uncountable	Uncountable	Uncountable
32.	Total Coliform	APHA:9222 B	Number/ 100 ml	---	Uncountable	Uncountable	Uncountable	Uncountable	Uncountable	Uncountable	Uncountable	Uncountable	Uncountable

ND = not detected, NEQS = National Environmental Quality Standards

5.3.4. Soil Analysis

137. During quarterly instrumental environmental monitoring, the soil analysis of camps and workshop areas was also carried out to record conditions of the soil at these sites, and track changes resulting from construction activities. These would obligate the EPC Contractor to restore the soil of the facilities to its original condition upon completion of the Project or handing over the site back to the owner(s).

138. A comparison of the soil analysis results obtained during the reporting period is in **Table 5.5.** As evident from the results, there is a vivid increase in sand content in the soil composition at all the monitored sites. Apparently, due to sand transportation and its utilization in construction activities, some sand might have been added to the soil resulting in an increase in sand content. Such a trend was also recorded in the previous monitoring results.

Table 5.5: Soil Analysis Results in Quarter 3 and Quarter 4, 2024

S/No	Parameters		Sampling Points and Results														
			Adit-1			Adit-2			Adit-3			GRC Camp			Powerhouse		
			Baseline	Third Quarter	Fourth Quarter	Baseline	Third Quarter	Fourth Quarter	Baseline	Third Quarter	Fourth Quarter	Baseline	Third Quarter	Fourth Quarter	Baseline	Third Quarter	Fourth Quarter
1	Soil Texture	Sand %	14	23	28	8	19	23	17	28	33	16	17	19	12	21	25
		Silt%	57	55	46	58	52	46	49	53	51	43	46	43	61	49	43
		Clay %	29	22	26	34	29	31	34	19	16	41	37	38	37	30	32
		Texture Class	Silty Clay Loam	Silty Clay Loam	Silty Clay Loam	Silty Clay Loam	Silty Clay Loam	Silty Clay Loam	Silty Clay Loam	Silty Clay Loam	Silty Clay Loam	Silty Clay Loam	Silty Clay Loam	Silty Clay Loam	Silty Clay Loam	Silty Clay Loam	Silty Clay Loam
2	pH		8.1	7.7	8.3	8.1	7.6	8	7.9	7.9	8.2	8.2	7.9	8.3	8.2	8	8.1
3	Electrical Conductivity EC (μSm^{-1})		238	252	236	225	288	241	244	261	239	239	234	226	221	277	236
4	Phosphorus ($mgkg^{-1}$)		2.01	1.83	2.95	2.76	2.61	2.87	2.73	2.43	1.66	1.66	3.83	2.2	2.37	3	3.81
5	Sodium Absorption Ratio		4.07	3.47	3.47	3.18	3.04	3.33	3.29	3.08	3.58	3.58	3.61	4.18	4.2	3.97	3.64

μSm^{-1}: Micro siemens/meter
$mgkg^{-1}$: milligram per Kilogram

5.3.5. Trends

139. Due to the propagation of construction activities, and deployment of heavy construction machinery at the site, an increase in particulate matter concentration and gaseous emissions was recorded at most of the monitored points, particularly during the fourth quarter of 2024. It is expected that after the development of access roads to construction sites and the application of regular water sprinkling on these roads, the intensity of particulate matter will significantly be decreased.

140. Similarly, with the continued application of third-party inspections of the EPC Contractor's equipment and construction machinery, emission levels from these sources are expected to be significantly reduced.

Glimpses of the Instrumental Environmental Monitoring at the Site

Ambient air and noise monitoring at the Dam site and A2 Camp

Kunhar River Water Sampling at Dam and Tailrace sites

Drinking Water Sampling at Source and Consumer End Points

5.3.6. Summary of Monitoring Outcomes

141. The instrumental environmental monitoring results show that the ongoing construction activities and deployment of heavy machinery collectively affected the baseline air quality at the monitoring points of the project area. However, such impacts are short-term term associated with the construction period as evident from the comparison between the hourly noise levels and particulate matter concentration results obtained during working and off-working hours.

142. To suppress fugitive dust at the site, the EPC Contractor was strictly instructed to increase water sprinkling intensity, particularly at access roads leading to construction sites and ensure tuning of the construction equipment to reduce GHG emissions.

5.4 Waste Management

143. In accordance with the EPC Contractor's contract signed with the Kaghan Development Authority (KDA), the latter collected waste from camps and workshops. The collected waste was then transported to a designated site for further disposal.

144. The main sources of solid waste generation are biodegradable kitchen waste and general waste. For waste collection, the EPC Contractor has provided waste bins at prominent locations. Solid waste from these bins is regularly emptied by Contractor's garbage collectors into a large garbage collection dumpster provided by the Kaghan Development Authority (KDA). Currently, there are large dumpsters available for A1, GRC Sangar camp, A2, A3, and the EPC Contractor's main camp.

Dumpster provided by the KDA for collection of Solid waste (Dam site).

145. For the safe disposal of medical waste, the EPC Contractor signed a contract with a certified firm namely ARAR (Assisting Remarkable Accomplishment Results). Under obligations of the contract, the EPC Contractor transports medical waste to the Balakot Tehsil hospital from where ARAR collects the waste and transports it to Peshawar for final disposal at the government of KP approved disposal site.

146. For lubricant and other hazardous waste disposal, the EPC Contractor identified a vendor from Sindh province. However, the contract with this vendor could not be finalized during the reporting period, as the vendor failed to provide verifiable certificates to ensure contract execution with a certified vendor. The EPC Contractor also identified a local vendor, but their services could not be procured for the same reason.

147. Although the EPC Contractor has engaged the govt. of KP approved firm for medical waste disposal however, no such firm or vendor could be engaged for the collection and safe disposal of hazardous waste generated at camps, stores, workshops, and construction sites. Since the start of the construction activities, the EPC Contractor once sold out hazardous

waste to AH Enterprise, a material supplier registered in Punjab province, however, the firm neither had any license for hazardous waste collection and disposal thereof nor had any experience in such operations hence, the EPC Contractor was directed to stop further supply to AH Enterprise, instead search out for an approved certified vendor.

148. Also, on the occasion of the ADB safeguard team site visit on October 15, 2024, poor hazardous waste management was observed at the EPC Contractor A3 batching plant and workshop site.

Improper storage of hazardous waste at the A3 Batching plant and workshop site.

149. As evident from **Table 5.6**, compared to the previous reporting period, there is a vivid increase in the number of used tyers during the current reporting period. This is due to increase in the EPC Contractor's vehicle fleet. Also, there is considerable increase in the biodegradable waste at the camp which shows the number of camp occupants have been increased.

150. During the current reporting period, the EPC Contractor established a fully equipped medical facility (dispensary) in the main camp in Paras village. The dispensary is stocked with essential medical equipment and medicines, and two medical doctors registered with the Pakistan Medical and Dental Council (PMDC) are performing their duties at the facility. A fully furnished ambulance is also available as part of the dispensary. As the dispensary is now fully functional, an increasing number of EPC Contractor workers will avail the medical services which may result increase in generation of medical waste.

151. For the primary treatment of camp sewage, the EPC Contractor has constructed a septic tank where sewage undergoes anaerobic treatment. Additionally, provisions are in place for surface drainage in the camp. Effluent and surface drainage samples collected from the EPC Contractor's main camp generally fall within the NEQS guideline values, except for the total suspended solids (TSS) in the sample collected from the outlet of the septic tank. The NEQS guiding value for TSS is 200 mg/l, while the results from the septic tank sample show 294 mg/l. Sample from the same point will again be analysed during the upcoming instrumental monitoring.

152. No groundwater contamination was observed as a consequential effect of the EPC Contractor's waste management aspect of the SSEMP.

153. Despite the above, during the monitoring period, some shortcomings were also observed in the EPC Contractor's waste management operation. For example, some construction sites had no solid waste containers, and the solid waste bins available at camps were not color-coded. Also, gaps were observed in the EPC Contractor's site waste storage.

154. **Table 5.6** and **5.7** show month-wise and cumulative details of waste generated at camp(s) and sites.

Table 5.6: Solid and Lubricant Waste Generated at Camps and Sites

S/No	Type of Waste	Quantity			Disposal
		This Reporting Period	Previous Reporting Period (Jan-June. 2024)	Cumulative for the Project	
1	Plastic waste	58.72kg	92.5 kg	190.72 kg	Initially collected in the KDA-supplied waste container and then transported to the approved waste disposal site.
2	Used tyres	43 Nos	22 Nos	130 Nos	Stored in junkyard (to be auctioned)
3	Used wooden sheets	0 Kg	0 kg	0 kg	Not produced yet.
4	Used engine oil	218ltr	400 ltr	1901 ltr	Stored in barrels.
5	Biodegradable waste (vegetables, food etc)	485 Kg	372 kg	1307 kg	Through KDA, for further processing and composting.

Table 5.7: Medical Waste and Sorbents Generated at Camps and Sites

S/No	Month	Medical Waste (kg)	Contaminated Sorbents (kg)
1	July	0.4	0.1
2	August	0.2	0.02
3	September	0.5	0.06
4	October	0.3	0.04
5	November	0.5	0.02
6	December	07	0.05
Total for Reporting Period (July-Dec. 2024)		2.6	0.29
Total for Previous Reporting Period (Jan-June 2024)		3.75	1.5
Cumulative for the Project		8.75	1.79

5.5 Health and Safety

5.5.1. Community Health and Safety

155. During the reporting period, the EPC Contractor undertook several initiatives toward the community's health and safety. The utmost efforts were made to construct temporary facilities like camps, batching plants, and workshops at locations isolated from the nearest community to minimize risks associated with such facilities. For example, the A2 camp, batching plant, workshop, and magazine at Ganhool Nullah, and GRC camp at Sangar village have been constructed in complete isolation from the community. All these facilities have dedicated approach roads guarded by the Special Security Unit (SSU).

156. Although instances of non-compliance have also been observed however, to suppress dust, the EPC Contractor frequently sprinkling the katcha roads leading to various permanent facilities. For example, the entire access road R3 to colony and powerhouse, and kacha sections of access road to the adit tunnel A3 were frequently sprinkled to suppress dust emanating from the heavy machinery movement. Also, some of the temporary roads, like the one at A3 site, have been paved to eliminate dust generation.

157. Furthermore, the sections of unpaved tracks exposed to excess particulate matter concentration were particularly sprinkled more frequently. .

158. The EPC Contractor frequently interact with the representatives of various local forums and GRCs to resolve the local issues swiftly and address complaints effectively.

159. Similarly, while identifying new sites for the construction of temporary facilities or muck disposal, consultation with the community is mandatory wherein the scope of work, impacts, and benefits are discussed in the local language and a conducive environment. For example, during the reporting period, the PMC HSE staff consulted owners of the land identified for muck disposal at A2 and A3 sites wherein various aspects of muck disposal operation, associated risks, and future benefits were discussed while their apprehensions/recommendations were recorded for consideration in demarcation and design of such sites.

160. To maintain the privacy of the houses near the construction sites, green shade nets have been provided to locals on demand.

161. To maintain good working relations with the project area community, the EPC Contractor has allocated some of the environmental mitigation cost for provision of clean drinking water and sanitation facilities. Also, budgeted awareness campaigns regarding health and safety of the community are part of the EPC Contractor’s plans.

162. Although construction activities were also carried out during the night, however, such activities did not create a nuisance to the locals as they were mainly undertaken inside adit tunnels.

163. Throughout the construction sites, warning signs/messages in English and Urdu languages have been displayed at appropriate locations enabling the community members to safeguard themselves from potential risks at works sites.

164. To prevent unauthorized access to construction sites, camps, workshops, batching plants, etc. these areas have been cordoned off with gates and fences and are being guarded 24/7 by personnel of the SSU.

165. The SSU maintains an in-and-out record of the community residing within the valley where the EPC Contractor's construction activities are ongoing. While this is primarily done to ensure the security of the EPC Contractor's staff, it has also created a sense of enhanced safety and security among the community members, as reported by some residents. For instance, the SSU keeps a daily record of the community residing in the Kholia Nullah valley, where the EPC Contractor's batching plant and access road to the adit tunnel A3 are located. Similar arrangements have also been made at the access roads to the main camp and other active sites.

5.5.2. Workers Health and Safety

166. For the EPC Contractor’s workforce health and safety, not only PPEs were provided to them but also a variety of trainings were imparted to ensure safe working; eliminate or minimize incidents and overcome work-related risks.

167. To effectively implement HSE provisions contained in the SSEMP, management plans, and works-related method statements, EPC Contractor has deputed 16 HSE officers to support the H&S and Environment managers in supervising their field activities. To build the capacity of these HSE officers, in-house essential HSE trainings were provided to these officers from time to time.

168. To encourage workers to consistently follow safety protocols and implement safety measures at work sites, champion programs were regularly held where cash awards were distributed to the HSE (Health, Safety, and Environment) champions of the month. During this reporting period, the HSE champion award ceremony was held on December 27, 2024, where cash prizes were awarded to 18 champions for July through December 2024. Typically, three skilled or unskilled labors/staff from the EPC Contractor's workforce, who regularly adhered to safety protocols and motivated other staff to do the same, were selected as HSE champions of the month.

Prize distribution under the HSE champion program at the EPC Contractor’s main camp

169. For the construction workers, the EPC Contractor conducted periodic trainings and held regular toolbox talks on safety issues with practical demonstrations of response to any emergency. Also, on November 16, 2024, the trainers from Muzaffarabad Poly Technical Institute Azad Kashmir, provided one day training to the EPC Contractor’s relevant workforce on: (i) crain operation; (ii) blasting and drilling; (iii) safety in electrical works; (iv) welding; and (v) forklift operation; to enhance their capacity to safely execute their assigned duties.

170. In addition to the above, as detailed in the training section of the report, the EPC Contractor organized a two-day annual OHS training on November 27 and 28, 2024, at the site. The training included presentations at the camp and field demonstrations at the site, conducted by professionals from Rescue 1122 of District Mansehra.

171. During the reporting period, PMC ensured the availability of first aid boxes at all construction sites to provide first aid in case of any emergency. Also, to respond to fire outbreaks, fire extinguishers were made available at the camps, batching plants and laboratories/offices, etc.

172. During the reporting period, under the PMC instructions and regular follow-up, the EPC Contractor provided sanitation facilities at all construction sites and ensured a regular supply of clean drinking water to the workers. As exhibited by the environmental monitoring results, drinking water complied with the NSDWQ. Also, the EPC Contractor’s camps were equipped with all necessities, like accommodation, dining halls, sanitation, and games.

173. Under the provisions of the construction contract, the EPC Contractor hired full-time services of the PMDC registered medical doctor who remained available at the main camp

dispensary round the clock. The record maintained at the dispensary covers medicines received and used, the name of the patient treated, and type of disease, etc. **Table 5.8** exhibits month-wise patient records and types of common diseases treated at the dispensary.

174. During the reporting period, the medical doctor administered medicines to patients suffering from common headaches, vomiting, stomach pain, etc. As evident from the record, during the reporting period, three patients were referred to the DHQ and THQ Hospital Balakot for further treatment. The EPC Contractor fully assisted the patients in availing medical treatment from each hospital.

Table 5.8: Patient Records for the Current Reporting Period

S/No	Description	July	August	September	October	November	December
1	The EPC Contractor's monthly workforce deployment	1177	1200	1427	1495	1495	1841
2	Number of patients treated at Camp Medical Facility	144	60	39	247	168	162
3	Number of patients referred to DHQ Hospital, THQ Balakot	0	1	2	0	0	0
4	Percentage of workforce illness/treated	12 %	5 %	3 %	17 %	11 %	9 %
5	Type of illness	Flu. Cough	Flu. cough, Sinusitis	pain abdomen	Kidney pain. Left flank pain	Generalized body pains, Weakness	Hypertension, GBA
		Toothache	Kidney Pain	Burning micturition	Cough and constipation	Burning micturition, Chest infection	Sore throat
		Body aches	Leg pain	Stomach acidity	Scabies, Flu, Strep throat	Flue and cough	Headache, Hypertension
		Headache	Generalized body aches	Lethargy and body pain	minor injuries. Muscle sprains	Chest Pain, Stomach acidity	Diarrhea. Vomiting

175. During the previous reporting period, a total of 1,116 patients were treated for the aforementioned diseases. In the current reporting period, however, a total of 820 patients were treated, which represents a 26.52% decrease in the number of patients recorded at the EPC Contractor's dispensary. Although, as evident from the **Table 2.11,** the EPC Contractor's workforce has significantly increased during the current reporting period, however, there has been a sharp decrease in the number of patients treated at the dispensary. As the EPC Contractor has shifted its main camp to the dam site and established a fully functional dispensary there, an increase in the number of patients is anticipated in the upcoming reporting period.

176. During the reporting period, a total of 16 accidents occurred at work sites causing damage to equipment and injuries to the Contractor's workforce. In one incident (as detailed below under a separate subhead) inside the A3 tunnel on December 5, 2024, one of the EPC Contractor labors lost his life. The EPC Contractor's incident record **(Annexure 3)** indicates that 13 out of the 16 incidents occurred in December 2024 alone.

5.5.2.1. Fatal Incident During the Reporting Period

177. As detailed in the incident report given in **Annexure 3 (A)**, on December 5, 2024, at approximately 12:20 PM, an accident occurred at the Headrace Tunnel (Ch: 8+932.5, upstream) of Adit-3 during drilling, fixing, and installation of wire mesh as part of the support work. The left part of the crown collapsed while workers were refurbishing and lifting the wire mesh, causing rocks to fall onto the workers and the working platform. The volume of the collapsed debris was approximately 0.714 m^3.

178. The following three workers sustained injuries due to the falling debris and subsequent fall from a platform at a height of 5 meters.

i. Mr. Muhammad Ilyas
ii. Mr. Mazhar Hussain
iii. Mr. Naqash Ahmed

179. The foreman, HSE officer, and other labors immediately rescued the injured and provided first aid. Thereafter, the EPC Contractor's HSE Officer, Mr. Rashid, and Foreman, Mr. Khizer, shifted the victims to Balakot Tehsil Hospital using company vehicles.

180. Following initial treatment at Balakot Tehsil Hospital, the injured workers were referred to Mansehra District Hospital via three separate ambulances. At Mansehra District Hospital, Mr. Mazhar Hussain was admitted for further treatment while Mr. Muhammad Ilyas and Mr. Naqash Ahmed were referred to Ayub Medical Complex based on the advice of the Mansehra District Hospital.

181. Out of the three injured workers, Mr. Mazhar Hussain was treated and discharged from the hospital on the same day while Mr. Muhammad Ilyas remained in the hospital for treatment till the end of the reporting period. Unfortunately, Mr. Naqash Ahmed, who got serious injuries to his head and legs, died on the next day of the incident.

182. As given in the root cause investigation report, the workload, non-adherence to the HSE instructions, and ignoring the geological conditions of the rock were the main causes attributed to the occurrence of the fatal incident.

5.6 Implementation Status of Environmental Management Plan

183. **Table 5.9** shows the implementation status of the pre-construction and construction phase mitigation measures in the disclosed EIA report of the Project, while the implementation status of corrective actions proposed in the previous monitoring period has been given separately in **Table 8.1.**

Table 5.9: Implementation Status of EMP (Pre-construction and Construction Phases)

S/No	EMP Requirements		Compliance Attained		Comment on Reasons for Partial or Non-Compliance	Required Action and Target Dates to Achieve Compliance
	Impact	Mitigation Measures				
Pre-Construction Phase						
1	Terrestrial habitat loss caused by construction related activities	Minimize disturbance to, or movement of, soil and vegetation	Yes			
		Minimize project footprint.	Yes			
		Retain as much natural vegetation as possible.	Yes			
		Locate construction facilities based on a knowledge of the soil.	Yes			
		slope and vegetation cover of the area to avoid disturbance to the natural environment	Yes			
2	Decline in abundance and diversity of terrestrial flora and fauna caused by construction related activities	Locate vehicle yards away from open soils and top soil stockyard	Yes			
		Maximize use of locally-sourced aggregate and borrow material	Yes			
		Minimize contact of non-local aggregate and borrow material with native soil.	Yes			
		Minimize disturbance to, or movement of, soil and vegetation.	Yes			
3	Blasting may pose a health hazard due to flying debris	A minimum buffer of 500 m should be provided between the settlements and point of blasting.	Yes			
4	Construction activities may be cause alterations to groundwater flow patterns	Record location of the springs especially those in areas proximal to where the underground headrace tunnel will be closer to the ground level	Yes[6]			
5	Use of local water resources for construction activities may reduce the water	Prepare a Water Sourcing and Abstraction Plan specifying the source, owner, total yield, current usage, allowable quantity and the duration for which water can be obtained.	Yes[7]			

[6] The EPC Contractor submitted the updated Hydro-census report in July 2024.
[7] Water source permission(s) and other details annexed to the SSEMP.

S/No	EMP Requirements		Compliance Attained		Comment on Reasons for Partial or Non-Compliance	Required Action and Target Dates to Achieve Compliance
	Impact	Mitigation Measures				
	availability for the local communities.	To the extent possible avoid, and where unavoidable, minimize the use of water from local sources (springs) for the Project where local abstraction is unavoidable	Yes			
		Undertake an assessment of the local source identifying its total yield and current usage. If the abstraction from a single source extends three months, the assessment shall be repeated	Yes			
		Fix the allowable quantity to not more than 50% of the available yield (total yield minus current usage)	Yes			
		Enter into a formal agreement with the owner for the water source (or government if it is a public source)	Yes[8]			
6	Increase in ambient noise levels due to operation of construction equipment, movement of construction traffic and blasting may create nuisance for nearby communities and visiting tourists.	Use visual alarms in preference to audible alarms.	Yes			
		Locate noisy equipment behind parking lots, parks or behind sound barriers or sound absorbers – for example, gravel stockpiles or constructed barriers. and away from potential sources of conflict	Yes			
		Using vibratory piling instead of impact piling.	Yes			
		Erect earth mounds around the site boundary can provide acoustic as well as visual screening	Yes			
7	Failure of spoil dumping sites resulting in increased erosion and sediment load entering river	Dumping sites should have a flood prevention design for a 20- year flood		Partial	Design of the two muck disposal sites has been approved by the PMC in November 2024, while review of the surge tunnel disposal site is in progress.	PMC will complete the due diligence of the surge tunnel muck disposal site by January 30, 2024.
		Preparation of spoil management plan	Yes			

[8] Agreements with the locals are annexed in the SSEMP report.

S/No	EMP Requirements		Compliance Attained		Comment on Reasons for Partial or Non-Compliance	Required Action and Target Dates to Achieve Compliance
	Impact	Mitigation Measures				
8	Permanent impact in aesthetics due to proposed developments	Develop and implement a Site Rehabilitation and Landscaping Plan	Yes			
		Use colors that better integrate with the landscape	Yes			
		Disguise elements with vegetation where possible	Yes			
		Retain as much natural vegetation as possible	Yes			
9	Improved accessibility due to construction of Project internal roads	Consult communities during final design and location of site access roads	Yes			
10	Increase in congestion, due to increased traffic volume will cause delays	Make roundabouts for the congestion points.	Yes			
		Retain as much natural vegetation as possible to reduce the impact of smoke due to vehicles.	Yes			
		Consult National Highway Authority for implementation of the above measures	Yes			
11	Loss of assets and livelihood as a result of land acquired for the Project	LARP implementation		Partial	LARP implementation is in progress.	
12	Submergence of the graveyard	Plaster the graves with mud or cement.	Yes[9]			
		If relocation of the graveyard cannot be avoided, it shall be managed through the local religious authorities.	Yes			
13	Impact of climate change in possible enhancing of flood impacts such as during possible overtopping of spillway	Ensure minimal damage to dam structure from small amount of overtopping of spillway through design	Yes			

[9] All 19 graves from the Sangar area (Employer's colony site) have been relocated. The contract for relocation of 184 graves from the dam site has been awarded, but the relocation at this site is yet to be initiated.

S/No	EMP Requirements		Compliance Attained		Comment on Reasons for Partial or Non-Compliance	Required Action and Target Dates to Achieve Compliance
	Impact	Mitigation Measures				
Construction Phase						
1	Construction Impacts	SSEMP exhibiting areas to be cleared, vegetated areas to be protected or fenced, slopes to be stabilized and solid waste disposal locations.	Yes			
2	Improvement of the river ecosystem through implementation of the BAP Loss of riverine ecosystem due to inundation by Project Reservoir Degradation of the river ecosystem in the low flow segment downstream of the Project dam Degradation of the River Ecosystem Downstream of the Tailrace Terrestrial habitat loss caused by construction related activities.	Implement BAP		Partial	The works-related measures have been taken by the EPC Contractor while for the protection measures in the Area of Management, contract signing with the Fisheries and Wildlife departments is awaited till approval of the updated EIA report by the Project financiers.	The signing of the contract and field activities will be initiated after the Bank's concurrence to the updated EIA report[10].
3	Terrestrial habitat loss caused by construction related activities.	Provide awareness training to staff and contractors on: prevention of injury of animals; identification of likely species found on site; identifications of animal hazards (such as venomous snakes); and what to do if dangerous animals are encountered	Yes[11]			

[10] The updated EIA report was submitted to the PIU on December 25, 2024 for review ,and onward transmission to the ADB and AIIB for their review and concurrence.
[11] The second annual training was held on November 27 and 28, 2024.

S/No	EMP Requirements		Compliance Attained		Comment on Reasons for Partial or Non-Compliance	Required Action and Target Dates to Achieve Compliance
	Impact	Mitigation Measures				
		Solid waste should only be disposed of at designated sites and a Waste Management Plan developed and implemented.	Yes[12]			
		Prepare an Environmental Training Plan that contains awareness training to staff and contractors on: prevention of injury of animals; identification of likely species found on site; identifications of animal hazards (such as venomous snakes); and what to do if dangerous animals are encountered. Also see guidelines for the Environmental Training Plan in IR 5	Yes			
		Encourage personnel to report sightings of wildlife of conservation importance or incidents of poaching to PEDO	Yes			
		Minimize disturbance to, or movement of, soil and vegetation	Yes			
		Prevent soil damage and erosion				
		Prevent Alien Invasive Species (AIS) establishment on exposed stored soil (do not store bare soil near known sources of AIS). The habitat most at risk is the Riparian Habitat. The species that are highest risk include Parthenium Weed, Common Weed and Castor Oil Plant	Yes			
		Train and raise awareness regarding AIS among Project staff and contractors				
		Retain as much natural vegetation as possible				
		Solid waste should only be disposed of at designated sites	Yes			

[12] The EPC Contractor has hired services of the Kaghan Development Authority (KDA) for the waste disposal at the approved location(s).

S/No	EMP Requirements		Compliance Attained		Comment on Reasons for Partial or Non-Compliance	Required Action and Target Dates to Achieve Compliance
	Impact	Mitigation Measures				
		Minimize the project footprint, clearly delineate and restrict access beyond work sites and other areas to be disturbed				
		Within the quarry and borrow areas, activities will be restricted to areas at a distance from perennial water channels so as to avoid disturbances to them including the risk of siltation	Yes			
4	Decline in abundance and diversity of terrestrial flora and fauna caused by construction related activities.	Large flood lights should not be installed outside 50 m of the Project fence.	Yes			
		Lights should be directed towards Project facilities and not towards the natural habitats.	Yes			
		Regulations for Project staff and contractors to avoid illegal poaching to be incorporated in contract documents	Yes			
		Provide awareness training to staff and contractors on: prevention of injury of animals; identification of likely species found on site; identifications of animal hazards (such as venomous snakes); and what to do if dangerous animals are encountered.	Yes			
		Incorporate regulations for Project staff and contractors to avoid illegal poaching in contract documents	Yes			
		Provide adequate knowledge to the workers on relevant government regulations and punishments for illegal poaching.	Yes			
		Encourage personnel to report sightings of wildlife of conservation importance or incidents of poaching to PEDO	Yes			
		Project staff and contractors to report kills of large mammals particularly designated species of conservation concern	Yes			
		Train and raise awareness regarding AIS among Project staff and contractors	Yes			

S/No	EMP Requirements		Compliance Attained		Comment on Reasons for Partial or Non-Compliance	Required Action and Target Dates to Achieve Compliance
	Impact	Mitigation Measures				
		The Contractor shall prepare an Environmental Training Plan for all construction workers: the Plan shall address the following items: • All Contractor's employees shall be required to comply with environmental protection procedures and they shall be able to provide evidence that they attended the training sessions detailed in the Plan; • The Plan shall educate all construction workers on the following issues but not limited to them: fire arm possession, traffic regulations, illegal logging and collection of non-timber forestry products, non-disturbance of resettlement communities, hunting and fishing restrictions, waste management, erosion control, health and safety issues, all prohibited activities, the Code of Conduct requirements and disciplinary procedures, and general information on the environment in which they will be working and living • Proposed methods for conducting the training program, which shall include formal training sessions, posters, data in newsletters, signs in construction and camp areas and 'tool box' meetings	Yes[13]			
		Equipment emitting excessive noise in comparison with other similar equipment will not be allowed to operate	Yes			

[13] Detailed training plans have been given in the SSEMP.

S/No	EMP Requirements		Compliance Attained		Comment on Reasons for Partial or Non-Compliance	Required Action and Target Dates to Achieve Compliance
	Impact	Mitigation Measures				
		Equipment under use will be regularly maintained, tuned, and provided with mufflers to minimize noise levels.		Partial	There were instances where generators, particularly at the A3 site were producing noise and air pollution.	Although the EPC Contractor addressed the issue in the previous reporting period however, the issue re-surfaced for which the EPC Contractor was instructed to take remedial measures immediately.
		Equipment in poor state of maintenance, particularly without effective noise control will be checked to determine if it can be improved, and replaced with less noisy equipment as soon as practicable	Yes			
		Blowing of horn will be prohibited on all sensitive areas except under emergency conditions	Yes			
		Compensatory trees will be planted. The EPC Contractor will plant a minimum of ten trees for each tree removed in acquired land. PEDO will monitor and maintain the vegetation until it is established.		Partial	The EPC Contractor's Tree Plantation Plan (TPP) has been approved while the plantation of trees will be initiated once sites (access roads, muck disposal sites, slopes, etc.) are made available for plantation.	Plantation will be initiated in the first plantation period of 2025 subject to availability of the sites identified for plantation.
5	Increase in ambient and ground level concentration of air pollutants from construction activities and vehicular movement may cause health impacts to the community.	Develop and implement an Air Pollution Control Plan	Yes[14]			
		Prepare a SSEMP for each construction site and must outline areas to be cleared, vegetated areas to be protected or fenced, solid waste disposal locations, and sprinkling locations	Yes			
		Fugitive and exhaust emissions from transport vehicles:		Partial	During the reporting period, instances of dust generation	

[14] Air pollution plan is part of the SSEMP.

S/No	EMP Requirements		Compliance Attained		Comment on Reasons for Partial or Non-Compliance	Required Action and Target Dates to Achieve Compliance
	Impact	Mitigation Measures				
		♦ Cover all trucks hauling soil, sand, and other loose materials or require all trucks to maintain at least two feet of freeboard (i.e., the minimum required space between the top of the load and the top of the trailer). ♦ Install and maintain all vehicles and machinery with appropriate emission control equipment. ♦ Regularly maintain vehicles and equipment to keep emissions in check. ♦ Smoke from internal combustion engines should not be visible for more than ten seconds. ♦ To the extent possible, use new and low emission equipment and vehicles. ♦ Purchase best quality fuel and lubes and where possible use lead free oil and lubes. ♦ Sprinkle water on all unsealed roads used by Project vehicles that are within 200 m of any settlement. ♦ Cover loads and long-term piles of friable material to reduce fugitive dust emission. ♦ Reduce traffic speeds on all unpaved surfaces to 15 miles per hour or less. ♦ Paved roads shall be swept frequently if soil material has been carried onto adjacent paved, public thoroughfares from the Project site. ♦ Install wheel washers where vehicle exit onto paved road from unpaved. ♦ Wheel washing of vehicles leaving the site. ♦ Wash vehicles/equipment prior to each trip. ♦ Use catalytic converters on vehicles, an emission control device, used to convert harmful pollutants to less harmful pollutants			due to insufficient water sprinkling was observed at various locations particularly at the micro pile drilling location at the dam site.	The EPC Contractor Environmental Manager was instructed repeatedly to ensure regular sprinkling on the unpaved roads particularly at the dam site. Although the EPC Contractor has provided respirators to the labor working at the micro pile drilling site however, suppression of dust has not fully been ensured. The PMC Health and Safety monitor is regularly monitoring the site to ensure compliance to the instructions issued in the matter.

S/No	EMP Requirements		Compliance Attained		Comment on Reasons for Partial or Non-Compliance	Required Action and Target Dates to Achieve Compliance
	Impact	Mitigation Measures				
		e.g. it converts the nitrogen oxides back into nitrogen and oxygen. ♦ Appropriate maintenance of vehicles and machinery				
		Fugitive dust emissions from blasting ♦ Indicate the limits of a clearing land with highly visible markers. ♦ Leave a layer of about 5 m of undisturbed softs above the top of the overburden blasts. This will act as a blanket to contain air blast, dust and fly rock. ♦ Sprinkle water on the area where blasting is done to settle down the particulate matter emissions.		Partial	Same as above	Same as above
		Fugitive dust emissions from quarry areas ♦ Indicate the limits of a clearing land with highly visible markers. ♦ Avoid earth stripping or moving in periods of dry and windy weather. ♦ Carry out dust generating activities where maximum protection can be obtained through topography or in areas where prevailing winds will blow dust away from sensitive areas/uses. ♦ Water spraying of conveyors/conveyor transfer points, stockpiles and roads. ♦ Covering of fine dry loads or spraying of loads prior to exiting the site, and if necessary regular cleaning of public roads in the vicinity of the entrance.	Yes			
		Fugitive dust emissions from concrete batching plants ♦ Suspend earthwork operation when wind speed exceeds 20 km/hr. in areas within 500 m of any settlement.	Yes			

S/No	EMP Requirements		Compliance Attained		Comment on Reasons for Partial or Non-Compliance	Required Action and Target Dates to Achieve Compliance
	Impact	Mitigation Measures				
		• The whole process of weighing and mixing would be performed in a fully enclosed environment. • The mixers would all equip with dust collectors, no dust emission would be expected. • Siting the concrete batching plant out of prevailing high winds minimizing dust emissions. • The prevailing wind direction should be considered to ensure that bunkers and conveyors are sited in the leeward direction to minimize the effects of the wind. • The provision of natural or artificial wind barriers – such as trees, fences and landforms – to help control the emission of dust from the plant should be considered. • Batching plants should be sited on land that is not flood prone. • Batching plant should be kept as near to natural sinks to minimize emissions to ambient environment • All stacks to be vertical and at least 3 m above ground				
		Fugitive dust emissions from aggregate production and handling system • Suspend operation when wind speed exceeds 20 km/hr. in areas within 500 m of any settlement. • The prevailing wind direction should be considered to ensure that aggregate handling systems located in the leeward direction to minimize the effects of the wind.	Yes			

S/No	EMP Requirements		Compliance Attained		Comment on Reasons for Partial or Non-Compliance	Required Action and Target Dates to Achieve Compliance
	Impact	Mitigation Measures				
		• Sprinkle water on all exposed surfaces, particularly those close and up-wind of settlements.				
		Wind-blown dust from exposed surfaces such as bare land and waste dumping sites • Cover all exposed surfaces, particularly those close and up-wind of settlements. • All grading operations on a project should be suspended when winds exceed 20 miles per hour. • Minimize disturbance to, or movement of, soil and vegetation. • Sprinkle water on all exposed surfaces, particularly those close and up-wind of settlements. • Retain as much natural vegetation as possible	Yes			
		Wind-blown dust from stockpiles of dusty materials such as sand and other minerals • On-site dirt piles or other stockpiled PM should be covered, wind breaks installed, and water and/or soil stabilizers employed to reduce wind-blown dust emissions. • Adequately wet, cover with plastic, or provide with wind shield all stockpiles to reduce dust emission. • Sprinkle water on all exposed surfaces, particularly those close and up-wind of settlements. • Minimize disturbance to, or movement of, soil and vegetation. • Prevent soil damage and erosion. • Retain as much natural vegetation as possible	Yes			

S/No	EMP Requirements		Compliance Attained		Comment on Reasons for Partial or Non-Compliance	Required Action and Target Dates to Achieve Compliance
	Impact	Mitigation Measures				
6	Vibration from blasting during the construction phase may disturb local communities.	Develop a Blasting and Explosives Management Plan and Vibration Monitoring Plan.	Yes[15]			
		♦ Conduct a pre-construction survey of structures at risk of vibration impacts households. ○ In the initial stages, the blasting induced vibration shall be measured as a function of maximum instantaneous charge and distance from the blasting site. This data shall be then used to refine the Blasting Induced Vibration Risk Zones on the basis of the adopted criteria. ○ Using, the refined Blasting Induced Vibration Risk Zones maps and the tunnel boring schedule, the Supervision Consultant in consultation with the PEDO and the Construction Contractor, shall identify the houses that will be affected and the impact duration and schedule. ○ For the houses that will fall in the Structural Damage Risk Zone, a temporary relocation plan will be developed. An amendment to the Land Acquisition and Resettlement Plan (LARP) will be commissioned for this purpose. Before start of blasting, all residents of houses in the Structural Damage Risk Zone will be relocated as per the LARP. ○ A survey will be undertaken in both zones, to determine the pre-blasting conditions of the buildings. The survey	Yes			

[15] The EPC Contractor has developed and obtained approval for the Blasting Management Plan. However, the plan will be updated till 25th of the February to include the technical details from the approved Blasting Method Statements.

S/No	EMP Requirements		Compliance Attained		Comment on Reasons for Partial or Non-Compliance	Required Action and Target Dates to Achieve Compliance
	Impact	Mitigation Measures				
		will be commissioned by the Supervision Consultant and will identify and record any existing damage to the structures. The survey will cover the following aspects: ➢ Overall condition of the structures, both exterior and interior. ➢ Documentation of defects observed in the structure using digital imagery along with notes, measurements and sketches. ➢ Documentation of pre-existing cracks using digital imagery along with notes, measurements and sketches.				
		♦ Following completion of the blasting, the survey will be repeated in the Structural Damage Risk Zone to determine the condition of the buildings and verify that they are safe for re-occupation. If the buildings are safe, the residents will be allowed to return to their houses following any necessary damage repairs. If the buildings are damaged beyond repair, compensation will be paid to the owners as per the LARP. If there are any claims or reports of damage in the Cosmetic Damage Risk Zone, the affected house will be surveyed against the pre-Project survey and repairs will be undertaken as appropriate.	Yes			
		♦ Meaningful contact with the community shall be maintained and their grievance shall be attended to in a timely manner. In this regard: o A meaningful community engagement plan will be developed. The plan will	Yes			

S/No	EMP Requirements		Compliance Attained		Comment on Reasons for Partial or Non-Compliance	Required Action and Target Dates to Achieve Compliance
	Impact	Mitigation Measures				
		cover identify the affected community; the key contact persons; frequency of engagement; the information to be shared; the responsibilities to manage the plan; and the notice period to be giving to the community for various blasting related generating activities. o The GRM will be used to record, investigate, and respond to any complaints. Investigation of the complaints will be undertaken by the Supervision Consultant.				
		♦ Develop a Vibration Monitoring Plan that will include monitoring of vibration levels and frequency around the blasting sites. The objectives of the monitoring will be to: o ensure that vibration levels in the communities are within the adopted criteria levels; o maintain record of vibration to settle any potential conflicts; and o monitor changes in the vibration levels due to possible changes in the rock formation and take appropriate corrective actions.	Yes			
7	Blasting may pose a health hazard due to flying debris.	A minimum buffer of 500 m should be provided between the settlements and point of blasting.	Yes			
		Leave a layer of about 5 m of undisturbed softs above the top of the overburden blasts. This will act as a blanket to contain air blast, dust and fly rock.	Yes			
		Ensure that the holes are correctly collared with respect to the back-break/inclination of the face and that digging alongside the initiation face well controlled.	Yes			

S/No	EMP Requirements		Compliance Attained		Comment on Reasons for Partial or Non-Compliance	Required Action and Target Dates to Achieve Compliance
	Impact	Mitigation Measures				
		Inadequate forward displacement of the front row burden arising out of the under charging of these holes will result in fly rock from vertical catering of the rear holes	Yes			
		Where fly rock possesses a serious problem, the stemming length should not be less than the whole burden. Also, an effective stemming material like crushed angular rock should be used to prevent premature venting of explosion gases through the stemming column.	Yes			
		The forward fly rock could be fairly controlled to the commonly used 'inline open loop' pattern. The maximum inter-row delay interval consistent with the absence of cut off helped in minimizing the fly rock formation. As a thumb rule an inter-row delay of 4-8ms/m of burden could be used for this purpose.	Yes			
		Adequate care should be taken while connecting the delay devices in the holes/rows and the initiation sequence properly checked before firing to avoid initiation of blast holes out of sequence.	Yes			
		Blasts designed on a face length to width ratio in the range of 3 to 4 produces minimum fly rock.	Yes			
8	Alterations of natural passage of springs due to blasting for tunnels may disrupt the water supply for mountain spring users.	Record location of the springs, especially those in areas proximal to where the underground headrace tunnel will be closer to the ground level i.e. high-risk areas.	Yes[16]			
		Monitor flow for located springs and maintain records.				

[16] The PMC reviewed and approved the EPC Contractor's Hydro-census Report in July 2024.

S/No	EMP Requirements		Compliance Attained		Comment on Reasons for Partial or Non-Compliance	Required Action and Target Dates to Achieve Compliance
	Impact	Mitigation Measures				
		Support the community in development of alternate water supply schemes through local NGOs	Yes			
		Ensure the availability of water to the communities and the access of the communities to the water resources being used by them is not adversely affected.	Yes			
9	Use of local water resources for construction activities may reduce the water availability for the local communities.	Develop a Water Sourcing and Abstraction Plan	Yes			
		Source water for construction from authorized abstraction sources agreed between the local communities, local government and EPC contractor.	Yes			
		Water conservation techniques will be developed and implemented by the EPC contractor.	Yes			
		Access of community to water sources shall be kept clear so that the community's ability to meet its water requirements are not compromised.	Yes			
		Exercise care while moving heavy machinery to avoid damage or blockage of natural waterways and channels.	Yes			
		Maintain records of water usage in all Project activities.	Yes[17]			
		Incorporate the above measures in the Construction SSEMP	Yes			
10	Discharge from construction activities can potentially result in the contamination of soil, groundwater and surface water.	Develop and implement a Water Quality Management Plan	Yes			
		Prepare and implement a Spill Prevention and Response Plan and inducted to the staff for any incident of spill.		Partial	Spill prevention plan is part of the SSEMP. There were some instances of oil spillage which were reported to	The EPC Contractor appropriately rectified the oil spillage events.

[17] For further details refer to Section 2.4 of the report.

S/No	EMP Requirements		Compliance Attained		Comment on Reasons for Partial or Non-Compliance	Required Action and Target Dates to Achieve Compliance
	Impact	Mitigation Measures				
					the EPC Contractor for rectification.	The Contractor was however instructed through CAPs to construct hard flooring in workshops to avoid soil contamination. February 15, 2025, is the target date for completion of the concrete flooring at workshop.
		Provide and use spill prevention trays at refueling locations.	Yes			
		The runoff from maintenance workshops will be collected by impervious channels and passed through oil-water separators (OWS) before final disposal. The sludge and oil collected at the OWS will be disposed of properly.		No	i. The Grease trap is part of the EPC Contractor's washing yard. As the EPC Contractor has not scheduled the washing yard hence, the grease trap is also pending. ii. Also, the Contractor has not decided yet, whether to construct a washing yard or not.	
		Build separate impervious pits (with concrete walls and proper shed) at the construction sites for temporary handling and storage of contaminated soil and water if encountered during construction such as sludge from OWS.		No	Same as above	
		Keep all fuel storage tanks and lubricating oil drums in secondary containment impervious pits with impervious shed walls.		Partial	As evidenced by the October 2024 CAP, delivered to the EPC Contractor for rectification, lubricating oil drums were not properly stored at some locations, particularly at the A3 camp site. The EPC Contractor failed to complete the	During the meeting held on November 6, 2024, regarding the October CAP, the EPC Contractor committed to constructing the concrete pad for the storage of oil drums by January 5, 2025.

S/No	EMP Requirements		Compliance Attained		Comment on Reasons for Partial or Non-Compliance	Required Action and Target Dates to Achieve Compliance
	Impact	Mitigation Measures				
					rectifications by the target date of November 5, 2024.	
		Avoid on-site maintenance of construction vehicles and equipment, as far as possible.	Yes			
		Regularly inspect construction vehicles and equipment to detect leakages.	Yes			
		Store fuels and lubricants in covered and dyked areas, underlain with impervious lining.		Partial	Same as above	Same as above
		Spill control kits (shovels, plastic bags and absorbent materials) will be available near fuel and oil storage areas, vehicle parking, and vehicle maintenance areas as well as at construction sites.	Yes			
		Remove contaminated soil from the site and dispose in a manner to ensure protection of water sources.	Yes			
		Construct the bottom of any soak pit or septic tank at least 100 meters away from springs and water bores.	Yes			
		Maintain records of spills and volume of removed contaminated soil.	Yes			
		Maintain record of remedial measures taken.	Yes			
		Use silt traps to prevent contamination of river and streams.		Partial	Although temporary sedimentation tanks are operational at the adit tunnel sites, properly designed sedimentation tanks have not yet been constructed due to the non-finalization of their design.	The sedimentation tanks design will be finalized till January 25,2025. Construction of sedimentation tanks will immediately be commenced upon approval of the design.
		Incorporate the above measures in the Construction SSEMP	Yes			
11		Develop a Noise and Vibration Control Plan	Yes[18]			

[18] Noise and Vibration plans are part of the approved SSEMP.

S/No	EMP Requirements		Compliance Attained		Comment on Reasons for Partial or Non-Compliance	Required Action and Target Dates to Achieve Compliance
	Impact	Mitigation Measures				
	Increase in ambient noise levels due to operation of construction equipment, movement of construction traffic and blasting may create nuisance for nearby communities and visiting tourists.	**Noise generated from construction sites from construction activities.** • Select the quietest available plant and equipment that can economically undertake the work required. • Undertake maintenance of the equipment as simple maintenance can reduce noise levels by as much as 50%. Parts may become loose, creating more noise because of improper operation or scraping against other parts. Grinding noises may also occur as the result of inadequate lubrication. • Equipment under use will be regularly maintained, tuned, and provided with mufflers to minimize noise levels. • Use visual alarms in preference to audible alarms. • Enclose noisy equipment. • Provide noise attenuation screens, where appropriate. • Build an enclosure around the noise source so that noise is contained. The enclosure should be free from gaps and made of dense material and be lined with noise-absorbing material like glass or polyester batts. • Locate noisy equipment behind parking lots or parks. • Close liaison with the community and regular monitoring of the noise levels in the community are key to successful implementation of the above mitigation measures. Specifically, inform communities	Yes[19]			

[19] The mitigation measures have largely been implied at sites.

S/No	EMP Requirements		Compliance Attained		Comment on Reasons for Partial or Non-Compliance	Required Action and Target Dates to Achieve Compliance
	Impact	Mitigation Measures				
		of all major construction activities three days in advance.				
		Construction noise from traffic • Fit and maintain appropriate mufflers on earth-moving and other vehicles on the site. • Mobile plants such as excavators, front-end loaders and other diesel-engine equipment should be fitted with residential class mufflers and other silencing equipment, as applicable. • Haul roads within the site should have as low a gradient as possible, and paving should be considered if practicable where noise-sensitive receptors are likely to be affected. • Owners and operators of existing facilities should implement special noise reduction measures, such as erecting purpose-built acoustic barriers, restricting opening hours and maintaining transport vehicle	Yes			
		Construction noise from on-site plant operations and equipment • All fixed plants at the work sites will be appropriately selected, and where necessary, fitted with silencers, acoustical enclosures and other noise attenuation measures. • Modify the equipment or the work area to make it quieter by substituting existing equipment with quieter equipment; retro-fitting existing equipment with damping materials, mufflers, or enclosures; erecting barriers; and maintenance. • Shifting to a quieter construction process for example pile driving is very loud as	Yes			

S/No	EMP Requirements		Compliance Attained		Comment on Reasons for Partial or Non-Compliance	Required Action and Target Dates to Achieve Compliance
	Impact	Mitigation Measures				
		compared to boring which is a much quieter way to do the same work. • Combine noisy operations to occur in the same time period. The total noise level produced will not be significantly greater than the level produced if the operations were performed separately. • All plants and equipment should be regularly maintained. • Move static plants and equipment as far as possible from sensitive boundaries, as work allows. A distance of four times further away lowers the noise by 12 dBA. A reduction of 10 dBA will sound half as loud. • Sound attenuation measures should be used for plants and equipment such as baffles and specialized mufflers, acoustic enclosures or partial enclosure housings. • Acoustic barriers need to be designed and purpose built if needed. Vegetated buffer zones can also be planted to mitigate noise from operations using suitably selected native plantings local to the area. • Reduce workers' exposure to high noise levels by keeping moving workers away from the noise source; restricting access to areas; rotating workers performing noisy tasks; and shutting down noisy equipment when not needed. • Use earplugs to reduce workers' exposure to high noise levels.				
		Noise generated from the blasting in quarry areas.	Yes[20]			

[20] Construction materials are being supplied from the government approved sources which are located outside of the Project area

S/No	EMP Requirements		Compliance Attained		Comment on Reasons for Partial or Non-Compliance	Required Action and Target Dates to Achieve Compliance
	Impact	Mitigation Measures				
		• Using vibratory piling instead of impact piling. • Conveyor belts and crushing/screening equipment can be housed to provide acoustic screening. • It is important that sound-reduction equipment fitted to machinery is used and maintained properly. • Erect earth mounds around the site boundary can provide acoustic as well as visual screening. • Soft ground (e.g. grassland and cultivated fields) attenuation can sometimes have a greater impact in reducing noise than barrier attenuation, especially if the ground supports sound absorbing vegetation.				
		Noise emissions from concrete batching • Locate noisy equipment away from potential sources of conflict. • Locate noisy equipment behind sound barriers or sound absorbers – for example, gravel stockpiles or constructed barriers. • Install silencing devices to all pressure operated equipment	Yes			
12	Contamination of soil as a result of accidental release of solvents, oils and lubricants can degrades soil fertility and agricultural productivity.	Prepare a Spill Prevention and Response Plan and induct to the staff for any incident of spill.	Yes[21]			
		Appropriately mark fuel tanks by content and store in dyked areas with an extra 10% of the storage capacity of the fuel tank. The area will be lined with an impervious base.	Yes			
		Install grease traps on the site, wherever needed, to prevent flow of oily water.		No	The grease trap is not available	A grease trap will be constructed as part of the washing yard. EPC

[21] The requisite plan is included in the approved SSEMP.

S/No	EMP Requirements		Compliance Attained		Comment on Reasons for Partial or Non-Compliance	Required Action and Target Dates to Achieve Compliance
	Impact	Mitigation Measures				
						Contractor has not scheduled construction of the washing yard yet.
		Spill cleaning kit (shovels, plastic bags and absorbent materials) will be available near fuel and oil storage areas.	Yes			
		Carry cleanup kits in all fuel trucks.	Yes			
		Fueling should only take place over impermeable surfaces, other hazmat should be stored and used over impermeable surfaces.	Yes			
		The bottom of any soak pit or septic tank shall be at least 10 m above the groundwater table. The distance can be reduced, based on the soil properties, if it is established that distance will not result in contamination of groundwater.	Yes			
13	Land clearing, excavation, tunnel boring and other construction activities may loosen the top soil in the project area resulting in loss of soil and possible acceleration of soil erosion and land sliding, especially in the wet season.	Develop an Erosion Control Plan.	Yes			
		Limit vegetation loss to demarcated construction area.	Yes			
		Cover areas such as muck disposal area, batching plant, labor camp and quarry sites after the closure shall with grass and shrubs.		No[22]		
		Adopt slope stabilization measures such as adequate vertical and horizontal drains, drainage along roadsides, cross drainage and retaining walls.	Yes			
		Monitor slope movements around excavation work areas.	Yes			
		Salvage, store, and reuse all topsoil at all construction sites.	Yes[23]			

[22] The closure phase has not been reached yet.

[23] As most of the temporary facilities have either been identified on the barren land or on mountainous land hence, this and the subsequent mitigation measures are so-far not applicable. The compliance status of these mitigation measures has however been termed “Yes” exhibiting such measures are in consideration for compliance at appropriate time.

S/No	EMP Requirements		Compliance Attained		Comment on Reasons for Partial or Non-Compliance	Required Action and Target Dates to Achieve Compliance
	Impact	Mitigation Measures				
		The height of the stockpile will be minimized to the extent possible by increasing the size of the land for the stockpile.	Yes			
		Topsoil will be carefully stripped to ensure that it is not mixed with subsoil.	Yes			
		The stockpiles will be revegetated to minimize loss of soil quality, minimizing weed infestation, maintaining soil organic matter levels, maintaining soil structure and microbial activity.	Yes			
		Topsoil stockpiles will be clearly signposted for easy identification and to avoid any inadvertent losses.	Yes			
		The establishment of declared plants on the stockpiles will also be monitored and control programs implemented as required.	Yes			
		The topsoil will be treated with temporary soil stabilization and erosion control measures.	Yes			
		During removal of topsoil stockpile for restoration of project affected areas, it is preferred that the soil is removed in layers (less than 0.5 m thick) under a gradual process.	Yes			
		The top layer will be mixed with the remainder of the stockpile to ensure that living organisms are distributed throughout the topsoil material at the time of final placement. The use of micro-organism inoculates may be necessary to re-establish micro-organisms in topsoil material.	Yes			
		Select local species for plantation to restore the biodiversity of the area in consultation with Forest Department after completion of respective activities.	Yes			

S/No	EMP Requirements		Compliance Attained		Comment on Reasons for Partial or Non-Compliance	Required Action and Target Dates to Achieve Compliance
	Impact	Mitigation Measures				
14	Failure of spoil dumping sites resulting in increased erosion and sediment load entering river	Dumping sites should have a flood prevention design for a 20-year flood.	Yes			
		The water drainage works consist of the masonry structures, and shall be designed to drain a 5-year rainfall every 10 minutes.	Yes			
		Where constructed tailing hold structure will be of galvanized woven wire mesh gabions	Yes			
		All dumping sites will undergo vegetation restoration works comprising of surface leveling, covering and forest/grass planting or agricultural land rehabilitation	Yes[24]			
		Develop a Spoil Disposal Plan that includes the following measures: • Slope movements will be monitored around excavation work areas. • Restore to the maximum extent possible the hydrological regime and reinstate natural drainage of the land (including provisions to maintain the water balance of the site and protect from flooding where appropriate). • Reinstate topsoil (in case it was stripped before construction activities). • Revegetate sites with suitable native plant species. • Drain spoil piles to prevent the concentration of flow and to prevent rill and gully erosion. • Separate organic material (e.g., roots, stumps) from the dirt fill and store separately. Place this material in long-term, upland storage sites, as it cannot be used for fill.	Yes[25]			

[24] All dumping sites will be rehabilitated under the terms of lease agreements while, where applicable, plantation will be undertaken on the dumping sites.
[25] Design documents of the two spoil disposal areas (A2 and A3) containing essential details have been reviewed and approved by the PMC .

S/No	EMP Requirements		Compliance Attained		Comment on Reasons for Partial or Non-Compliance	Required Action and Target Dates to Achieve Compliance
	Impact	Mitigation Measures				
		• Store “clean” material in a short-term disposal site (stockpile) if it will likely be re-used for fill or shoulder widening projects. • Where feasible, recycle asphalt material in embankments and shoulder backing. Place these materials where they will not enter the stream system. Asphalt that is 5 years old is considered “inert” (that is, all oils washed off). • Do not add excess unusable material to permanently closed sites. • Spread material not to be re-used in compacted layers, generally conforming to the local topography. • Design the final disposal site reclamation topography to minimize the discharge of concentrated surface water and sediment off the site and into nearby watercourses. • Cover the compacted surfaces with a 6-inch layer of organic or fine-grained soil, if feasible. • After placement of the soil layer, track walk the slopes perpendicular to the contour to stabilize the soil until vegetation is established. Track walking creates indentations that trap seeds and decrease erosion of the reclaimed surfaces. (See figure on next page.). • Revegetate the disposal site with a mix of native plant species. Cover the seeded and planted areas with straw compost, mulched with straw at a rate of 1 to 1 ½ tons per acre. Apply jute netting or similar erosion control fabric on slopes greater than 1:2 if site is erosive.				

S/No	EMP Requirements		Compliance Attained		Comment on Reasons for Partial or Non-Compliance	Required Action and Target Dates to Achieve Compliance
	Impact	Mitigation Measures				
		• Locate stockpiles away from drainage lines, at least 10 meters away from natural waterways and where they will be least susceptible to wind erosion. • Ensure that stockpiles and batters are designed with slopes no greater than 1:2 (vertical\ horizontal). • Besides these measures, erosion can also be minimized by regular rehabilitation of areas not in use for Project activities during construction. These will include: re-grading and immediate re-vegetation (using fast-growing species and different functional groups of plants for keeping soil in place) of slopes to minimize erosion. • Install erosion and sediment control measures, if possible before construction commences. · Identify drainage lines and install control measures to handle predicted stormwater and sediment loads generated in the mini-catchment. • Design and install appropriate erosion and sediment run-off control measures appropriate to site conditions to handle a one-in-two-year storm event (a two-year ARI with an intensity of six hours), for temporary structures, and a one-in-fifty-year storm event, for permanent structures. • Establish an adequate inspection, maintenance and cleaning program for sediment run-off control structures. Ensure that contingency plans are in place for unusual storm events. • Continually assess the effectiveness of sediment control measures and make necessary improvements.				

S/No	EMP Requirements		Compliance Attained		Comment on Reasons for Partial or Non-Compliance	Required Action and Target Dates to Achieve Compliance
	Impact	Mitigation Measures				
		• Keep temporary disposal sites out of wetlands, adjacent riparian corridors, and ordinary high-water areas as well as high risk zones, such as 100-year floodplain and unstable slopes. • Anticipate a sufficient storage area with no risk for sediment delivery for piles that may slump. Stress cracks indicate that the pile is at risk of slumping. • Cover the trucks that will be used for the transportation of spoil material to disposal sites.				
15	Deterioration of aesthetics and visual amenity of nearby receptors due to construction activities, including vehicular movement on roads, may cause disturbance in aesthetics for tourists, businesses and nearby communities.	Minimize disturbance to, or movement of, soil and vegetation.	Yes			
		Back fill to original levels.		No	Mitigation measures will be applied upon completion of activities at site(s).	
		Reshaping to match in with surrounding topography.	Yes			
		Reinstate vegetation around construction sites.		No	Implementation of the tree plantation plan has not been started yet.	Under provisions of the approved TPP, tree plantation was scheduled to initiate at the onset of the monsoon season of 2024, however, due to the non-availability of the identified sites, such plantation will be undertaken in the first plantation period of 2025 subject to availability of the sites identified for plantation.
16		Develop and implement a Site Rehabilitation and Landscaping Plan.	Yes			

S/No	EMP Requirements		Compliance Attained		Comment on Reasons for Partial or Non-Compliance	Required Action and Target Dates to Achieve Compliance
	Impact	Mitigation Measures				
	Permanent impact in aesthetics due to proposed developments.	Use colors that better integrate with the landscape.	Yes			
		Disguise elements with vegetation where possible.	Yes			
		Retain as much natural vegetation as possible.	Yes			
17	Increase in congestion, due to increased traffic volume will cause delays.	Develop and implement a Traffic Management Plan.	Yes[26]			
		Make roundabouts for the congestion points.	Yes			
		Retain as much natural vegetation as possible to reduce the impact of smoke due to vehicles.	Yes			
		The vehicles going on the spoil routes and passing through the communities must be completely covered to avoid dust emissions.		Partial	Vehicles loaded with construction materials are generally covered however, some of the vehicles carrying spoil materials were observed without cover hence, the aspect is termed partially complied.	The EPC Contractor has been instructed to immediately cover materials loaded on vehicles, whether they are being transported for construction or dumping at the approved disposal sites.
		Strictly implement speed limits and defensive driving policies.				
18	Increase in traffic volume will deteriorate the air quality.	Keep speeds slow (30 km/hr) on unsealed roads.	Yes			
		Sprinkle water on unsealed roads that are used for construction traffic.		Partial	The water sprinkling on the unpaved road is not regular.	The EPC Contractor was instructed in the HSE meetings and through written instructions to undertake regular sprinkling of water on the access roads particularly on the unpaved road

[26] Traffic management plan is part of the SSEMP.

S/No	EMP Requirements		Compliance Attained		Comment on Reasons for Partial or Non-Compliance	Required Action and Target Dates to Achieve Compliance
	Impact	Mitigation Measures				
						leading to dam and powerhouse sites.
		Retain as much natural vegetation as possible to reduce the impact of smoke due to vehicles.	Yes			
		The vehicles going on the spoil routes and passing through the communities must be completely covered to avoid dust emissions.		Partial	Vehicles loaded with construction materials are generally covered however, some of the vehicles carrying spoil materials were observed without cover hence, the aspect is termed partially complied.	The EPC Contractor has been instructed to immediately cover materials loaded on vehicles, whether they are being transported for construction or dumping at the approved disposal sites.
		Strictly implement speed limits and defensive driving policies.	Yes			
		Promptly and properly repair and maintain roads that are subject to damage by Project activities.		Partial	The section of N-15 damaged near the A3 batching plant site at the left of the Kholia Nullah is yet to be repaired by the EPC Contractor.	The National Highway Authority (NHA) has addressed the issue with the Employer, and a joint site visit is scheduled for the second week of January 2025. Following this visit, the EPC Contractor will repair the damaged section in accordance with NHA's instructions and guidelines.
19	Increased risk to community safety due to increased traffic volume	Develop and implement a Traffic Management Plan.	Yes			
		Identify suitable times to transport equipment.	Yes[27]			

[27] Mostly day time transportation is undertaken

S/No	EMP Requirements		Compliance Attained		Comment on Reasons for Partial or Non-Compliance	Required Action and Target Dates to Achieve Compliance
	Impact	Mitigation Measures				
	during the construction phase near communities.	Road safety awareness education will also be included during community visits or information sessions, so that communities can be familiarized with common road signs and the types of vehicles and equipment that will be moving through the area	Yes			
		Keep speeds slow (30 km/hr) where there is traffic exchange between roads.	Yes			
		Make roundabouts for the congestion points.	Yes			
		Designate traffic wardens at roads on the transport route to manage traffic during school hours.	Yes			
		Construction traffic will not travel during school starting and ending hours on designated road segments in front of schools on the transport route.	Yes			
		Strictly implement speed limits and defensive driving policies.	Yes			
		Maintain vehicles especially brakes.	Yes			
20	Degradation of the pavement due to use by heavy construction traffic	Promptly and properly repair and maintain roads that are subject to damage by Project activities.		Partial	The section of N-15 damaged near the A3 batching plant site at the left of the Kholia Nullah is yet to be repaired by the EPC Contractor.	The National Highway Authority (NHA) has addressed the issue with the Employer, and a joint site visit is scheduled for the second week of January 2025. Following this visit, the EPC Contractor will repair the damaged section in accordance with NHA's instructions and guidelines.
21		**Enhancement measures**:	Yes			

S/No	EMP Requirements		Compliance Attained		Comment on Reasons for Partial or Non-Compliance	Required Action and Target Dates to Achieve Compliance
	Impact	Mitigation Measures				
	Direct, indirect and induced employment at the local levels, resulting in increased prosperity and wellbeing due to higher and stable incomes of people.	♦ ensure preferential recruitment of local candidates provided they have the required skills and qualifications. ♦ include an assessment of the contractor's demonstrated commitment to domestic and local procurement and local hiring in the tender evaluation process. ♦ coordinate recruitment efforts related to non-skilled labor, including for non-skilled labor positions required by contractors.				
		Good practice measures: ♦ determine what constitutes 'fair and transparent' practices in recruitment and in distribution of jobs among different community groups, in consultation with local communities and their leaders.	Yes			
22	Increase in the stock of skilled human capital due to transfer of knowledge and skill under the Project resulting in enhanced productivity of the local labor.	Support a 'Vocational Training Program' to assist local people to qualify for semi-skilled positions focusing on issues such as procurement, involvement of vulnerable groups in Project opportunities and continual professional development of staff.	Yes			
		Assist local people having practical skills but lacking qualifications to obtain their certificates and thus increase their employment opportunities.	Yes			
		Support initiatives promoting a culture of learning in local communities.	Yes			
		Plan and implement training program for vulnerable groups to encourage their participation in economic opportunities created by the Project.	Yes			
		Assist employees and local communities to improve basic personal financial life skills through training and awareness campaigns, respectively.				

S/No	EMP Requirements		Compliance Attained		Comment on Reasons for Partial or Non-Compliance	Required Action and Target Dates to Achieve Compliance
	Impact	Mitigation Measures				
		Consider further training programs to prepare retrenched workers to seek employment in sectors not related to dam construction.	Yes			
23	Increase in recreational and subsistence fishing due to increase in catch of fish following creation of favorable habitats for the fish in the Kunhar River.	Implementation of the BAP		Partial	The works-related measures have been taken by the EPC Contractor while for the protection measures in the Area of Management, contract signing with the Fisheries and Wildlife departments is awaited till approval of the updated EIA report by the Project financiers.	The signing of the contract and field activities will be initiated after the Bank's concurrence to the updated EIA report.
24	Loss of income from sand and gravel mining due to change in pattern of sediment deposition following construction of the dam.	Sediment Mining and Management Guidelines are prepared and will be implemented as a part of the BAP, which will identify possible sand and gravel mining spots along the Kunhar River to meet community needs without harming the river ecology.	Yes[28]			
25	Increase in population due to in-migration of job seekers (in-migrants) leading to pressure on existing social infrastructure and services in the Study Area.	Development of a Grievance Redressal Mechanism	Yes			
		Encourage local communities to use the grievance procedure for concerns related to deterioration of local services.	Yes			
		Support local government in the implementation of infrastructure projects.	Yes			
		Support NGOs specializing in development of infrastructure to assist local government.	Yes			
26	Disputes over distribution of Project employment within and between Study Area inhabitants and the in-	Implement PEDO Stakeholder Engagement Plan including: ♦ maintaining regular communication with local communities and other stakeholders	Yes			

[28] The preparation of sediment mining and management guidelines are part of the BAP implementation as included in the EIA report.

S/No	EMP Requirements		Compliance Attained		Comment on Reasons for Partial or Non-Compliance	Required Action and Target Dates to Achieve Compliance
	Impact	Mitigation Measures				
	migrants resulting in social unrest.	to minimize tensions arising from Project activities; ♦ maintaining a grievance procedure, and encourage and facilitate stakeholders to use the mechanism to express concerns; and ♦ providing sufficient resources to the community relations officers to enable them to monitor negative perceptions and associated tensions, and to address them in a timely fashion.				
27	Potential social unrest in the Study Area due to conflicting socio-cultural norms amongst the inhabitants and in-migrants.	Plaster the graves with mud or cement.	Yes[29]			
		If relocation of the graveyard cannot be avoided, it shall be managed through the local religious authorities.	Yes			

[29] All 19 graves from the Sangar area (Employer's colony site) have been relocated. The contract for relocation of 184 graves from the dam site has been awarded, but the relocation at this site is yet to be initiated.

5.7. Trainings

184. **Annual OHS training:** In pursuance of the EMP/SSEMP requirements, the EPC Contractor arranged annual OHS training on November 27 and 28, 2024. The two-day training was imparted by professionals of the Rescue 1122 of District Mansehra. The training was participated by relevant staff from PIU, PMC, and the EPC Contractor's HSE staff and supervisors from work sites, workshops, batching plants, etc.

185. On the first day of the training, the Rescue 1122 professionals presented various aspects of the OHS including risks at the work site, emergency response, and first aid administration. At the end of the presentation, events exhibiting fire extinguishing drills and first aid administration were also held at the EPC Contractor's main Camp in Paras village.

186. On the second day of the OHS training, field demonstrations were held at the dam site and workshop wherein drills were undertaken involving emergency response, evacuation, and first aid treatment in case of occurrence of incident(s). While involving the Contractor's field staff, the Rescue professionals also demonstrated how to approach a drowning worker and how to rescue him without jeopardizing the safety of the rescuer.

187. At the end of the training, certificates of participation in the training were distributed among the participants.

Rescue demonstration at the Main Camp (Annual OHS Training 2024)

188. **Other OHS and Blasting Management Trainings:** In addition to the annual OHS training, the EPC Contractor also arranged various trainings for workers involved in various types of works like blasting, operation of heavy machinery, and equipment at the site.

189. In this regard, on November 16, 2024, the trainers from Muzaffarabad Poly Technical Institute Azad Kashmir, provided one day training to the EPC Contractor's relevant workforce in:

i. crain operation;

ii. blasting and drilling;

iii. safety in electrical works;

iv. welding; and

v. forklift operation.

190. During the training, the experts demonstrated how to label, store, transport, and use explosive material with an emphasis on mandatory safety precautions while handling such materials. The trainers also highlighted risks associated with the blasting operation; major causes of injuries to staff handling the operation; and possible damages to the assigned equipment and infrastructure in the vicinity of the blasting site.

191. At the end of the training, certificates were distributed among the participants of the training.

A training session on OHS and Blasting Management

192. **Vocational training.** In pursuance of the EMP/SSEMP requirements and under the vocational training program, on May 2, 2024, the EPC Contractor got admission of 18 students (7 male and 11 female) for the first training at the Government Skill Development Center Hassa Balakot. The training was completed in October 2024 whereby a total of 18 students (7 male and 11 female) were trained in various trades, including tailoring, beautician services, computer operation, and electrician work. These students- selected from the project-affected communities- were trained in tailoring, beautician, computer operation, and electrician trades.

193. A total of 10 such training courses are planned during the currency of the contract i.e. till December 2024. It is worthwhile to mention here that the EPC Contractor is providing pick-and-drop, lunch, and training materials to each student free of cost.

Beautician trade learner at the Vocational Center

5.8. Complaints

194. During the reporting period, the Assistant Commissioner of Balakot forwarded a local resident's complaint to the PIU via letter No. 1809-10/BHPP/A (B), dated 26/08/2024, for early resolution under the law. The forwarded application is attached in the report as **Annexure 4.**

195. According to the documentary record, the complainant stated that the EPC Contractor's earthwork activities had caused damage to their land and trees. The complainant also requested the construction of a protection wall to prevent further potential damages.

196. Following the GRM procedure, the complaint was forwarded to the local GRC for prompt resolution. However, the complainant requested through the same complaint that the PIU resolve it by involving new GRC members. In response, the PIU forwarded the complaint to the PMC for an assessment of the facts on the ground and the submission of a detailed report on the matter.

197. Although further progress and the status of the complaint will be reported in the SAEMR for January to June 2025, the PIU will provide regular updates about the complaint resolution to the safeguard teams of the ADB and AIIB during this period.

198. During the reporting period, the social section of the PIU received six complaints from the locals. As evident from the scanned copy of the GRM register maintained by the PIU **(Annexure 4),** all six complaints were successfully resolved by the end of the reporting period.

6. FUNCTIONING OF THE SSEMP

6.1. SSEMP Review

199. Generally, the SSEMP serves the intended purpose of mitigating/minimizing risks associated with construction activities.

200. Various plans contained in the SSEMP, like pollution prevention , waste management ,instrumental environmental monitoring, and health and safety plans were satisfactorily implemented by the EPC Contractor.

201. In the last week of December 2024, after the EPC Contractor finalized the locations for camps, batching plants, access roads, sedimentation tanks, and magazines, and obtained approval for two muck disposal sites, the PMC instructed the EPC Contractor to update the approved SSEMP by January 15, 2025. The updated SSEMP will not only cover the aforementioned elements but will also include building demolition protocols, approved details related to blasting operations, and the latest project salient features, maps, etc.

202. Once updated by the EPC Contractor, the same will be shared with the ADB and AIIB for their review and comments for improvement.

203. Although there were instances of minor non-compliances at active construction sites, the EPC Contractor largely complied with the SSEMP provisions regarding the project's health and safety aspects. The minor non-compliances recorded during the current reporting period include: delay in replacing expired fire extinguishers; delay in installing reflectors and barriers on N-15 road; improper housekeeping on-site; partially damaged drainage system in the tunnel at Adit-3; unavailability of flagmen on N-15 road; improper storage of gas cylinders; maintenance of defaced safety signboards; unavailability of the permit and method statement in the permit boxes; ineffective or insufficient incident investigation; helpers sitting with excavator operators during activity; and fire extinguishers not being hung in fixed locations.

7. GOOD PRACTICE AND OPPORTUNITY FOR IMPROVEMENT

7.1. Good Practices

204. The EPC Contractor's consultation with the local area community before planning the facilities for temporary works is a good initiative. For example, the consultation conducted for the A2, A3 and surge shaft tunnel become fruitful in finalization of the lease contracts for A2 and A3 sites. The surges haft tunnel muck disposal site is under review of the PMC.

205. The successful completion of vocational training for eligible youngsters in the project area is a commendable initiative aimed at improving the affected community. As indicated by the certificate in **Annexure 5,** issued to the EPC Contractor, the successful candidates are expected to receive their course completion certificates in March 2025. Upon receipt of these certificates, the EPC Contractor will be encouraged to employ these trained electricians, plumbers, and computer operators, rather than hiring from outside the project area. In the long run, such training will help the trained youngsters earn their livelihood outside the project area and abroad, particularly in Middle Eastern countries where many Pakistanis are engaged in these professions.

206. To preserve the local norms and cultural values, the EPC Contractor provided veils (green shade nets) to the houses near the work area. This initiative of the EPC Contractor created a sense of norm protection in the community resulting in conducive relations.

207. During the reporting period, the HSE champion award ceremony was held on December 27, 2024, where cash prizes were awarded to 18 champions for July through December 2024. Typically, three skilled or unskilled labors/staff from the EPC Contractor's workforce, who regularly adhered to safety protocols and motivated other staff to do the same, were selected as HSE champions of the month. This initiative is indeed a commendable practice to promote a safe environment at the worksite. It recognizes and empowers individuals within the workforce who display exceptional commitment and dedication to HSE practices. By establishing HSE champions, the organization encourages a culture of safety and empowers employees to take an active role in identifying and addressing potential hazards or risks. These champions serve as role models and ambassadors for safety, promoting best practices, conducting safety inspections, and fostering a collaborative approach to mitigate risks. The HSE champion program fosters increased awareness, engagement, and accountability among the workforce, leading to a safer work environment, reduced accidents, and improved overall well-being. Also, the initiative has encouraged the EPC Contractor's supervisors and other staff to get more and more training and to adhere to the safety protocols so that they could win cash prizes at the end of each month.

7.2. Opportunities for Improvement

208. Although the EPC Contractor has steadily increased the number of HSE field officers from zero at the start of the project construction activities to 15 by the end of the current reporting period, the increased number of incidents, particularly the 13 accidents in December 2024, indicates that these officers need regular training.

209. Although the EPC Contractor created good working relations with the community by providing jobs and skilled development training, there is room for improvement in cementing such relations. This can be achieved through regular communication, addressing community concerns, and implementing social responsibility initiatives. For example, the EPC Contractor needs to immediately address community complaints about potential damages to their property caused by construction activities at the sites.

210. The EPC Contractor also needs to hold informal meetings with the project area communities to apprise them regarding progress on the construction activities, planned interventions, and various issues requiring support from the community to resolve them. This

engagement will certainly help the EPC Contractor and the Employer in resolving social issues; creating a conducive working environment; eliminating communication gaps and instilling a sense of the importance of stakeholders. In this regard, the EPC Contractor can jointly work out plans with the NGO already on board.

211. The EPC Contractor's "Environmental Mitigation Cost" includes activities aimed at improving the affected community. However, no significant activities have been undertaken so far. During the reporting period, in a meeting held on December 12, 2024, the PMC HSE team emphasized the need for the Contractor to initiate these activities. This will further strengthen the working relationship between the community and the EPC Contractor.

8. SUMMARY AND RECOMMENDATIONS

8.1. Summary

212. During the reporting period, the detailed engineering design, including the design of muck disposal areas and sedimentation tanks; and review of the engineering, procurement, and construction (EPC) Contractor's method statements/technical reports remained in progress. On-site, construction activities continued robustly at the dam site, residential colony, access roads, and the headrace tunnel. Also, protection works and the establishment of a camp at the powerhouse sites remained in progress during the reporting period**.** The HSE aspects of these activities were regularly monitored and supervised by the PMC and PIU staff. Also, during the reporting period, the PMC supervisory staff monitored quarterly instrumental environmental monitoring conducted by the KPEPA approved laboratory at the pre-identified locations at the site.

213. During the reporting period, EPC Contractor addressed most of the major non-compliances reported during the previous reporting period. This includes the updation and finalization of the hydro-census report; installation of various monitoring equipment in tunnels; and identification of muck disposal sites and approvals for two such sites.

214. During the reporting period, a total of 16 accidents occurred at sites causing damage to equipment and injuries to the Contractor's workforce. In one incident inside the A3 tunnel on December 5, 2024, one of the EPC Contractor's labors lost his life. The findings from this incident highlight the tunnel foreman's negligence and non-adherence to the HSE officer's instructions. The EPC Contractor's records indicate that 13 out of the 16 incidents occurred in December 2024 alone. To address this situation, the Health and Safety Monitor of the PMC plans to initiate a robust OHS training program for the EPC Contractor's workforce. The program will be implemented during January and February 2025.

215. The EPC Contractor's failure to identify and engage a certified firm/vendor for safe collection, transportation, and disposal of hazardous waste is perhaps the one of the pending non-complied activities since the start of construction works.

216. The major observations recorded by the EEM during his site audit on August 8, 2024, included an oil spillage at the A-3 batching plant and delays in the design of proper sedimentation tanks at all the three adits, while the minor observations included poor housekeeping, missing signage, deficiencies in record keeping, and improper storage of materials. The EPC Contractor promptly addressed the oil spillage and submitted a report within two days of the EEM visit. Also, the design of the sedimentation tanks has almost been completed. The minor observations, shared with the EPC Contractor in the form of a CAP were mostly rectified by the end of the reporting period.

217. During September 2024, the EPC Contractor shifted his main camp, also known as A2 camp, to the existing camp facility previously used by the Sukki Kinari HPP (884 MW) construction staff. This new camp facility is . In November 2024, the PMC conducted an environmental audit of the EPC Contractor new camp located in the Paras village between the left bank of the Kunhar River and the N-15 (Balakot- Naran Road) and furnished an environmental audit report whereby the gaps identified were reported to the EPC Contractor for necessary rectification. However, till the end of the reporting period, the EPC Contractor failed to fully address the identified gaps.

218. On October 16, 2024, the ADB safeguard team, along with relevant staff from the PIU, PMC, and EPC Contractor, visited the construction sites and the EPC Contractor's camps. They recorded various observations regarding the HSE aspects of the works. These observations were subsequently shared with the EPC Contractor in the form of a CAP for necessary rectifications. However, till the end of the reporting period, the EPC Contractor

failed to address the observations through the implementation of the proposed mitigation measures given in the CAP.

219. During the reporting period, the EPC Contractor completed a six-month vocational training program for eligible candidates from the project-affected community, and also organized a two-day annual OHS training on November 27 and 28, 2024, at the site. The training was imparted by professionals from Rescue 1122 of District Mansehra. The training included presentations at the camp and field demonstrations at the site. The EPC Contractor also conducted other pieces of training like blasting and drilling, safety in electrical works, welding, forklift operation, toolbox talks, etc.

220. During the reporting period, the EPC Contractor organized HSE champion program event on December 27, 2024, whereby cash awards were distributed among 18 champions of the month covering the period from July to December 2024.

221. During the reporting period, the PMC updated the EIA report and submitted it to the PIU on December 25, 2024, for further review and onward transmission to the quarter concerned at ADB and AIIB. Upon the financier's concurrence with the EIA report, the field implementation of the project-specific BAP will be initiated.

222. The proposal submitted by the DG Fisheries Department in connection with the updation of the Shino-Jared fish hatchery remained under discussion between Fisheries HQ and the PIU. It is expected that the proposal will be finalized by the end of February 2025.

223. The EPC Contractor conducted quarterly instrumental environmental monitoring at the site, focusing on points identified in the SSEMP and near sensitive receptors. Although exceedances in particulate matter and gaseous emissions were recorded at a few locations during the third and fourth quarters, all the recorded results fell within the guiding values of NEQS and WHO.

224. **Table 8.1** exhibits the status of implementing the targets set in the previous SAEMR during the current reporting period.

Table 8.1: Implementation Status of Corrective Action(s) Proposed in the Previous SAEMR

S/No	Issue	Required Action[30]	Responsibility	Timing (Target Date)	Description of Resolution and Timing (Actual)	Reason(s) of delay/non-achievement and further Action Required with Time frame
1.	Finalization of hydro-census report	Submission of final hydro-census report	EPC Contractor	July 5, 2024	July 5, 2024	
2.	Noise and excessive emissions from diesel generators	Installation of proper exhaust stack to the diesel generators and their tunning including other construction equipment/machinery.	EPC Contractor	July 24, 2024	July 30, 2024	
3.	Lack of air, noise, and vibration monitoring equipment inside adit tunnels	Installation/providence of the following monitoring equipment permanently. (i) Lux meter (ii) dBA meter (iii) Gas testing meter (iv) Vibrometer	EPC Contractor	August 10, 2024	August 15, 2024[31]	
4.	The non-availability of the Third-Party certification of heavy construction machinery/equipment.	The EPC Contractor shall certify the heavy machinery/ equipment through government-approved labs/institutions to ensure safeand efficient usage of	EPC Contractor	August 13, 2024	August 17, 2024[32]	

[30] Actions proposed in the previous SAEMR
[31] The EPC Contractor initiated intermittent recording of the required parameters.
[32] The EPC Contractor reported conduction of third party certification of the heavy equipment however, the report has not been submitted to the PMC yet.

S/No	Issue	Required Action[30]	Responsibility	Timing (Target Date)	Description of Resolution and Timing (Actual)	Reason(s) of delay/non-achievement and further Action Required with Time frame
		such machinery.				
5.	Procurement of services of a registered and certified hazardous waste collection and disposal firm.	The EPC Contractor shall identify and sign a contract with a registered and certified hazardous waste collection and disposal firm to dispose of the hazardous waste generated at camps and sites.	EPC Contractor	August 30, 2024	The EPC Contractor could not hire services of the certified/registered vendor as planned.	During the reporting period, the EPC Contractor identified a local vendor for the disposal of hazardous waste however, the vendor failed to produce documentary evidence establishing authorization for the disposal of hazardous waste. The EPC Contractor has been instructed to contact KPEPA and the HSE departments of the other ongoing projects for support in the identification of the certified vendor. The vendor shall be identified by the end of January 2025.
6.	Re-submission of the updated EIA report with particular emphasis on the updating of the biodiversity sections of the report.	Re-submission of the EIA report containing the updated biodiversity section in track changes mode.	PMC/PIU	August 20, 2024	August 21, 2024	
7.	BAP contract signing with the Fisheries and Wildlife departments of the KP province	Preparation of draft contracts and their finalization with the Fisheries and Wildlife departments.	PIU/PMC	September 15, 2024	As the updated EIA has not been finalized yet, hence, the contract signing with both the departments could not be materialized.	The contract signing process for implementation of the project-specific BAP will be initiated with both departments as soon as the ADB/AIIB grants concurrence to the updated EIA report.
8	PIU recommendations on the future course of actions on Basin-wide BAP.	Submission of the PIU recommendations to the ADB and AIIB, setting out the future course of actions on Basin-wide BAP.	PIU	August 30, 2024	On the occasion of the presentation to the ADB midterm review (MTR) mission at the PEDO House	

S/No	Issue	Required Action[30]	Responsibility	Timing (Target Date)	Description of Resolution and Timing (Actual)	Reason(s) of delay/non-achievement and further Action Required with Time frame
					Peshawar, the PIU recommended that the project team should focus on the project-specific BAP while the Basin-wide BAP will be dealt with later as most of the projects (prospective financiers of basin-wide BAP) are yet to start construction of their projects.	
9.	Establishment of a Fish hatchery for the Fisheries department of the KP province	With the consent of the Fisheries department, finalization of the site for the construction of a fish hatchery in the project area.	PIU	August 30, 2024	A meeting was held on July 31, 2024, during which the Fisheries Department proposed upgrading the Shino-Jared fish hatchery instead of constructing a new one.	The proposal submitted by the DG Fisheries in December 2024 is currently under discussion with the Fisheries Department and is expected to be finalized by the end of February 2025.

225. The Corrective Action Plan in **Table 8.2** shows issues identified during the current monitoring period and actions proposed to resolve them within the given time frame.

Table 8.2: Corrective Action Plan against issues identified during the Current Monitoring Period

S/ No	Issue	Required Action	Responsibility	Timing (Target Dates)
1	Procurement of services of a registered and certified hazardous waste collection and disposal firm.	The EPC Contractor shall identify and sign a contract with a registered and certified hazardous waste collection and disposal firm to dispose of the hazardous waste generated at camps and sites.	EPC Contractor	February 15, 2025
2	Partial implementation of the CAP transmitted to the EPC Contractor in October 2024 **(Annexure 6)**	The gaps identified by the ADB safeguard team during the site audit in October 2024 shall be implemented in full.	EPC Contractor	February 25, 2025
3	Non-rectification of gaps identified as a result of the EPC Contractor's main camp environmental audit **(Annexure 6).**	The gaps identified as a result of the EPC Contractor's main camp environmental audit conducted during November 2024 shall be implemented in totality.	EPC Contractor	February 25, 2025
4	Implementation of tree plantation plan	The EPC Contractor shall submit plan exhibiting tree plantation schedule, species to be planted, and sites where plantation will be undertaken.	EPC Contractor	January 31, 2025

8.2. Recommendations

226. Given the increased number of accidents that occurred in December 2024, the PMC's OHS team should conduct training sessions for the EPC Contractor's field health and safety officers. In this regard, preparation of training plan and its implementation under the supervision of the PMC Health and Safety Monitor is recommended.

227. The PIU and Fisheries Department should finalize the Shino-Jared fish hatchery upgradation proposal by the end of February 2025, enabling both parties to initiate the upgradation works. Regular follow-up by the PIU is recommended.

228. The EPC Contractor should implement the budgeted activities aimed at raising awareness and improving the well-being of the affected community. The Contractor should proactively engage the community by organizing events where updates on project activities, progress, issues, and opportunities can be shared. Support from the PIU in organizing these events is recommended.

ANNEXURES

Annexure 1: Minutes of HSE Weekly Progress Review Meeting (September 28, 2024)

Minutes of Weekly HSE Progress Review Meeting
Dated September 28, 2024.

S.No	Agenda Item	Action	Responsibility	Time Frame
1.	Discussed major non-conformances and their effective resolution.	Contractor has accepted the time line to resolve the non-conformance within the prescribed date.	EPC Contractor	Target date 10th, October,24.
2.	Site orientation video translation in Urdu and English.	EPC contractor informed to PMC that 70 % video is already completed and rest will be finalized in couple of days. Mr. Li Yong informed that the video has been translated into English language. PMC asked to the contractor for the video to review and assess its.	EPC Contractor	15th. April,2024 (New Date) 15th. May, 2024 (Issue Pending) 30th Oct, 2024
3.	Mucking operation: Clearly mention the disposal site for muck disposal.	I. EPC contractor informed to PMC that dumping has been stopped near water body. II. Design of Muck disposal areas soon finalized. III. Discussed on the new submitted proposal of muck IV. Mr. Assad will visit the site after the meeting and assess the proposal submitted by the NESPAK designers. V. It is under construction and utilizing.	EPC Contractor	Design of Adit-2 will be submitted on 15 April,2024 Dam and Adit-3 muck disposal area design will be submitted after one month. Design meeting conducted on: 24th, April, 2024 (Issue Closed)
4.	Establish the emergency protocol.	EPC contractor request for a week to arrange the wind sock. CGGC manager respond that wind sock is already ordered but soon it will reach in Pakistan from China. It was purchased but not installed.	EPC Contractor	<u>Wind sock:</u> October, 2023. (Issue Pending) 29th.Feb, 2024 25th April, 2024 15th. May, 2024 5th October (Issue Pending) New Date 10th October, 2024

S.No	Agenda Item	Action	Responsibility	Time Frame
5.	GRC workers were found improper PPEs and lose clothing.	HSE Manager has informed that PPEs has been provided to the workers and PMC can verify it. After several site visits PPEs' violations were recorded. PMC will again write the letter against the violation of the GRC. CGGC was also agreed to take necessary action against GRC. GRC HSE manager has informed that after a week every worker will have proper PPEs.	EPC Contractor	(Issue Pending) 15th, May, 2024 New Date 15th, August, 2024 (Issue Pending) New Date 10th October, 2024
6.	Washroom condition in Adit-3	PMC instructed to the Contractor for the maintenance of washrooms in the Adit-3 and provide more Geiser. Mr. Tahir is attended the meeting to discuss the camp issues at Adit-3. He committed to resolve the issue as soon as possible.	EPC Contractor	31st, Jan, 2024 (Issue Pending) 30th April, 2024 15th, May, 2024 (Issue Pending) New Date 10th October, 2024
7.	Lack of HSE coverage by GRC.	HSE coverage still negligible at site. PMC has instructed, to hire at-least three more safety officers. HSE Manager informed PMC that he already raised the issue to their Project Manager and soon it will rectify. Again, HSE manager said the same that he already requested to the PM for hiring more safety officers.	EPC Contractor	15th, March, 2024 30th April, 2024 15th, May, 2024 New Date 15th, August, 2024 (Issue Pending) New Date 30th October, 2024
8.	Corrective Action Plan	EPC contractor said that most of the point mentioned in the CAP have been rectified by PMC continuous hammering in the minutes of meeting. PMC has intimated to the contractor that PMC will thoroughly review the corrective action plan implementation after Eid holidays. Mr. Irshad will send the achievement.	EPC Contractor	17th April, 2024 15th, May, 2024 New Date 30th August, 2024 (Issue Closed)
9.	Repair of the sedimentation tank.	PMC instructed to repair the damaged sedimentation tank and remove the debris around it. Submitted the new design and after the approval it will be rectified.	EPC Contractor	26th April, 2024 (New Date) 15th. May 2024 15th. August, 2024 (Issue Pending) 13th. October, 2024
10.	Vent pipe installation on the septic tank.	Admin Manager took the responsibility.	EPC Contractor	26th April, 2024 15th, May, 2024 (Issue Closed) New Date 13th. October, 2024
11.	Mock evacuation drill in the months of May, June and July.	Mock Drill should conduct quarterly to check the effectiveness of the system and understand of the employees. Mock evacuation drill will be schedule in the month of May, 2024. Conducted in the month of June.	EPC Contractor	Month of June (Issue Closed)

S.No	Agenda Item	Action	Responsibility	Time Frame
12.	List of First Aiders on the site.	Contractor provides the list of the first aider on site. First Aider list has been provided to PMC which is as followed 1. Mr. Hasan Ali 2. Mr. Syed Ubaid Ali PMC instructed to increase the number of first aider by arranging third party training for all HSE and supervisory staff. Mr. Li Yond is agreed on it. PMC has instructed the contractor for arranging the third-party training for the workers.	EPC Contractor	15th. May, 2024 (Issue Pending) New Date 30th. October 2024
13.	HSE Score board was not update on daily basis.	PMC strictly assigned the task to Mr. Babar HSE officer to maintain the safety score board. Mr. Ali Haider will be responsible to update the safety score board on daily basis because Mr. Babar had resigned. Contractor informed that new safety score board will display in new CGGC camp at Paras and then it will be maintained.	EPC Contractor	27th, May, 2024 (Issue Pending) New Date 13th.October 2024
14.	NOC of NHA	NOC is under process and applied. NOC not yet received by the concerned. Waiting for it by the concerned department.	EPC Contractor	15th, August, 2024 (Issue Pending) New Date 30th. October 2024
15.	NOC of Magazine by explosive department.	Mr. Li Yong respond that CGGC will not keep the explosive in the magazine of Adit-3. Only shift the explosive from Adit-2 to Adit-3 for keeping it for few hours as Chinese movement is restricted in the night time. Stopped to keep explosive in the Adit-3 magazine.	EPC Contractor	(Issue Closed)
16.	Hiring of dispenser/ nurse in the clinic along with the doctor.	Hiring is subjected to shift the clinic in the Paras-Camp because currently clinic size is small and there is no more space to accommodate the dispenser along with the doctor. Contractor agreed on the process of hiring dispenser.	EPC Contractor	Tentative date 15th, August, 2024 (Issue Pending) New Date 30th.October, 2024
17.	Availability of the medicine in the clinic	Contractor said within a week all medicine will be available in the clinic.	EPC Contractor	6th. October, 2024
18.	Insurance of the workers	PMC has asked to the contractor for submitting the evidence of the insurance of workers. Contractor has replied that the evidence of insurance will be submit to the PMC after taking it from the HR department.	EPC Contractor	10th. October 2024

S.No	Agenda Item	Action	Responsibility	Time Frame
19.	Transportation of the workers from the camp to adit-2.	Contractor informed to the PMC that the issue has been resolved and jeeps were using for the workers transportation.	EPC Contractor	(Issue Closed)
20.	Condition of Adit-1 and the violation of HSE procedures.	GRC manager requested for the picture of the Adit-1 issues and committed to resolve it within two to three days.	EPC Contractor	10th. October 2024
21.	Pathetic condition and unavailability of the water in Pakistani camp at Adit-3.	PMC instructed to the contractor for taking serious action against the concerned to maintain the Pakistan camp on prime basis. Contractor is committed to visit the camp and rectify the issues.	EPC Contractor	10th. October 2024
22.	Damage sedimentation tanks on all Adit.	PMC instructed to the contractor for repairment of all the sedimentation tanks.	EPC Contractor	10th. October 2024
23.	Submission of Final investigation reports.	PMC has emphasized the Contractor to submit all the final investigation reports to the PMC and effectively implement the recommendations.	EPC Contractor	12th. October 2024
24.	Emergency vehicle unavailability at Adit-2, 3 and powerhouse.	Provide an emergency vehicle at Adit-3 or powerhouse.	EPC Contractor	15th. October 2024
25.	Disposal of waste or used oil and hiring of its disposal vendor.	PMC has asked to the contractor for the disposal and its contractor issue. Contractor informed to the PMC that they were searching for the approved vendor and currently the keep all the discarded waste oil in the drums and seal it properly and store on a designated place.	EPC Contractor	30th. October 2024
26.	EEM visit and its observations.	PMC has asked to the contractor about the status of the EEM observations and its rectification. Contractor has responded that most of it has been rectified and some are under consideration.	EPC Contractor	30th. October 2024

Enclosed: Attendance sheet and Pictures

BALAKOT HPP CONSULTANTS

A JV of DOLSAR, AGES, BAK, CIV TECH, ELECTRA & TLC Consultants

DOLSAR ENGINEERING AGES BAK C E

LIST OF PARTICIPANTS
HSE PROGRESS REVIEW MEETING
BALAKOT HYDRO POWER PROJECT

September 28,2024

Sr.#	Name of Participants	Designation	Department/ Organization	Signature
1.	Qixiufeng	DPM (QHSE)	CGGC	
2.	LiZhenNing	safety officer	CGGC	
3.	Wang Chaowei	QHSE officer	CGGC	
4.	Zul Qarnain	HSE Manager	GRC	
5.	Irshad Saeed	Environmental Manager		
6.	SYED ALI FAWAD	H&S EXPERT	PMC	
7.				
8.				
9.				
10.				
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16.				
17.				
18.				
19.				

Four Season Hotel, Near PTCL Exchange, Shohal Najaf Khan, Kaghan Road Balakot, District Mansheha Khyber Pakhtunkhwa, Pakistan
Tel: +92-0997-360155

Annexure 2: Copies of Instrumental Environmental Monitoring

Ambient Air Monitoring Results (Third Quarter, 2024)-Particulate Matters

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AMBIENT PARTICULATE MATTERS MONITORING REPORT

Reference Number	BHPP/ENV/128-2024	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Monitoring Location:**	Dam Site (Paras Valley)
Monitoring Date:	27-09-2024	**Reporting Date:**	11-10-2024
Source:	Ambient Air	**Monitoring Instrument:**	Aeroqual AQMS-09
GPS Coordinates:	34.660470, 73.455497		

Sr. No	Time	Parameters		Results (Average 24 Hrs)	
		$PM_{2.5}$	PM_{10}		
		Units		$PM_{2.5}$	PM_{10}
	Hours of Monitoring	($\mu g/m^3$)	($\mu g/m^3$)		
1.	09:00 A.M	14.91	39.05	13.14 ($\mu g/m^3$)	43.63 ($\mu g/m^3$)
2.	10:00 A.M	17.32	37.12		
3.	11:00 A.M	14.84	49.13		
4.	12:00 P.M	10.62	39.64		
5.	01:00 P.M	12.80	28.20		
6.	02:00 P.M	10.45	47.01		
7.	03:00 P.M	15.27	44.41		
8.	04:00 P.M	14.19	44.19		
9.	05:00 P.M	11.80	38.77		
10.	06:00 P.M	12.21	52.31		
11.	07:00 P.M	13.94	34.79		
12.	08:00 P.M	13.87	52.75		
13.	09:00 P M	11.37	46.31		
14.	10:00 P M	10.16	44.54		
15.	11:00 P M	10.83	52.17		
16.	12:00 A M	16.90	29.89		
17.	01:00 A M	14.50	56.24		
18.	02:00 A M	9.25	39.40		
19.	03:00 A M	11.99	33.31		
20.	04:00 A M	13.65	38.54		
21.	05:00 A M	11.94	52.93		
22.	06:00 A M	13.30	58.21		
23.	07:00 A M	14.89	38.72		
24.	08:00 A M	14.25	49.50		
NEQSAA				35($\mu g/m^3$)	150($\mu g/m^3$)
WHO				15 ($\mu g/m^3$)	45 ($\mu g/m^3$)

NEQSAA: National Environmental Quality Standards for Ambient Air
WHO: World Health Organization
Note:

- Selected measurement units were $\mu g/m^3$ otherwise stated.
- The client is responsible lawful usage of reported data in future.
- The report is not valid for court.

Signature of Analyst: *Signature of Chief Chemist*

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AMBIENT PARTICULATE MATTERS MONITORING REPORT

Reference Number	BHPP/ENV/128-2024	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Monitoring Location:**	Adit-1 (Thobi)
Monitoring Date:	02-10-2024	**Reporting Date:**	11-10-2024
Source:	Ambient Air	**Monitoring Instrument:**	Aeroqual AQMS-09
GPS Coordinates:	34.636125, 73.428597		

Sr. No	Time	Parameters		Results (Average 24 Hrs)	
		$PM_{2.5}$	PM_{10}	$PM_{2.5}$	PM_{10}
		Units			
	Hours of Monitoring	($\mu g/m^3$)	($\mu g/m^3$)		
1.	09:00 A.M	27.37	68.39	24.59 ($\mu g/m^3$)	68.30 ($\mu g/m^3$)
2.	10:00 A.M	25.66	55.74		
3.	11:00 A.M	26.04	64.01		
4.	12:00 P.M	27.66	78.93		
5.	01:00 P.M	26.30	79.82		
6.	02:00 P.M	25.17	71.61		
7.	03:00 P.M	23.71	74.10		
8.	04:00 P.M	27.17	63.35		
9.	05:00 P.M	25.34	60.66		
10.	06:00 P.M	28.49	54.10		
11.	07:00 P.M	23.94	87.01		
12.	08:00 P.M	24.83	57.34		
13.	09:00 P M	22.93	69.69		
14.	10:00 P M	25.85	57.24		
15.	11:00 P M	22.40	78.68		
16.	12:00 A M	21.52	74.34		
17.	01:00 A M	21.09	56.70		
18.	02:00 A M	19.72	75.25		
19.	03:00 A M	26.69	78.90		
20.	04:00 A M	26.18	72.27		
21.	05:00 A M	19.79	56.91		
22.	06:00 A M	24.79	55.67		
23.	07:00 A M	25.92	68.49		
24.	08:00 A M	21.65	80.06		
NEQSAA				35($\mu g/m^3$)	150($\mu g/m^3$)
WHO				15 ($\mu g/m^3$)	45 ($\mu g/m^3$)

NEQSAA: National Environmental Quality Standards for Ambient Air
WHO: World Health Organization
Note:

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Signature of Analyst: ***Signature of Chief Chemist***

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AMBIENT PARTICULATE MATTERS MONITORING REPORT

Reference Number	BHPP/ENV/128-2024	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Monitoring Location:**	Adit-2 (Ghanool)
Monitoring Date:	28-09-2024	**Reporting Date:**	11-10-2024
Source:	Ambient Air	**Monitoring Instrument:**	Aeroqual AQMS-09
GPS Coordinates:	34.619787, 73.417525		

Sr. No	Time	Parameters		Results (Average 24 Hrs)	
		$PM_{2.5}$	PM_{10}		
		Units		$PM_{2.5}$	PM_{10}
	Hours of Monitoring	($\mu g/m^3$)	($\mu g/m^3$)		
1.	09:00 A.M	15.90	57.22	17.58 ($\mu g/m^3$)	51.49 ($\mu g/m^3$)
2.	10:00 A.M	16.21	41.81		
3.	11:00 A.M	13.51	55.31		
4.	12:00 P.M	19.75	58.69		
5.	01:00 P.M	15.89	47.64		
6.	02:00 P.M	16.70	44.56		
7.	03:00 P.M	14.91	54.58		
8.	04:00 P.M	19.02	56.73		
9.	05:00 P.M	20.67	53.46		
10.	06:00 P.M	21.17	43.34		
11.	07:00 P.M	21.27	46.89		
12.	08:00 P.M	15.56	44.68		
13.	09:00 P M	13.90	60.06		
14.	10:00 P M	20.14	46.08		
15.	11:00 P M	19.20	62.61		
16.	12:00 A M	14.97	57.84		
17.	01:00 A M	20.93	42.51		
18.	02:00 A M	20.64	44.98		
19.	03:00 A M	13.28	62.46		
20.	04:00 A M	20.80	48.96		
21.	05:00 A M	15.99	49.21		
22.	06:00 A M	17.95	57.31		
23.	07:00 A M	13.45	53.17		
24.	08:00 A M	20.20	46.95		
NEQSAA				35 ($\mu g/m^3$)	150($\mu g/m^3$)
WHO				15 ($\mu g/m^3$)	45 ($\mu g/m^3$)

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WHO: World Health Organization
Note:

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AMBIENT PARTICULATE MATTERS MONITORING REPORT

Reference Number	BHPP/ENV/128-2024	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Monitoring Location:**	Adit-3 (Kholian)
Monitoring Date:	29-09-2024	**Reporting Date:**	11-10-2024
Source: **GPS Coordinates:**	Ambient Air 34.610253,73.389367	**Monitoring Instrument:**	Aeroqual AQMS-09

Sr. No	Time	Parameters		Results (Average 24 Hrs)	
		$PM_{2.5}$	PM_{10}	$PM_{2.5}$	PM_{10}
		Units			
	Hours of Monitoring	($\mu g/m^3$)	($\mu g/m^3$)		
1.	09:00 A.M	17.72	44.18		
2.	10:00 A.M	16.00	45.50		
3.	11:00 A.M	18.76	37.69		
4.	12:00 P.M	18.29	34.07		
5.	01:00 P.M	13.92	39.13		
6.	02:00 P.M	18.85	41.64		
7.	03:00 P.M	15.26	47.84		
8.	04:00 P.M	12.79	48.28		
9.	05:00 P.M	18.47	50.52		
10.	06:00 P.M	17.90	34.40		
11.	07:00 P.M	18.30	39.46		
12.	08:00 P.M	13.20	50.16		
13.	09:00 P M	12.79	49.85	15.92 ($\mu g/m^3$)	42.11 ($\mu g/m^3$)
14.	10:00 P M	14.57	42.28		
15.	11:00 P M	18.58	32.69		
16.	12:00 A M	11.91	32.40		
17.	01:00 A M	13.24	44.47		
18.	02:00 A M	14.41	38.42		
19.	03:00 A M	19.06	35.45		
20.	04:00 A M	15.21	44.44		
21.	05:00 A M	13.83	43.12		
22.	06:00 A M	16.40	37.34		
23.	07:00 A M	13.51	46.31		
24.	08:00 A M	19.07	51.02		
NEQSAA				35 ($\mu g/m^3$)	150($\mu g/m^3$)
WHO				15 ($\mu g/m^3$)	45 ($\mu g/m^3$)

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AMBIENT PARTICULATE MATTERS MONITORING REPORT

Reference Number	BHPP/ENV/128-2024	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Monitoring Location:**	Powerhouse (Barkot)
Monitoring Date:	30-09-2024	**Reporting Date:**	11-10-2024
Source:	Ambient Air	**Monitoring Instrument:**	Aeroqual AQMS-09
GPS Coordinates:	34.601812, 73.377145		

Sr. No	Time	Parameters		Results (Average 24 Hrs)	
		$PM_{2.5}$	PM_{10}		
		Units		$PM_{2.5}$	PM_{10}
	Hours of Monitoring	($\mu g/m^3$)	($\mu g/m^3$)		
1.	09:00 A.M	19.89	62.83	21.86 ($\mu g/m^3$)	69.20 ($\mu g/m^3$)
2.	10:00 A.M	21.56	57.39		
3.	11:00 A.M	24.13	52.25		
4.	12:00 P.M	20.97	50.58		
5.	01:00 P.M	24.43	77.15		
6.	02:00 P.M	21.95	76.78		
7.	03:00 P.M	23.41	84.29		
8.	04:00 P.M	22.17	59.07		
9.	05:00 P.M	22.69	75.10		
10.	06:00 P.M	24.69	61.61		
11.	07:00 P.M	21.68	83.51		
12.	08:00 P.M	19.10	55.45		
13.	09:00 P M	22.84	62.67		
14.	10:00 P M	25.00	72.54		
15.	11:00 P M	21.05	52.74		
16.	12:00 A M	20.93	80.32		
17.	01:00 A M	23.36	81.89		
18.	02:00 A M	21.89	58.91		
19.	03:00 A M	19.75	82.22		
20.	04:00 A M	17.41	66.54		
21.	05:00 A M	20.85	70.83		
22.	06:00 A M	21.42	63.94		
23.	07:00 A M	24.74	85.90		
24.	08:00 A M	18.64	86.37		
NEQSAA				35 ($\mu g/m^3$)	150($\mu g/m^3$)
WHO				15 ($\mu g/m^3$)	45 ($\mu g/m^3$)

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WHO: World Health Organization
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Street No. 09, Main Canal Road, Abshaar Colony Warsak Road, Peshawar, Pakistan
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Reference Number	BHPP/ENV/128-2024	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Monitoring Location:**	Tailrace Upstream (Barkot)
Monitoring Date:	01-10-2024	**Reporting Date:**	11-10-2024
Source:	Ambient Air	**Monitoring Instrument:**	Aeroqual AQMS-09
GPS Coordinates:	34.596088, 73.374512		

Sr. No	Time	Parameters		Results (Average 24 Hrs)	
		$PM_{2.5}$	PM_{10}		
		Units		$PM_{2.5}$	PM_{10}
	Hours of Monitoring	($\mu g/m^3$)	($\mu g/m^3$)		
1.	09:00 A.M	13.15	52.09		
2.	10:00 A.M	16.79	48.23		
3.	11:00 A.M	20.76	48.52		
4.	12:00 P.M	13.48	42.14		
5.	01:00 P.M	19.64	53.99		
6.	02:00 P.M	15.60	57.11		
7.	03:00 P.M	22.69	45.02		
8.	04:00 P.M	15.34	44.47		
9.	05:00 P.M	15.35	40.46		
10.	06:00 P.M	16.63	57.45		
11.	07:00 P.M	13.91	38.53		
12.	08:00 P.M	19.82	44.06	17.78 ($\mu g/m^3$)	49.42 ($\mu g/m^3$)
13.	09:00 P M	21.83	57.41		
14.	10:00 P M	20.50	47.77		
15.	11:00 P M	18.71	50.61		
16.	12:00 A M	21.81	44.96		
17.	01:00 A M	18.61	50.12		
18.	02:00 A M	17.34	46.75		
19.	03:00 A M	15.40	57.49		
20.	04:00 A M	18.45	54.36		
21.	05:00 A M	18.21	47.50		
22.	06:00 A M	17.40	45.61		
23.	07:00 A M	19.08	59.29		
24.	08:00 A M	16.12	52.56		
NEQSAA				35 ($\mu g/m^3$)	150($\mu g/m^3$)
WHO				15 ($\mu g/m^3$)	45 ($\mu g/m^3$)

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WHO: World Health Organization
Note:

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Street No. 09, Main Canal Road, Abshaar Colony Warsak Road, Peshawar, Pakistan
Tell: +92 91 5202323 Cell: +92 3000391053 Email: inenvconsultants@yahoo.com www. iec-consultants.com

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AMBIENT PARTICULATE MATTERS MONITORING REPORT

Reference Number	BHPP/ENV/128-2024	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Monitoring Location:**	GRC Camp Office (Sanghar)
Monitoring Date:	03-10-2024	**Reporting Date:**	11-10-2024
Source:	Ambient Air	**Monitoring Instrument:**	Aeroqual AQMS-09
GPS Coordinates:	34.584562, 73.373878		

Sr. No	Time	Parameters		Results (Average 24 Hrs)	
		$PM_{2.5}$	PM_{10}		
		Units		$PM_{2.5}$	PM_{10}
	Hours of Monitoring	($\mu g/m^3$)	($\mu g/m^3$)		
1.	09:00 A.M	24.99	59.98		
2.	10:00 A.M	24.16	49.34		
3.	11:00 A.M	19.59	58.36		
4.	12:00 P.M	20.57	64.17		
5.	01:00 P.M	16.85	65.16		
6.	02:00 P.M	23.55	65.82		
7.	03:00 P.M	24.36	57.60		
8.	04:00 P.M	17.68	58.43		
9.	05:00 P.M	24.27	54.77		
10.	06:00 P.M	16.91	67.76		
11.	07:00 P.M	21.51	55.88		
12.	08:00 P.M	22.37	54.04	21.47 ($\mu g/m^3$)	57.10 ($\mu g/m^3$)
13.	09:00 P M	25.19	50.37		
14.	10:00 P M	18.69	62.84		
15.	11:00 P M	24.70	51.62		
16.	12:00 A M	22.88	58.03		
17.	01:00 A M	22.66	52.35		
18.	02:00 A M	18.22	51.99		
19.	03:00 A M	23.74	64.25		
20.	04:00 A M	18.83	50.45		
21.	05:00 A M	21.17	53.51		
22.	06:00 A M	21.88	57.87		
23.	07:00 A M	20.64	51.10		
24.	08:00 A M	19.91	54.65		
NEQSAA				35 ($\mu g/m^3$)	150($\mu g/m^3$)
WHO				15 ($\mu g/m^3$)	45 ($\mu g/m^3$)

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Note:

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- The report is not valid for court.

Signature of Analyst: ***Signature of Chief Chemist***

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Street No. 09, Main Canal Road, Abshaar Colony Warsak Road, Peshawar, Pakistan
Tell: +92 91 5202323 Cell: +92 3000391053 Email: inenvconsultants@yahoo.com www. iec-consultants.com

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AMBIENT PARTICULATE MATTERS MONITORING REPORT

Reference Number	BHPP/ENV/128-2024	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Monitoring Location:**	Colony Area (Sanghar)
Monitoring Date:	04-10-2024	**Reporting Date:**	11-10-2024
Source:	Ambient Air	**Monitoring Instrument:**	Aeroqual AQMS-09
GPS Coordinates:	34.587775, 73.366225		

Sr. No	Time	Parameters		Results (Average 24 Hrs)	
		$PM_{2.5}$	PM_{10}		
		Units		$PM_{2.5}$	PM_{10}
	Hours of Monitoring	($\mu g/m^3$)	($\mu g/m^3$)		
1.	09:00 A.M	24.72	51.47	21.21 ($\mu g/m^3$)	50.61 ($\mu g/m^3$)
2.	10:00 A.M	19.08	43.94		
3.	11:00 A.M	17.31	46.43		
4.	12:00 P.M	19.16	54.40		
5.	01:00 P.M	24.79	40.91		
6.	02:00 P.M	23.37	46.87		
7.	03:00 P.M	20.05	42.08		
8.	04:00 P.M	19.27	54.90		
9.	05:00 P.M	23.65	52.55		
10.	06:00 P.M	19.70	45.95		
11.	07:00 P.M	17.30	56.43		
12.	08:00 P.M	23.43	59.14		
13.	09:00 P M	17.33	52.16		
14.	10:00 P M	22.92	59.14		
15.	11:00 P M	23.16	56.07		
16.	12:00 A M	22.81	50.42		
17.	01:00 A M	22.66	51.30		
18.	02:00 A M	23.20	45.16		
19.	03:00 A M	20.14	40.12		
20.	04:00 A M	17.24	60.63		
21.	05:00 A M	20.18	55.62		
22.	06:00 A M	24.05	50.13		
23.	07:00 A M	23.86	48.37		
24.	08:00 A M	19.74	49.24		
NEQSAA				35 ($\mu g/m^3$)	150($\mu g/m^3$)
WHO				15 ($\mu g/m^3$)	45 ($\mu g/m^3$)

NEQSAA: National Environmental Quality Standards for Ambient Air
WHO: World Health Organization
Note:

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Signature of Analyst: ***Signature of Chief Chemist***

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Street No. 09, Main Canal Road, Abshaar Colony Warsak Road, Peshawar, Pakistan
Tell: +92 91 5202323 Cell: +92 3000391053 Email: inenvconsultants@yahoo.com www. iec-consultants.com
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Ambient Gaseous Monitoring Results (Third Quarter, 2024)

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AMBIENT GASES MONITORING REPORT

Reference Number	BHPP/ENV/128-2024	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Monitoring Location:**	Dam Site (Paras Valley)
Monitoring Date:	27-09-2024	**Reporting Date:**	11-10-2024
Source:	Ambient Air Gases	**Monitoring Instrument:**	Aeroqual AQM9-09
GPS Coordinates:	34.660470, 73.455497		

Sr. No	Time	Parameters			
		CO	NO	NO_2	SO_2
		Units			
	Hours	(mg/m^3)	($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)
1.	09:00 A.M	0.55	11.42	13.88	11.81
2.	10:00 A.M	0.65	12.35	15.20	10.62
3.	11:00 A.M	0.39	8.03	18.43	14.25
4.	12:00 P.M	0.37	8.19	19.32	11.90
5.	01:00 P.M	0.55	8.30	14.66	12.99
6.	02:00 P.M	0.55	7.69	14.56	14.57
7.	03:00 P.M	0.40	8.61	15.53	10.02
8.	04:00 P.M	0.25	11.08	17.46	13.76
9.	05:00 P.M	0.29	10.50	13.05	14.42
10.	06:00 P.M	0.45	8.72	19.12	11.42
11.	07:00 P.M	0.57	9.25	19.37	13.99
12.	08:00 P.M	0.26	11.08	17.09	13.72
13.	09:00 P M	0.43	9.26	17.46	14.50
14.	10:00 P M	0.55	8.14	16.09	12.95
15.	11:00 P M	0.35	9.63	18.88	10.35
16.	12:00 A M	0.55	7.40	16.65	13.93
17.	01:00 A M	0.38	9.35	18.75	10.06
18.	02:00 A M	0.25	9.03	13.35	10.37
19.	03:00 A M	0.25	11.34	12.50	12.90
20.	04:00 A M	0.46	9.32	15.66	13.55
21.	05:00 A M	0.34	9.09	13.51	14.37
22.	06:00 A M	0.38	11.57	15.32	10.00
23.	07:00 A M	0.64	9.18	16.45	12.52
24.	08:00 A M	0.49	11.02	19.38	13.06
Average Concentration		**0.43**	**9.57**	**16.32**	**12.58**
NEQSAA		**05**	**40**	**80**	**120**
WHO		**04**	**---**	**25**	**40**

NEQSAA: National Environmental Quality Standards for Ambient Air
WHO: World Health Organization

Note:

- Selected measurement units were $\mu g/m^3$ & mg/m^3 otherwise stated.
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Signature of Analyst: *Signature of Chief Chemist*

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Street No. 09, Main Canal Road, Abshaar Colony Warsak Road, Peshawar, Pakistan
Tell: +92 91 5202323 Cell: +92 3000391053 Email: inenvconsultants@yahoo.com www. iec-consultants.com

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AMBIENT GASES MONITORING REPORT

Reference Number	BHPP/ENV/128-2024	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Monitoring Location:**	Adit-1 (Thobi)
Monitoring Date:	02-10-2024	**Reporting Date:**	11-10-2024
Source:	Ambient Air Gases	**Monitoring Instrument:**	Aeroqual AQMS-09
GPS Coordinates:	34.636125, 73.428597		

Sr. No	Time	Parameters			
		CO	NO	NO_2	SO_2
		Units			
	Hours	(mg/m^3)	($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)
1.	09:00 A.M	0.67	14.22	19.51	13.26
2.	10:00 A.M	0.67	12.70	21.64	14.84
3.	11:00 A.M	0.81	14.76	13.99	15.52
4.	12:00 P.M	0.82	12.95	17.59	15.81
5.	01:00 P.M	0.50	11.18	19.60	13.88
6.	02:00 P.M	0.43	10.10	19.90	13.12
7.	03:00 P.M	0.55	10.24	19.88	13.12
8.	04:00 P.M	0.62	14.06	17.06	13.36
9.	05:00 P.M	0.50	15.43	15.09	12.93
10.	06:00 P.M	0.65	16.07	18.63	12.98
11.	07:00 P.M	0.85	10.56	17.12	14.90
12.	08:00 P.M	0.49	16.27	16.00	16.08
13.	09:00 P M	0.71	10.88	14.64	13.93
14.	10:00 P M	0.81	9.53	14.81	16.51
15.	11:00 P M	0.57	9.44	21.08	16.81
16.	12:00 A M	0.53	10.51	16.70	15.96
17.	01:00 A M	0.57	15.82	20.70	12.92
18.	02:00 A M	0.78	13.66	16.67	14.94
19.	03:00 A M	0.72	15.02	19.58	13.29
20.	04:00 A M	0.52	10.11	14.00	15.39
21.	05:00 A M	0.76	10.79	19.29	16.01
22.	06:00 A M	0.60	15.03	16.05	17.10
23.	07:00 A M	0.74	12.32	17.37	17.06
24.	08:00 A M	0.84	9.95	17.42	16.81
Average Concentration		**0.65**	**12.57**	**17.68**	**14.86**
NEQSAA		**05**	**40**	**80**	**120**
WHO		**04**	**---**	**25**	**40**

NEQSAA: National Environmental Quality Standards for Ambient Air
WHO: World Health Organization

Note:

- Selected measurement units were $\mu g/m^3$& mg/m^3 otherwise stated.
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Street No. 09, Main Canal Road, Abshaar Colony Warsak Road, Peshawar, Pakistan
Tell: +92 91 5202323 Cell: +92 3000391053 Email: inenvconsultants@yahoo.com www. iec-consultants.com
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AMBIENT GASES MONITORING REPORT

Reference Number	BHPP/ENV/128-2024	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Monitoring Location:**	Adit-2 (Ghanool)
Monitoring Date:	28-09-2024	**Reporting Date:**	11-10-2024
Source: **GPS Coordinates:**	Ambient Air Gases 34.619787, 73.417525	**Monitoring Instrument:**	Aeroqual AQMS-09

Sr. No	Time	Parameters			
		CO	NO	NO_2	SO_2
		Units			
	Hours	(mg/m³)	(µg/m³)	(µg/m³)	(µg/m³)
1.	09:00 A.M	0.41	6.47	15.63	10.66
2.	10:00 A.M	0.38	9.53	15.33	12.89
3.	11:00 A.M	0.23	6.88	13.87	13.10
4.	12:00 P.M	0.40	6.73	12.85	11.43
5.	01:00 P.M	0.43	8.66	16.10	9.84
6.	02:00 P.M	0.34	9.44	14.70	9.35
7.	03:00 P.M	0.46	8.56	13.59	11.06
8.	04:00 P.M	0.45	7.39	12.95	13.03
9.	05:00 P.M	0.41	8.94	11.57	11.57
10.	06:00 P.M	0.28	9.43	10.67	10.71
11.	07:00 P.M	0.48	6.47	12.94	12.44
12.	08:00 P.M	0.41	9.21	14.83	10.26
13.	09:00 P M	0.21	6.73	14.11	8.88
14.	10:00 P M	0.48	6.96	11.49	10.07
15.	11:00 P M	0.48	9.52	14.13	10.05
16.	12:00 A M	0.22	9.28	13.04	12.73
17.	01:00 A M	0.48	6.72	11.67	11.55
18.	02:00 A M	0.45	8.35	14.16	9.92
19.	03:00 A M	0.43	8.38	11.92	12.38
20.	04:00 A M	0.40	8.65	12.52	11.75
21.	05:00 A M	0.35	9.25	11.02	13.26
22.	06:00 A M	0.21	7.15	15.32	9.90
23.	07:00 A M	0.40	7.48	11.80	8.53
24.	08:00 A M	0.28	7.20	14.15	11.29
Average Concentration		**0.38**	**8.06**	**13.35**	**11.11**
NEQSAA		**05**	**40**	**80**	**120**
WHO		**04**	**---**	**25**	**40**

NEQSAA: National Environmental Quality Standards for Ambient Air
WHO: World Health Organization

Note:

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Signature of Analyst:

Signature of Chief Chemist

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Street No. 09, Main Canal Road, Abshaar Colony Warsak Road, Peshawar, Pakistan
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AMBIENT GASES MONITORING REPORT

Reference Number	BHPP/ENV/128-2024	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Monitoring Location:**	Adit-3 (Kholian)
Monitoring Date:	29-09-2024	**Reporting Date:**	11-10-2024
Source: **GPS Coordinates:**	Ambient Air Gases 34.610253,73.389367	**Monitoring Instrument:**	Aeroqual AQMS-09

Sr. No	Time	Parameters			
		CO	NO	NO_2	SO_2
		Units			
	Hours	(mg/m^3)	($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)
1.	09:00 A.M	0.17	11.32	12.88	8.98
2.	10:00 A.M	0.26	10.60	7.74	5.46
3.	11:00 A.M	0.35	9.48	11.28	8.93
4.	12:00 P.M	0.26	8.97	12.84	5.88
5.	01:00 P.M	0.19	8.59	9.76	8.19
6.	02:00 P.M	0.20	10.11	10.84	7.58
7.	03:00 P.M	0.31	9.45	9.85	6.55
8.	04:00 P.M	0.24	8.71	11.88	5.96
9.	05:00 P.M	0.36	11.88	9.12	9.81
10.	06:00 P.M	0.17	10.07	9.61	6.80
11.	07:00 P.M	0.24	11.30	6.95	5.99
12.	08:00 P.M	0.35	9.71	9.66	7.45
13.	09:00 P M	0.17	11.24	11.47	8.50
14.	10:00 P M	0.23	9.31	11.79	8.19
15.	11:00 P M	0.31	8.47	12.44	8.23
16.	12:00 A M	0.24	11.29	10.05	9.58
17.	01:00 A M	0.25	10.34	8.99	7.16
18.	02:00 A M	0.36	11.54	11.67	8.27
19.	03:00 A M	0.33	9.47	12.70	5.35
20.	04:00 A M	0.34	10.32	13.43	6.71
21.	05:00 A M	0.24	10.76	10.82	7.28
22.	06:00 A M	0.30	11.45	11.83	7.98
23.	07:00 A M	0.24	7.64	6.73	9.83
24.	08:00 A M	0.27	10.81	13.24	9.49
Average Concentration		**0.27**	**10.12**	**10.73**	**7.67**
NEQSAA		**05**	**40**	**80**	**120**
WHO		**04**	**---**	**25**	**40**

NEQSAA: National Environmental Quality Standards for Ambient Air
WHO: World Health Organization

Note:

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Signature of Analyst:

Signature of Chief Chemist

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Street No. 09, Main Canal Road, Abshaar Colony Warsak Road, Peshawar, Pakistan
Tell: +92 91 5202323 Cell: +92 3000391053 Email: inenvconsultants@yahoo.com www. iec-consultants.com

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AMBIENT GASES MONITORING REPORT

Reference Number	BHPP/ENV/128-2024	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Monitoring Location:**	Powerhouse (Barkot)
Monitoring Date:	30-09-2024	**Reporting Date:**	11-10-2024
Source:	Ambient Air Gases	**Monitoring Instrument:**	Aeroqual AQMS-09
GPS Coordinates:	34.601812, 73.377145		

Sr. No	Time	Parameters			
		CO	NO	NO_2	SO_2
		Units			
	Hours	(mg/m^3)	($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)
1.	09:00 A.M	0.64	12.17	10.40	9.80
2.	10:00 A.M	0.37	7.74	8.01	8.44
3.	11:00 A.M	0.48	12.41	9.29	10.03
4.	12:00 P.M	0.66	11.12	8.92	10.17
5.	01:00 P.M	0.45	12.03	7.98	9.17
6.	02:00 P.M	0.53	6.86	10.14	8.59
7.	03:00 P.M	0.47	10.43	7.98	8.51
8.	04:00 P.M	0.78	7.30	8.44	10.43
9.	05:00 P.M	0.88	9.06	10.35	8.84
10.	06:00 P.M	0.58	9.95	8.83	10.63
11.	07:00 P.M	0.78	10.44	9.09	9.50
12.	08:00 P.M	0.60	12.32	10.43	7.69
13.	09:00 P M	0.38	11.18	10.01	8.44
14.	10:00 P M	0.51	10.66	8.72	9.15
15.	11:00 P M	0.61	7.94	9.78	7.35
16.	12:00 A M	0.88	9.40	8.30	8.25
17.	01:00 A M	0.43	10.14	9.71	10.14
18.	02:00 A M	0.44	8.88	10.40	10.78
19.	03:00 A M	0.82	9.63	8.07	10.27
20.	04:00 A M	0.64	11.40	10.57	9.80
21.	05:00 A M	0.84	5.88	10.15	8.30
22.	06:00 A M	0.61	8.04	11.39	6.90
23.	07:00 A M	0.86	10.94	9.27	9.56
24.	08:00 A M	0.87	5.96	10.60	9.36
Average Concentration		**0.63**	**9.66**	**9.45**	**9.17**
NEQSAA		**05**	**40**	**80**	**120**
WHO		**04**	**---**	**25**	**40**

NEQSAA: National Environmental Quality Standards for Ambient Air
WHO: World Health Organization

Note:

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Signature of Analyst: *Signature of Chief Chemist*

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FOR ENVIRONMENTAL MONITORING, ANALYSIS & SURVEYS
Street No. 09, Main Canal Road, Abshaar Colony Warsak Road, Peshawar, Pakistan
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AMBIENT GASES MONITORING REPORT

Reference Number	BHPP/ENV/128-2024	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Monitoring Location:**	Tailrace Upstream (Barkot)
Monitoring Date:	01-10-2024	**Reporting Date:**	11-10-2024
Source:	Ambient Air Gases	**Monitoring Instrument:**	Aeroqual AQMS-09
GPS Coordinates:	34.596088, 73.374512		

Sr. No	Time	Parameters			
		CO	NO	NO_2	SO_2
		Units			
	Hours	(mg/m^3)	($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)
1.	09:00 A.M	0.29	7.08	5.18	4.32
2.	10:00 A.M	0.24	4.38	5.57	7.95
3.	11:00 A.M	0.39	5.26	6.26	8.07
4.	12:00 P.M	0.27	6.92	8.68	8.62
5.	01:00 P.M	0.42	5.87	5.72	4.86
6.	02:00 P.M	0.15	5.56	9.08	6.01
7.	03:00 P.M	0.32	7.13	8.11	9.22
8.	04:00 P.M	0.13	4.50	8.04	6.91
9.	05:00 P.M	0.40	5.91	9.05	6.52
10.	06:00 P.M	0.19	6.88	9.18	6.16
11.	07:00 P.M	0.38	5.80	5.44	9.13
12.	08:00 P.M	0.32	6.74	6.21	5.69
13.	09:00 P.M	0.21	6.34	6.97	4.17
14.	10:00 P.M	0.39	5.09	7.20	4.29
15.	11:00 P.M	0.40	6.61	7.68	5.48
16.	12:00 A.M	0.17	5.59	7.92	6.14
17.	01:00 A.M	0.27	5.92	5.45	8.54
18.	02:00 A.M	0.21	4.77	6.14	4.17
19.	03:00 A.M	0.25	5.28	7.90	4.88
20.	04:00 A.M	0.39	7.66	8.95	7.83
21.	05:00 A.M	0.16	5.07	6.46	6.87
22.	06:00 A.M	0.23	5.72	9.26	7.49
23.	07:00 A.M	0.17	7.30	8.43	3.81
24.	08:00 A.M	0.28	6.79	5.59	7.93
Average Concentration		**0.28**	**6.01**	**7.27**	**6.46**
NEQSAA		**05**	**40**	**80**	**120**
WHO		**04**	**---**	**25**	**40**

NEQSAA: National Environmental Quality Standards for Ambient Air
WHO: World Health Organization

Note:

- Selected measurement units were $\mu g/m^3$ & mg/m^3 otherwise stated.
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- The report is not valid for court.

Signature of Analyst: *Signature of Chief Chemist*

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FOR ENVIRONMENTAL MONITORING, ANALYSIS & SURVEYS
Street No. 09, Main Canal Road, Abshaar Colony Warsak Road, Peshawar, Pakistan
Tell: +92 91 5202323 Cell: +92 3000391053 Email: inenvconsultants@yahoo.com www. iec-consultants.com
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AMBIENT GASES MONITORING REPORT

Reference Number	BHPP/ENV/128-2024	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Monitoring Location:**	GRC Camp Office (Sanghar)
Monitoring Date:	03-10-2024	**Reporting Date:**	11-10-2024
Source:	Ambient Air Gases	**Monitoring Instrument:**	Aeroqual AQMS-09
GPS Coordinates:	34.584562, 73.373878		

Sr. No	Time	Parameters			
		CO	NO	NO_2	SO_2
		Units			
	Hours	(mg/m^3)	($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)
1.	09:00 A.M	0.34	9.19	9.78	6.61
2.	10:00 A.M	0.39	8.82	10.43	11.10
3.	11:00 A.M	0.42	10.31	9.15	9.99
4.	12:00 P.M	0.37	8.78	14.38	9.66
5.	01:00 P.M	0.45	8.05	9.15	11.18
6.	02:00 P.M	0.33	8.55	13.46	9.67
7.	03:00 P.M	0.34	9.62	10.77	8.09
8.	04:00 P.M	0.43	10.45	12.64	9.93
9.	05:00 P.M	0.36	10.34	10.24	11.28
10.	06:00 P.M	0.41	9.74	12.45	9.08
11.	07:00 P.M	0.44	8.46	9.52	8.11
12.	08:00 P.M	0.29	9.37	10.53	8.30
13.	09:00 P M	0.40	7.90	12.47	7.49
14.	10:00 P M	0.40	9.90	10.96	9.11
15.	11:00 P M	0.44	8.55	14.23	8.72
16.	12:00 A M	0.44	7.65	9.09	7.34
17.	01:00 A M	0.34	8.06	10.60	8.42
18.	02:00 A M	0.40	9.79	11.52	10.10
19.	03:00 A M	0.35	8.92	9.81	10.34
20.	04:00 A M	0.39	8.56	12.32	8.83
21.	05:00 A M	0.39	9.89	13.85	6.88
22.	06:00 A M	0.37	9.80	14.36	7.56
23.	07:00 A M	0.39	8.57	14.41	9.97
24.	08:00 A M	0.33	10.33	11.72	10.48
Average Concentration		**0.38**	**9.15**	**11.58**	**9.09**
NEQSAA		**05**	**40**	**80**	**120**
WHO		**04**	**---**	**25**	**40**

NEQSAA: National Environmental Quality Standards for Ambient Air
WHO: World Health Organization

Note:

- Selected measurement units were $\mu g/m^3$& mg/m^3 otherwise stated.
- The client is responsible lawful usage of reported data in future.
- The report is not valid for court.

Signature of Analyst: ***Signature of Chief Chemist***

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FOR ENVIRONMENTAL MONITORING, ANALYSIS & SURVEYS
Street No. 09, Main Canal Road, Abshaar Colony Warsak Road, Peshawar, Pakistan
Tell: +92 91 5202323 Cell: +92 3000391053 Email: inenvconsultants@yahoo.com www. iec-consultants.com
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AMBIENT GASES MONITORING REPORT

Reference Number	BHPP/ENV/128-2024	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Monitoring Location:**	Colony Area (Snaghar)
Monitoring Date:	04-10-2024	**Reporting Date:**	11-10-2024
Source:	Ambient Air Gases	**Monitoring Instrument:**	Aeroqual AQMS-09
GPS Coordinates:	34.587775, 73.366225		

Sr. No	Time	Parameters			
		CO	NO	NO_2	SO_2
		Units			
	Hours	(mg/m^3)	($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)
1.	09:00 A.M	0.27	6.14	15.54	11.61
2.	10:00 A.M	0.33	6.95	16.29	9.95
3.	11:00 A.M	0.34	6.70	10.67	10.05
4.	12:00 P.M	0.20	11.48	9.56	9.38
5.	01:00 P.M	0.23	8.77	13.48	11.41
6.	02:00 P.M	0.36	7.02	15.34	11.34
7.	03:00 P.M	0.24	10.56	10.70	10.45
8.	04:00 P.M	0.34	8.67	12.65	11.51
9.	05:00 P.M	0.30	9.49	10.30	8.78
10.	06:00 P.M	0.26	7.21	16.11	9.82
11.	07:00 P.M	0.25	7.09	13.55	10.30
12.	08:00 P.M	0.28	9.62	10.10	10.84
13.	09:00 P M	0.33	7.85	13.13	11.27
14.	10:00 P M	0.20	8.20	10.51	9.83
15.	11:00 P M	0.33	10.70	13.85	10.14
16.	12:00 A M	0.29	6.18	11.62	10.17
17.	01:00 A M	0.21	7.60	15.68	10.53
18.	02:00 A M	0.25	11.47	16.13	11.70
19.	03:00 A M	0.32	10.92	15.68	9.67
20.	04:00 A M	0.29	10.12	14.24	11.08
21.	05:00 A M	0.35	6.27	9.53	13.48
22.	06:00 A M	0.29	10.41	14.87	11.30
23.	07:00 A M	0.26	8.44	9.49	12.17
24.	08:00 A M	0.33	9.69	16.07	12.03
Average Concentration		**0.29**	**8.65**	**13.13**	**10.78**
NEQSAA		**05**	**40**	**80**	**120**
WHO		**04**	**---**	**25**	**40**

NEQSAA: National Environmental Quality Standards for Ambient Air
WHO: World Health Organization

Note:

- Selected measurement units were $\mu g/m^3$& mg/m^3 otherwise stated.
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Signature of Analyst: ***Signature of Chief Chemist***

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Street No. 09, Main Canal Road, Abshaar Colony Warsak Road, Peshawar, Pakistan
Tell: +92 91 5202323 Cell: +92 3000391053 Email: inenvconsultants@yahoo.com www. iec-consultants.com
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Ambient Noise level Results (Third Quarter, 2024)

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AMBIENT NOISE MONITORING REPORT

Reference Number	BHPP/ENV/128-2024	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Monitoring Location:**	Dam Site (Paras Valley)
Monitoring Date:	27-09-2024	**Reporting Date:**	11-10-2024
Source: **GPS Coordinates:**	Ambient Noise 34.660470, 73.455497	**Monitoring Instrument:**	Noise Meter-IEC651-Type-2

Sr. No.	Monitoring Time	Unit	Minimum	Maximum	Leq
1.	09:00 A.M	dB(A)	58.8	63.2	61
2.	10:00 A.M		58.6	63	60.8
3.	11:00 A.M		58.4	62.8	60.6
4.	12:00 P.M		58.2	62.6	60.4
5.	01:00 P.M		58	62.3	60.15
6.	02:00 P.M		57.7	62.1	59.9
7.	03:00 P.M		57.5	61.9	59.7
8.	04:00 P.M		57.3	61.7	59.5
9.	05:00 P.M		57.1	61.5	59.3
10.	06:00 P.M		56.9	61.3	59.1
11.	07:00 P.M		56.7	61	58.85
12.	08:00 P.M		56.4	60.8	58.6
13.	09:00 P.M		56.2	60.6	58.4
14.	10:00 P.M		56	60.4	58.2
15.	11:00 P.M		55.8	60.2	58
16.	12:00 A.M		55.6	60	57.8
17.	01:00 A.M		55.4	59.8	57.6
18.	02:00 A.M		55.2	59.6	57.4
19.	03:00 A.M		55	59.4	57.2
20.	04:00 A.M		54.8	59.1	56.95
21.	05:00 A.M		54.5	58.9	56.7
22.	06:00 A.M		54.3	58.7	56.5
23.	07:00 A.M		54.1	58.5	56.3
24.	08:00 A.M		53.9	58.3	56.1

NEQS limit : 45-55 dB
WHO limit: 70 dB

NEQS: National Environmental Quality Standards **WHO:** World Health Organization
Leq: Log Equivalent Continuous Sound Level

Note:

- Selected measurement units were dB (A) otherwise stated.
- The client is responsible lawful usage of reported data in future.
- The report is not valid for court.

Signature of Analyst: *Signature of Chief Chemist*

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Street No. 09, Main Canal Road, Abshaar Colony Warsak Road, Peshawar, Pakistan
Tell: +92 91 5202323 Cell: +92 3000391053 Email: inenvconsultants@yahoo.com www. iec-consultants.com

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AMBIENT NOISE MONITORING REPORT

Reference Number	BHPP/ENV/128-2024	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Monitoring Location:**	Adit-1 (Thobi)
Monitoring Date:	02-10-2024	**Reporting Date:**	11-10-2024
Source: **GPS Coordinates:**	Ambient Noise 34.636125, 73.428597	**Monitoring Instrument:**	Noise Meter-IEC651-Type-2

Sr. No.	Monitoring Time	Unit	Minimum	Maximum	Leq
1.	09:00 A.M	dB(A)	56.9	62.2	59.55
2.	10:00 A.M		56.7	61.9	59.3
3.	11:00 A.M		56.4	61.7	59.05
4.	12:00 P.M		56.2	61.5	58.85
5.	01:00 P.M		56	61.3	58.65
6.	02:00 P.M		55.8	61.1	58.45
7.	03:00 P.M		55.6	60.9	58.25
8.	04:00 P.M		55.4	60.6	58
9.	05:00 P.M		55.1	60.4	57.75
10.	06:00 P.M		54.9	60.2	57.55
11.	07:00 P.M		52.7	58	55.35
12.	08:00 P.M		52.5	57.8	55.15
13.	09:00 P M		52.3	57.6	54.95
14.	10:00 P M		52.1	57.3	54.7
15.	11:00 P M		53.3	58.6	55.95
16.	12:00 A M		53	58.3	55.65
17.	01:00 A M		52.8	58.1	55.45
18.	02:00 A M		52.6	57.9	55.25
19.	03:00 A M		52.4	57.7	55.05
20.	04:00 A M		52.2	57.4	54.8
21.	05:00 A M		51.9	57.2	54.55
22.	06:00 A M		51.7	57	54.35
23.	07:00 A M		52.6	58.4	55.5
24.	08:00 A M		57.3	62.9	60.1
NEQS limit : 45-55 dB **WHO limit**: 70 dB					

NEQS: National Environmental Quality Standards **WHO:** World Health Organization
Leq: Log Equivalent Continuous Sound Level

Note:

- Selected measurement units were dB (A) otherwise stated.
- The client is responsible lawful usage of reported data in future.
- The report is not valid for court.

Signature of Analyst: ***Signature of Chief Chemist***

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Street No. 09, Main Canal Road, Abshaar Colony Warsak Road, Peshawar, Pakistan
Tell: +92 91 5202323 Cell: +92 3000391053 Email: inenvconsultants@yahoo.com www. iec-consultants.com
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AMBIENT NOISE MONITORING REPORT

Reference Number	BHPP/ENV/128-2024	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Monitoring Location:**	Adit-2 (Ghanool)
Monitoring Date:	28-09-2024	**Reporting Date:**	11-10-2024
Source:	Ambient Noise	**Monitoring Instrument:**	Noise Meter-IEC651-Type-2
GPS Coordinates:	34.619787, 73.417525		

Sr. No.	Monitoring Time	Unit	Minimum	Maximum	Leq
1.	09:00 A.M	dB(A)	58.3	66.3	62.3
2.	10:00 A.M		58.1	66.1	62.1
3.	11:00 A.M		57.9	65.9	61.9
4.	12:00 P.M		57.7	65.7	61.7
5.	01:00 P.M		57.4	65.4	61.4
6.	02:00 P.M		57.2	65.2	61.2
7.	03:00 P.M		52.74	60.74	56.74
8.	04:00 P.M		52.54	60.54	56.54
9.	05:00 P.M		52.34	60.34	56.34
10.	06:00 P.M		52.14	60.14	56.14
11.	07:00 P.M		51.84	59.84	55.84
12.	08:00 P.M		51.64	59.64	55.64
13.	09:00 P M		51.44	59.44	55.44
14.	10:00 P M		51.24	59.24	55.24
15.	11:00 P M		51.04	59.04	55.04
16.	12:00 A M		50.74	58.74	54.74
17.	01:00 A M		50.54	58.54	54.54
18.	02:00 A M		50.34	58.34	54.34
19.	03:00 A M		53.14	61.14	57.14
20.	04:00 A M		52.94	60.84	56.89
21.	05:00 A M		56.9	64.9	60.9
22.	06:00 A M		56.7	64.7	60.7
23.	07:00 A M		56.5	64.5	60.5
24.	08:00 A M		58	66.1	62.05
NEQS limit : 45-55 dB **WHO limit**: 70 dB					

NEQS: National Environmental Quality Standards **WHO:** World Health Organization
Leq: Log Equivalent Continuous Sound Level

Note:

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- The report is not valid for court.

Signature of Analyst:

Signature of Chief Chemist

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Street No. 09, Main Canal Road, Abshaar Colony Warsak Road, Peshawar, Pakistan
Tell: +92 91 5202323 Cell: +92 3000391053 Email: inenvconsultants@yahoo.com www. iec-consultants.com
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AMBIENT NOISE MONITORING REPORT

Reference Number	BHPP/ENV/128-2024	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Monitoring Location:**	Adit-3 (Kholian)
Monitoring Date:	29-09-2024	**Reporting Date:**	11-10-2024
Source:	Ambient Noise	**Monitoring Instrument:**	Noise Meter-IEC651-Type-2
GPS Coordinates:	34.610253,73.389367		

Sr. No.	Monitoring Time	Unit	Minimum	Maximum	Leq
1.	09:00 A.M	dB(A)	55.8	60.6	58.2
2.	10:00 A.M		55.6	60.3	57.95
3.	11:00 A.M		55.3	60.1	57.7
4.	12:00 P.M		55.1	59.9	57.5
5.	01:00 P.M		54.9	59.7	57.3
6.	02:00 P.M		54.7	59.5	57.1
7.	03:00 P.M		52	57	54.5
8.	04:00 P.M		51.8	56.7	54.25
9.	05:00 P.M		51.5	56.5	54
10.	06:00 P.M		51.3	56.3	53.8
11.	07:00 P.M		51.1	56.1	53.6
12.	08:00 P.M		50.9	55.9	53.4
13.	09:00 P M		50.7	55.7	53.2
14.	10:00 P M		50.5	55.4	52.95
15.	11:00 P M		40.4	45.4	42.9
16.	12:00 A M		40.1	45.1	42.6
17.	01:00 A M		39.9	44.9	42.4
18.	02:00 A M		45.5	50.5	48
19.	03:00 A M		45.3	50.3	47.8
20.	04:00 A M		45.1	50	47.55
21.	05:00 A M		44.8	49.8	47.3
22.	06:00 A M		44.6	49.6	47.1
23.	07:00 A M		47.9	53.3	50.6
24.	08:00 A M		57.8	61.9	59.85

NEQS limit : 45-55 dB
WHO limit: 70 dB

NEQS: National Environmental Quality Standards **WHO:** World Health Organization
Leq: Log Equivalent Continuous Sound Level

Note:

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- The client is responsible lawful usage of reported data in future.
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Signature of Analyst:

Signature of Chief Chemist

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Street No. 09, Main Canal Road, Abshaar Colony Warsak Road, Peshawar, Pakistan
Tell: +92 91 5202323 Cell: +92 3000391053 Email: inenyconsultants@yahoo.com www. iec-consultants.com

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AMBIENT NOISE MONITORING REPORT

Reference Number	BHPP/ENV/128-2024	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Monitoring Location:**	Powerhouse (Barkot)
Monitoring Date:	30-09-2024	**Reporting Date:**	11-10-2024
Source:	Ambient Noise	**Monitoring Instrument:**	Noise Meter-IEC651-Type-2
GPS Coordinates:	34.601812, 73.377145		

Sr. No.	Monitoring Time	Unit	Minimum	Maximum	Leq
1.	09:00 A.M	dB(A)	62.7	66.8	64.75
2.	10:00 A.M		62.5	66.5	64.5
3.	11:00 A.M		62.2	66.3	64.25
4.	12:00 P.M		62	66.1	64.05
5.	01:00 P.M		61.8	65.9	63.85
6.	02:00 P.M		61.6	65.7	63.65
7.	03:00 P.M		59.4	63.5	61.45
8.	04:00 P.M		59.2	63.2	61.2
9.	05:00 P.M		58.9	63	60.95
10.	06:00 P.M		58.7	62.8	60.75
11.	07:00 P.M		58.5	62.6	60.55
12.	08:00 P.M		58.3	62.4	60.35
13.	09:00 P M		58.1	62.2	60.15
14.	10:00 P M		57.9	61.9	59.9
15.	11:00 P M		57.6	61.7	59.65
16.	12:00 A M		57.4	61.5	59.45
17.	01:00 A M		57.2	61.3	59.25
18.	02:00 A M		57	61.1	59.05
19.	03:00 A M		56.8	60.9	58.85
20.	04:00 A M		56.6	60.6	58.6
21.	05:00 A M		56.3	60.4	58.35
22.	06:00 A M		58.1	62.2	60.15
23.	07:00 A M		64.2	67.9	66.05
24.	08:00 A M		66	70.6	68.3

NEQS limit : 45-55 dB
WHO limit: 70 dB

NEQS: National Environmental Quality Standards **WHO:** World Health Organization
Leq: Log Equivalent Continuous Sound Level

Note:

- Selected measurement units were dB (A) otherwise stated.
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Signature of Analyst: *Signature of Chief Chemist*

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Street No. 09, Main Canal Road, Abshaar Colony Warsak Road, Peshawar, Pakistan
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AMBIENT NOISE MONITORING REPORT

Reference Number	BHPP/ENV/128-2024	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Monitoring Location:**	Tailrace Upstream (Barkot)
Monitoring Date:	01-10-2024	**Reporting Date:**	11-10-2024
Source: **GPS Coordinates:**	Ambient Noise 34.596088, 73.374512	**Monitoring Instrument:**	Noise Meter IEC651-Type-2

Sr. No.	Monitoring Time	Unit	Minimum	Maximum	Leq
1.	09:00 A.M	dB(A)	54.2	58.3	56.25
2.	10:00 A.M		54	58	56
3.	11:00 A.M		53.7	57.8	55.75
4.	12:00 P.M		53.5	57.6	55.55
5.	01:00 P.M		53.3	57.4	55.35
6.	02:00 P.M		53.1	57.2	55.15
7.	03:00 P.M		50.9	55	52.95
8.	04:00 P.M		50.7	54.7	52.7
9.	05:00 P.M		50.4	54.5	52.45
10.	06:00 P.M		50.2	54.3	52.25
11.	07:00 P.M		50	54.1	52.05
12.	08:00 P.M		49.8	53.9	51.85
13.	09:00 P M		49.6	53.7	51.65
14.	10:00 P M		49.4	53.4	51.4
15.	11:00 P M		49.1	53.2	51.15
16.	12:00 A M		48.9	53	50.95
17.	01:00 A M		48.7	52.8	50.75
18.	02:00 A M		48.5	52.6	50.55
19.	03:00 A M		48.3	52.4	50.35
20.	04:00 A M		48.1	52.1	50.1
21.	05:00 A M		47.8	51.9	49.85
22.	06:00 A M		49.6	53.7	51.65
23.	07:00 A M		55	58.2	56.6
24.	08:00 A M		51.5	53.4	52.45
NEQS limit : 45-55 dB **WHO limit**: 70 dB					

NEQS: National Environmental Quality Standards **WHO:** World Health Organization
Leq: Log Equivalent Continuous Sound Level

Note:

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Signature of Analyst: *Signature of Chief Chemist*

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AMBIENT NOISE MONITORING REPORT

Reference Number	BHPP/ENV/128-2024	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Monitoring Location:**	Colony Area (Sanghar)
Monitoring Date:	04-10-2024	**Reporting Date:**	11-10-2024
Source:	Ambient Noise	**Monitoring Instrument:**	Noise Meter-IEC651-Type-2
GPS Coordinates:	34.587775, 73.366225		

Sr. No.	Monitoring Time	Unit	Minimum	Maximum	Leq
1.	09:00 A.M	dB(A)	62.5	65.4	63.95
2.	10:00 A.M		62.3	65.1	63.7
3.	11:00 A.M		62	64.9	63.45
4.	12:00 P.M		61.8	64.7	63.25
5.	01:00 P.M		61.6	64.5	63.05
6.	02:00 P.M		61.4	64.3	62.85
7.	03:00 P.M		61.2	64.1	62.65
8.	04:00 P.M		61	63.8	62.4
9.	05:00 P.M		60.7	63.6	62.15
10.	06:00 P.M		60.5	63.4	61.95
11.	07:00 P.M		60.3	63.2	61.75
12.	08:00 P.M		60.1	63	61.55
13.	09:00 P M		59.9	62.8	61.35
14.	10:00 P M		56.7	58.3	57.5
15.	11:00 P M		52.8	54.7	53.75
16.	12:00 A M		50.2	53.6	51.9
17.	01:00 A M		49.1	52	50.55
18.	02:00 A M		50.9	52.2	51.55
19.	03:00 A M		48.7	51.6	50.15
20.	04:00 A M		49.4	51.3	50.35
21.	05:00 A M		48.2	51.1	49.65
22.	06:00 A M		51.7	54.3	53
23.	07:00 A M		55.4	57.9	56.65
24.	08:00 A M		60	62.4	61.2

NEQS limit : 45-55 dB
WHO limit: 70 dB

NEQS: National Environmental Quality Standards **WHO:** World Health Organization
Leq: Log Equivalent Continuous Sound Level

Note:

- Selected measurement units were dB (A) otherwise stated.
- The client is responsible lawful usage of reported data in future.
- The report is not valid for court.

Signature of Analyst: ***Signature of Chief Chemist***

Integrated Environment Laboratory

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Tell: +92 91 5202323 Cell: +92 3000391053 Email: inenvconsultants@yahoo.com www. iec-consultants.com
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Drinking Water Monitoring Results (Third Quarter, 2024)

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DRINKING WATER ANALYSIS REPORT

Reference Number	BHPP/ENV/128-2024	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Sampling Location:**	Dam Site (Paras Valley)
Sampling Date:	04-10-2024	**Reporting Date:**	11-10-2024
Source: **GPS Coordinates;**	Spring Water (Source) 34.653167, 73.445678	**Analysis Method**	APHA/USEPA Standard Methods

Sr. No.	Parameters	Standard Methods	Units	WHO	NDWQS	Results
1.	pH	APHA-4500H+ B	--	6.5-8.5	6.5-8.5	7.4
2.	Temperature	---	°C	---	----	18
3.	Taste & Odor	In-house	--	Non-Objectionable	Non Objectionable	Non Objectionable
4.	Color	APHA-2120 B/C	TCU	≤ 15	<15	6
5.	Turbidity	APHA-2130 B	NTU	<5	<5	3.5
6.	Total Dissolved Solids (TDS)	APHA-2540 C	mg/L	< 1000	<1000	327
7.	Total Hardness as $CaCO_3$	APHA-2340 C	mg/L	-------	<500	241
8.	Nitrate (NO_3)	APHA-4500NO3 B	mg/L	50	≤50	1.72
9.	Nitrite (NO_2)	APHA-4500NO2 B	mg/L	3	≤3	0.19
10.	Arsenic (As)	APHA-3500As B	mg/L	0.01	≤0.05	N.D.
11.	Nickel (Ni)	ASTM E3047-16	mg/L	0.02	≤0.02	0.007
12.	Antimony (Sb)	APHA-3500Sb B	mg/L	0.005	<0.005	N.D.
13.	Chloride (Cl)	APHA-4500Cl- B	mg/L	250	<250	105
14.	Chlorine	APHA-4500 CL	mg/L		0.5-1.5	0.42
15.	Lead (Pb)	APHA-3500 Pb-B	mg/L	0.01	≤0.05	N.D.
16.	Fluoride	APHA-4500F- C	mg/L	1.5	≤1.5	0.65
17.	Aluminum	APHA-3500 Al	mg/L	≤ 0.2	≤0.2	N.D.
18.	Manganese (Mn)	APHA-3500 MN-B	mg/L	0.5	≤0.5	N.D.
19.	Cadmium (Cd)	APHA-3500 Cd-B	mg/L	0.003	0.01	N.D.
20.	Barium (Ba)	APHA-3500 Ba B	mg/L	0.3	0.7	0.18
21.	Mercury (Hg)	APHA-3500 Hg-B	mg/L	0.001	≤0.001	N.D.
22.	Copper (Cu)	APHA- 3500 Cu-B	mg/L	2	2	0.066
23.	Zinc (Zn)	APHA- 3500 Zn B	mg/L	3	5	0.93
24.	Boron (B)	APHA 4500 B- C	mg/L	0.3	0.3	N.D.
25.	Chromium (Cr)	APHA 3500 cr B	mg/L	0.05	≤0.05	N.D.
26.	Selenium (Se)	APHA- 3500 Se C	mg/L	0.01	0.01	N.D.
27.	Cyanide (CN)	APHA 4500-CN	mg/L	0.07	≤0.05	N.D.
28.	E-Coli	APHA:9222 D	Number/100 mL	Must not be detectable in any 100 ml sample	0 Number/100 mL	0
29.	Total Coliform	APHA:9222 B	Number/100 mL	Must not be detectable in any 100 ml sample	0 Number/100 mL	0

NDWQS National Drinking Water Quality Standards **WHO** World Health Organization
N D Not Detected

Signature of Analyst: *Signature of Chief Chemist*

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DRINKING WATER ANALYSIS REPORT

Reference Number	BHPP/ENV/128-2024	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Sampling Location:**	Dam Site (Paras Valley)
Sampling Date:	04-10-2024	**Reporting Date:**	11-10-2024
Source: **GPS Coordinates;**	Tap Water (End User) 34.660653, 73.455772	**Analysis Method**	APHA/USEPA Standard Methods

Sr. No.	Parameters	Standard Methods	Units	WHO	NDWQS	Results
1.	pH	APHA-4500H+ B	--	6.5-8.5	6.5-8.5	7.3
2.	Temperature	---	°C	---	----	17
3.	Taste & Odor	In-house	--	Non-Objectionable	Non Objectionable	Non Objectionable
4.	Color	APHA-2120 B/C	TCU	≤ 15	<15	7
5.	Turbidity	APHA-2130 B	NTU	<5	<5	4
6.	Total Dissolved Solids (TDS)	APHA-2540 C	mg/L	< 1000	<1000	339
7.	Total Hardness as $CaCO_3$	APHA-2340 C	mg/L	-------	<500	256
8.	Nitrate (NO_3)	APHA-4500NO3 B	mg/L	50	≤50	0.86
9.	Nitrite (NO_2)	APHA-4500NO2 B	mg/L	3	≤3	0.006
10.	Arsenic (As)	APHA-3500As B	mg/L	0.01	≤0.05	N.D.
11.	Nickel (Ni)	ASTM E3047-16	mg/L	0.02	≤0.02	N.D.
12.	Antimony (Sb)	APHA-3500Sb B	mg/L	0.005	<0.005	N.D.
13.	Chloride (Cl)	APHA-4500Cl- B	mg/L	250	<250	86.4
14.	Chlorine	APHA-4500 CL	mg/L		0.5-1.5	0.52
15.	Lead (Pb)	APHA-3500 Pb-B	mg/L	0.01	≤0.05	N.D
16.	Fluoride	APHA-4500F- C	mg/L	1.5	≤1.5	0.42
17.	Aluminum	APHA-3500 Al	mg/L	≤ 0.2	≤0.2	N.D.
18.	Manganese (Mn)	APHA-3500 MN-B	mg/L	0.5	≤0.5	N.D.
19.	Cadmium (Cd)	APHA-3500 Cd-B	mg/L	0.003	0.01	N.D.
20.	Barium (Ba)	APHA-3500 Ba B	mg/L	0.3	0.7	0.049
21.	Mercury (Hg)	APHA-3500 Hg-B	mg/L	0.001	≤0.001	N.D.
22.	Copper (Cu)	APHA- 3500 Cu-B	mg/L	2	2	0.06
23.	Zinc (Zn)	APHA- 3500 Zn B	mg/L	3	5	1.14
24.	Boron (B)	APHA 4500 B- C	mg/L	0.3	0.3	N.D.
25.	Chromium (Cr)	APHA 3500 cr B	mg/L	0.05	≤0.05	N.D.
26.	Selenium (Se)	APHA- 3500 Se C	mg/L	0.01	0.01	N.D.
27.	Cyanide (CN)	APHA 4500-CN	mg/L	0.07	≤0.05	N.D.
28.	E-Coli	APHA:9222 D	Number/100 mL	Must not be detectable in any 100 ml sample	0 Number/100 mL	0
29.	Total Coliform	APHA:9222 B	Number/100 mL	Must not be detectable in any 100 ml sample	0 Number/100 mL	0

NDWQS National Drinking Water Quality Standards **WHO** World Health Organization
N D Not Detected

Signature of Analyst: *Signature of Chief Chemist*

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DRINKING WATER ANALYSIS REPORT

Reference Number	BHPP/ENV/128-2024	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Sampling Location:**	Adit-1 (Thobi)
Sampling Date:	04-10-2024	**Reporting Date:**	11-10-2024
Source: **GPS Coordinates;**	Spring Water (Source) 34.636125, 73.428597	**Analysis Method**	APHA/USEPA Standard Methods

Sr. No.	Parameters	Standard Methods	Units	WHO	NDWQS	Results
1.	pH	APHA-4500H+ B	--	6.5-8.5	6.5-8.5	7.6
2.	Temperature	---	°C	---	-----	20
3.	Taste & Odor	In-house	--	Non-Objectionable	Non Objectionable	Non Objectionable
4.	Color	APHA-2120 B/C	TCU	≤ 15	<15	4.3
5.	Turbidity	APHA-2130 B	NTU	<5	<5	3.2
6.	Total Dissolved Solids (TDS)	APHA-2540 C	mg/L	< 1000	<1000	349
7.	Total Hardness as $CaCO_3$	APHA-2340 C	mg/L	-------	<500	243
8.	Nitrate (NO_3)	APHA-4500NO3 B	mg/L	50	≤50	0.56
9.	Nitrite (NO_2)	APHA-4500NO2 B	mg/L	3	≤3	0.06
10.	Arsenic (As)	APHA-3500As B	mg/L	0.01	≤0.05	N.D.
11.	Nickel (Ni)	ASTM E3047-16	mg/L	0.02	≤0.02	N.D.
12.	Antimony (Sb)	APHA-3500Sb B	mg/L	0.005	<0.005	N.D.
13.	Chloride (Cl)	APHA-4500Cl- B	mg/L	250	<250	135
14.	Chlorine	APHA-4500 CL	mg/L		0.5-1.5	0.59
15.	Lead (Pb)	APHA-3500 Pb-B	mg/L	0.01	≤0.05	N.D.
16.	Fluoride	APHA-4500F- C	mg/L	1.5	≤1.5	0.73
17.	Aluminum	APHA-3500 Al	mg/L	≤ 0.2	≤0.2	N.D.
18.	Manganese (Mn)	APHA-3500 MN-B	mg/L	0.5	≤0.5	N.D.
19.	Cadmium (Cd)	APHA-3500 Cd-B	mg/L	0.003	0.01	N.D.
20.	Barium (Ba)	APHA-3500 Ba B	mg/L	0.3	0.7	0.07
21.	Mercury (Hg)	APHA-3500 Hg-B	mg/L	0.001	≤0.001	N.D.
22.	Copper (Cu)	APHA- 3500 Cu-B	mg/L	2	2	0.035
23.	Zinc (Zn)	APHA- 3500 Zn B	mg/L	3	5	1.09
24.	Boron (B)	APHA 4500 B- C	mg/L	0.3	0.3	N.D.
25.	Chromium (Cr)	APHA 3500 cr B	mg/L	0.05	≤0.05	N.D.
26.	Selenium (Se)	APHA- 3500 Se C	mg/L	0.01	0.01	N.D.
27.	Cyanide (CN)	APHA 4500-CN	mg/L	0.07	≤0.05	N.D.
28.	E-Coli	APHA:9222 D	Number/100 mL	Must not be detectable in any 100 ml sample	0 Number/100 mL	0
29.	Total Coliform	APHA:9222 B	Number/100 mL	Must not be detectable in any 100 ml sample	0 Number/100 mL	0

NDWQS National Drinking Water Quality Standards **WHO** World Health Organization
N D Not Detected

Signature of Analyst: *Signature of Chief Chemist*

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DRINKING WATER ANALYSIS REPORT

Reference Number	BHPP/ENV/128-2024	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Sampling Location:**	Adit-1 (Thobi)
Sampling Date:	04-10-2024	**Reporting Date:**	11-10-2024
Source: **GPS Coordinates;**	Tap Water (End User) 34.636125, 73.428597	**Analysis Method**	APHA/USEPA Standard Methods

Sr. No.	Parameters	Standard Methods	Units	WHO	NDWQS	Results
1.	pH	APHA-4500H+ B	--	6.5-8.5	6.5-8.5	7.4
2.	Temperature	---	°C	---	-----	19
3.	Taste & Odor	In-house	--	Non-Objectionable	Non Objectionable	Non Objectionable
4.	Color	APHA-2120 B/C	TCU	≤ 15	<15	4.7
5.	Turbidity	APHA-2130 B	NTU	<5	<5	3.5
6.	Total Dissolved Solids (TDS)	APHA-2540 C	mg/L	< 1000	<1000	357
7.	Total Hardness as $CaCO_3$	APHA-2340 C	mg/L	-------	<500	259
8.	Nitrate (NO_3)	APHA-4500NO3 B	mg/L	50	≤50	0.88
9.	Nitrite (NO_2)	APHA-4500NO2 B	mg/L	3	≤3	0.09
10.	Arsenic (As)	APHA-3500As B	mg/L	0.01	≤0.05	N.D.
11.	Nickel (Ni)	ASTM E3047-16	mg/L	0.02	≤0.02	N.D.
12.	Antimony (Sb)	APHA-3500Sb B	mg/L	0.005	<0.005	N.D.
13.	Chloride (Cl)	APHA-4500Cl- B	mg/L	250	<250	133
14.	Chlorine	APHA-4500 CL	mg/L		0.5-1.5	0.52
15.	Lead (Pb)	APHA-3500 Pb-B	mg/L	0.01	≤0.05	N.D.
16.	Fluoride	APHA-4500F- C	mg/L	1.5	≤1.5	0.82
17.	Aluminum	APHA-3500 Al	mg/L	≤ 0.2	≤0.2	N.D.
18.	Manganese (Mn)	APHA-3500 MN-B	mg/L	0.5	≤0.5	N.D.
19.	Cadmium (Cd)	APHA-3500 Cd-B	mg/L	0.003	0.01	N.D.
20.	Barium (Ba)	APHA-3500 Ba B	mg/L	0.3	0.7	0.04
21.	Mercury (Hg)	APHA-3500 Hg-B	mg/L	0.001	≤0.001	N.D.
22.	Copper (Cu)	APHA- 3500 Cu-B	mg/L	2	2	0.055
23.	Zinc (Zn)	APHA- 3500 Zn B	mg/L	3	5	1.13
24.	Boron (B)	APHA 4500 B- C	mg/L	0.3	0.3	N.D.
25.	Chromium (Cr)	APHA 3500 cr B	mg/L	0.05	≤0.05	N.D.
26.	Selenium (Se)	APHA- 3500 Se C	mg/L	0.01	0.01	N.D.
27.	Cyanide (CN)	APHA 4500-CN	mg/L	0.07	≤0.05	N.D.
28.	E-Coli	APHA:9222 D	Number/100 mL	Must not be detectable in any 100 ml sample	0 Number/100 mL	0
29.	Total Coliform	APHA:9222 B	Number/100 mL	Must not be detectable in any 100 ml sample	0 Number/100 mL	0

NDWQS National Drinking Water Quality Standards **WHO** World Health Organization
N D Not Detected

Signature of Analyst: ***Signature of Chief Chemist***

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DRINKING WATER ANALYSIS REPORT

Reference Number	BHPP/ENV/128-2024	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Sampling Location:**	Adit-2 (Ghanol)
Sampling Date:	04-10-2024	**Reporting Date:**	11-10-2024
Source: **GPS Coordinates;**	Spring Water 34.619367, 73.417288	**Analysis Method**	APHA/USEPA Standard Methods

Sr. No.	Parameters	Standard Methods	Units	WHO	NDWQS	Results
1.	pH	APHA-4500H+ B	--	6.5-8.5	6.5-8.5	7.3
2.	Temperature	---	°C	---	----	17
3.	Taste & Odor	In-house	--	Non-Objectionable	Non Objectionable	Non Objectionable
4.	Color	APHA-2120 B/C	TCU	≤ 15	<15	4
5.	Turbidity	APHA-2130 B	NTU	<5	<5	2
6.	Total Dissolved Solids (TDS)	APHA-2540 C	mg/L	< 1000	<1000	330
7.	Total Hardness as $CaCO_3$	APHA-2340 C	mg/L	-------	<500	217
8.	Nitrate (NO_3)	APHA-4500NO3 B	mg/L	50	≤50	0.59
9.	Nitrite (NO_2)	APHA-4500NO2 B	mg/L	3	≤3	0.28
10.	Arsenic (As)	APHA-3500As B	mg/L	0.01	≤0.05	N.D.
11.	Nickel (Ni)	ASTM E3047-16	mg/L	0.02	≤0.02	0.003
12.	Antimony (Sb)	APHA-3500Sb B	mg/L	0.005	<0.005	N.D.
13.	Chloride (Cl)	APHA-4500Cl- B	mg/L	250	<250	126
14.	Chlorine	APHA-4500 CL	mg/L		0.5-1.5	0.42
15.	Lead (Pb)	APHA-3500 Pb-B	mg/L	0.01	≤0.05	0.006
16.	Fluoride	APHA-4500F- C	mg/L	1.5	≤1.5	1.2
17.	Aluminum	APHA-3500 Al	mg/L	≤ 0.2	≤0.2	N.D.
18.	Manganese (Mn)	APHA-3500 MN-B	mg/L	0.5	≤0.5	N.D.
19.	Cadmium (Cd)	APHA-3500 Cd-B	mg/L	0.003	0.01	N.D.
20.	Barium (Ba)	APHA-3500 Ba B	mg/L	0.3	0.7	0.04
21.	Mercury (Hg)	APHA-3500 Hg-B	mg/L	0.001	≤0.001	N.D.
22.	Copper (Cu)	APHA- 3500 Cu-B	mg/L	2	2	N.D.
23.	Zinc (Zn)	APHA- 3500 Zn B	mg/L	3	5	1.13
24.	Boron (B)	APHA 4500 B- C	mg/L	0.3	0.3	N.D.
25.	Chromium (Cr)	APHA 3500 cr B	mg/L	0.05	≤0.05	N.D.
26.	Selenium (Se)	APHA- 3500 Se C	mg/L	0.01	0.01	N.D.
27.	Cyanide (CN)	APHA 4500-CN	mg/L	0.07	≤0.05	N.D.
28.	E-Coli	APHA:9222 D	Number/100 mL	Must not be detectable in any 100 ml sample	0 Number/100 mL	0
29.	Total Coliform	APHA:9222 B	Number/100 mL	Must not be detectable in any 100 ml sample	0 Number/100 mL	0

NDWQS National Drinking Water Quality Standards **WHO** World Health Organization
N D Not Detected

Signature of Analyst: *Signature of Chief Chemist*

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DRINKING WATER ANALYSIS REPORT

Reference Number	BHPP/ENV/128-2024	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Sampling Location:**	Adit-2 (Ghanol)
Sampling Date:	04-10-2024	**Reporting Date:**	11-10-2024
Source:	Tap Water (End User)	**Analysis Method**	APHA/USEPA Standard Methods
GPS Coordinates;	34.620250, 73.417595		

Sr. No.	Parameters	Standard Methods	Units	WHO	NDWQS	Results
1.	pH	APHA-4500H+ B	--	6.5-8.5	6.5-8.5	7.5
2.	Temperature	---	°C	---	-----	10
3.	Taste & Odor	In-house	--	Non-Objectionable	Non Objectionable	Non Objectionable
4.	Color	APHA-2120 B/C	TCU	≤ 15	<15	6
5.	Turbidity	APHA-2130 B	NTU	<5	<5	3.4
6.	Total Dissolved Solids (TDS)	APHA-2540 C	mg/L	< 1000	<1000	371
7.	Total Hardness as $CaCO_3$	APHA-2340 C	mg/L	-------	<500	268
8.	Nitrate (NO_3)	APHA-4500NO3 B	mg/L	50	≤50	0.72
9.	Nitrite (NO_2)	APHA-4500NO2 B	mg/L	3	≤3	0.66
10.	Arsenic (As)	APHA-3500As B	mg/L	0.01	≤0.05	N.D.
11.	Nickel (Ni)	ASTM E3047-16	mg/L	0.02	≤0.02	0.0051
12.	Antimony (Sb)	APHA-3500Sb B	mg/L	0.005	<0.005	N.D.
13.	Chloride (Cl)	APHA-4500Cl- B	mg/L	250	<250	159
14.	Chlorine	APHA-4500 CL	mg/L		0.5-1.5	0.47
15.	Lead (Pb)	APHA-3500 Pb-B	mg/L	0.01	≤0.05	N.D.
16.	Fluoride	APHA-4500F- C	mg/L	1.5	≤1.5	0.53
17.	Aluminum	APHA-3500 Al	mg/L	≤ 0.2	≤0.2	N.D.
18.	Manganese (Mn)	APHA-3500 MN-B	mg/L	0.5	≤0.5	N.D.
19.	Cadmium (Cd)	APHA-3500 Cd-B	mg/L	0.003	0.01	N.D.
20.	Barium (Ba)	APHA-3500 Ba B	mg/L	0.3	0.7	0.22
21.	Mercury (Hg)	APHA-3500 Hg-B	mg/L	0.001	≤0.001	N.D.
22.	Copper (Cu)	APHA- 3500 Cu-B	mg/L	2	2	0.06
23.	Zinc (Zn)	APHA- 3500 Zn B	mg/L	3	5	1.2
24.	Boron (B)	APHA 4500 B- C	mg/L	0.3	0.3	N.D.
25.	Chromium (Cr)	APHA 3500 cr B	mg/L	0.05	≤0.05	N.D.
26.	Selenium (Se)	APHA- 3500 Se C	mg/L	0.01	0.01	N.D.
27.	Cyanide (CN)	APHA 4500-CN	mg/L	0.07	≤0.05	N.D.
28.	E-Coli	APHA:9222 D	Number/100 mL	Must not be detectable in any 100 ml sample	0 Number/100 mL	0
29.	Total Coliform	APHA:9222 B	Number/100 mL	Must not be detectable in any 100 ml sample	0 Number/100 mL	0

NDWQS National Drinking Water Quality Standards **WHO** World Health Organization

N D Not Detected

Signature of Analyst:

Signature of Chief Chemist

Integrated Environment Laboratory

FOR ENVIRONMENTAL MONITORING, ANALYSIS & SURVEYS
Street No. 09, Main Canal Road, Abshaar Colony Warsak Road, Peshawar, Pakistan
Tell: +92 91 5202323 Cell: +92 3000391053 Email: inenvconsultants@yahoo.com www. iec-consultants.com
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DRINKING WATER ANALYSIS REPORT

Reference Number	BHPP/ENV/128-2024	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Sampling Location:**	Adit-3 (Kholian)
Sampling Date:	04-10-2024	**Reporting Date:**	11-10-2024
Source: **GPS Coordinates;**	Spring Water (Source) 34.605195, 73.394487	**Analysis Method**	APHA/USEPA Standard Methods

Sr. No.	Parameters	Standard Methods	Units	WHO	NDWQS	Results
1.	pH	APHA-4500H+ B	--	6.5-8.5	6.5-8.5	7.6
2.	Temperature	---	°C	---	----	18
3.	Taste & Odor	In-house	--	Non-Objectionable	Non Objectionable	Non Objectionable
4.	Color	APHA-2120 B/C	TCU	≤ 15	<15	5
5.	Turbidity	APHA-2130 B	NTU	<5	<5	3.2
6.	Total Dissolved Solids (TDS)	APHA-2540 C	mg/L	< 1000	<1000	372
7.	Total Hardness as $CaCO_3$	APHA-2340 C	mg/L	-------	<500	262
8.	Nitrate (NO_3)	APHA-4500NO3 B	mg/L	50	≤50	1.84
9.	Nitrite (NO_2)	APHA-4500NO2 B	mg/L	3	≤3	0.008
10.	Arsenic (As)	APHA-3500As B	mg/L	0.01	≤0.05	N.D.
11.	Nickel (Ni)	ASTM E3047-16	mg/L	0.02	≤0.02	0.003
12.	Antimony (Sb)	APHA-3500Sb B	mg/L	0.005	<0.005	N.D.
13.	Chloride (Cl)	APHA-4500Cl- B	mg/L	250	<250	129
14.	Chlorine	APHA-4500 CL	mg/L		0.5-1.5	0.38
15.	Lead (Pb)	APHA-3500 Pb-B	mg/L	0.01	≤0.05	N.D.
16.	Fluoride	APHA-4500F- C	mg/L	1.5	≤1.5	0.49
17.	Aluminum	APHA-3500 Al	mg/L	≤ 0.2	≤0.2	N.D.
18.	Manganese (Mn)	APHA-3500 MN-B	mg/L	0.5	≤0.5	N.D.
19.	Cadmium (Cd)	APHA-3500 Cd-B	mg/L	0.003	0.01	N.D.
20.	Barium (Ba)	APHA-3500 Ba B	mg/L	0.3	0.7	0.2
21.	Mercury (Hg)	APHA-3500 Hg-B	mg/L	0.001	≤0.001	N.D.
22.	Copper (Cu)	APHA- 3500 Cu-B	mg/L	2	2	0.058
23.	Zinc (Zn)	APHA- 3500 Zn B	mg/L	3	5	1.08
24.	Boron (B)	APHA 4500 B- C	mg/L	0.3	0.3	N.D.
25.	Chromium (Cr)	APHA 3500 cr B	mg/L	0.05	≤0.05	N.D.
26.	Selenium (Se)	APHA- 3500 Se C	mg/L	0.01	0.01	N.D.
27.	Cyanide (CN)	APHA 4500-CN	mg/L	0.07	≤0.05	N.D.
28.	E-Coli	APHA:9222 D	Number/100 mL	Must not be detectable in any 100 ml sample	0 Number/100 mL	0
29.	Total Coliform	APHA:9222 B	Number/100 mL	Must not be detectable in any 100 ml sample	0 Number/100 mL	0

NDWQS National Drinking Water Quality Standards **WHO** World Health Organization

N D Not Detected

Signature of Analyst:

Signature of Chief Chemist

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DRINKING WATER ANALYSIS REPORT

Reference Number	BHPP/ENV/128-2024	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Sampling Location:**	Adit-3 (Kholian)
Sampling Date:	04-10-2024	**Reporting Date:**	11-10-2024
Source:	Pipe Water (End User)	**Analysis Method**	APHA/USEPA Standard Methods
GPS Coordinates;	34.608942, 73.383133		

Sr. No.	Parameters	Standard Methods	Units	WHO	NDWQS	Results
1.	pH	APHA-4500H+ B	--	6.5-8.5	6.5-8.5	7.8
2.	Temperature	---	°C	---	----	20
3.	Taste & Odor	In-house	--	Non-Objectionable	Non Objectionable	Non Objectionable
4.	Color	APHA-2120 B/C	TCU	≤ 15	<15	4
5.	Turbidity	APHA-2130 B	NTU	<5	<5	2
6.	Total Dissolved Solids (TDS)	APHA-2540 C	mg/L	< 1000	<1000	392
7.	Total Hardness as $CaCO_3$	APHA-2340 C	mg/L	-------	<500	327
8.	Nitrate (NO_3)	APHA-4500NO3 B	mg/L	50	≤50	1.13
9.	Nitrite (NO_2)	APHA-4500NO2 B	mg/L	3	≤3	0.42
10.	Arsenic (As)	APHA-3500As B	mg/L	0.01	≤0.05	N.D.
11.	Nickel (Ni)	ASTM E3047-16	mg/L	0.02	≤0.02	0.0027
12.	Antimony (Sb)	APHA-3500Sb B	mg/L	0.005	<0.005	N.D.
13.	Chloride (Cl)	APHA-4500Cl- B	mg/L	250	<250	125
14.	Chlorine	APHA-4500 CL	mg/L		0.5-1.5	0.59
15.	Lead (Pb)	APHA-3500 Pb-B	mg/L	0.01	≤0.05	N.D.
16.	Fluoride	APHA-4500F- C	mg/L	1.5	≤1.5	0.76
17.	Aluminum	APHA-3500 Al	mg/L	≤ 0.2	≤0.2	N.D.
18.	Manganese (Mn)	APHA-3500 MN-B	mg/L	0.5	≤0.5	N.D.
19.	Cadmium (Cd)	APHA-3500 Cd-B	mg/L	0.003	0.01	N.D.
20.	Barium (Ba)	APHA-3500 Ba B	mg/L	0.3	0.7	0.18
21.	Mercury (Hg)	APHA-3500 Hg-B	mg/L	0.001	≤0.001	N.D.
22.	Copper (Cu)	APHA- 3500 Cu-B	mg/L	2	2	0.03
23.	Zinc (Zn)	APHA- 3500 Zn B	mg/L	3	5	0.98
24.	Boron (B)	APHA 4500 B- C	mg/L	0.3	0.3	N.D.
25.	Chromium (Cr)	APHA 3500 cr B	mg/L	0.05	≤0.05	N.D.
26.	Selenium (Se)	APHA- 3500 Se C	mg/L	0.01	0.01	N.D.
27.	Cyanide (CN)	APHA 4500-CN	mg/L	0.07	≤0.05	N.D.
28.	E-Coli	APHA:9222 D	Number/100 mL	Must not be detectable in any 100 ml sample	0 Number/100 mL	0
29.	Total Coliform	APHA:9222 B	Number/100 mL	Must not be detectable in any 100 ml sample	0 Number/100 mL	0

NDWQS National Drinking Water Quality Standards **WHO** World Health Organization
N D Not Detected

Signature of Analyst

Signature of Chief Chemist

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DRINKING WATER ANALYSIS REPORT

Reference Number	BHPP/ENV/128-2024	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Sampling Location:**	Powerhouse (Barkot)
Sampling Date:	04-10-2024	**Reporting Date:**	11-10-2024
Source:	Spring Water (Sanduri)	**Analysis Method**	APHA/USEPA Standard Methods
GPS Coordinates;	34.603747, 73.379525		

Sr. No.	Parameters	Standard Methods	Units	WHO	NDWQS	Results
1.	pH	APHA-4500H+ B	--	6.5-8.5	6.5-8.5	7.6
2.	Temperature	---	°C	---	----	11
3.	Taste & Odor	In-house	--	Non-Objectionable	Non Objectionable	Non Objectionable
4.	Color	APHA-2120 B/C	TCU	≤ 15	<15	4
5.	Turbidity	APHA-2130 B	NTU	<5	<5	3.8
6.	Total Dissolved Solids (TDS)	APHA-2540 C	mg/L	< 1000	<1000	367
7.	Total Hardness as $CaCO_3$	APHA-2340 C	mg/L	-------	<500	271
8.	Nitrate (NO_3)	APHA-4500NO3 B	mg/L	50	≤50	1.04
9.	Nitrite (NO_2)	APHA-4500NO2 B	mg/L	3	≤3	0.003
10.	Arsenic (As)	APHA-3500As B	mg/L	0.01	≤0.05	N.D.
11.	Nickel (Ni)	ASTM E3047-16	mg/L	0.02	≤0.02	N.D.
12.	Antimony (Sb)	APHA-3500Sb B	mg/L	0.005	<0.005	N.D.
13.	Chloride (Cl)	APHA-4500Cl- B	mg/L	250	<250	83.9
14.	Chlorine	APHA-4500 CL	mg/L		0.5-1.5	0.47
15.	Lead (Pb)	APHA-3500 Pb-B	mg/L	0.01	≤0.05	N.D
16.	Fluoride	APHA-4500F- C	mg/L	1.5	≤1.5	0.47
17.	Aluminum	APHA-3500 Al	mg/L	≤ 0.2	≤0.2	N.D.
18.	Manganese (Mn)	APHA-3500 MN-B	mg/L	0.5	≤0.5	N.D.
19.	Cadmium (Cd)	APHA-3500 Cd-B	mg/L	0.003	0.01	N.D.
20.	Barium (Ba)	APHA-3500 Ba B	mg/L	0.3	0.7	0.27
21.	Mercury (Hg)	APHA-3500 Hg-B	mg/L	0.001	≤0.001	N.D.
22.	Copper (Cu)	APHA- 3500 Cu-B	mg/L	2	2	0.19
23.	Zinc (Zn)	APHA- 3500 Zn B	mg/L	3	5	1.25
24.	Boron (B)	APHA 4500 B- C	mg/L	0.3	0.3	N.D.
25.	Chromium (Cr)	APHA 3500 cr B	mg/L	0.05	≤0.05	N.D.
26.	Selenium (Se)	APHA- 3500 Se C	mg/L	0.01	0.01	N.D.
27.	Cyanide (CN)	APHA 4500-CN	mg/L	0.07	≤0.05	N.D.
28.	E-Coli	APHA:9222 D	Number/100 mL	Must not be detectable in any 100 ml sample	0 Number/100 mL	0
29.	Total Coliform	APHA:9222 B	Number/100 mL	Must not be detectable in any 100 ml sample	0 Number/100 mL	0

NDWQS National Drinking Water Quality Standards **WHO** World Health Organization
N D Not Detected

Signature of Analyst:

Signature of Chief Chemist

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Street No. 09, Main Canal Road, Abshaar Colony Warsak Road, Peshawar, Pakistan
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DRINKING WATER ANALYSIS REPORT

Reference Number	BHPP/ENV/128-2024	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Sampling Location:**	GRC Camp Office (Sanghar)
Sampling Date:	04-10-2024	**Reporting Date:**	11-10-2024
Source: **GPS Coordinates;**	Spring Water (Source) 34.584928, 73.376913	**Analysis Method**	APHA/USEPA Standard Methods

Sr. No.	Parameters	Standard Methods	Units	WHO	NDWQS	Results
1.	pH	APHA-4500H+ B	--	6.5-8.5	6.5-8.5	7.2
2.	Temperature	---	°C	---	----	17
3.	Taste & Odor	In-house	--	Non-Objectionable	Non Objectionable	Non Objectionable
4.	Color	APHA-2120 B/C	TCU	≤ 15	<15	3
5.	Turbidity	APHA-2130 B	NTU	<5	<5	2
6.	Total Dissolved Solids (TDS)	APHA-2540 C	mg/L	< 1000	<1000	294
7.	Total Hardness as $CaCO_3$	APHA-2340 C	mg/L	-------	<500	206
8.	Nitrate (NO_3)	APHA-4500NO3 B	mg/L	50	≤50	0.7
9.	Nitrite (NO_2)	APHA-4500NO2 B	mg/L	3	≤3	0.29
10.	Arsenic (As)	APHA-3500As B	mg/L	0.01	≤0.05	N.D.
11.	Nickel (Ni)	ASTM E3047-16	mg/L	0.02	≤0.02	N.D.
12.	Antimony (Sb)	APHA-3500Sb B	mg/L	0.005	<0.005	N.D.
13.	Chloride (Cl)	APHA-4500Cl- B	mg/L	250	<250	118
14.	Chlorine	APHA-4500 CL	mg/L		0.5-1.5	0.52
15.	Lead (Pb)	APHA-3500 Pb-B	mg/L	0.01	≤0.05	N.D.
16.	Fluoride	APHA-4500F- C	mg/L	1.5	≤1.5	0.84
17.	Aluminum	APHA-3500 Al	mg/L	≤ 0.2	≤0.2	N.D.
18.	Manganese (Mn)	APHA-3500 MN-B	mg/L	0.5	≤0.5	N.D.
19.	Cadmium (Cd)	APHA-3500 Cd-B	mg/L	0.003	0.01	N.D.
20.	Barium (Ba)	APHA-3500 Ba B	mg/L	0.3	0.7	0.19
21.	Mercury (Hg)	APHA-3500 Hg-B	mg/L	0.001	≤0.001	N.D.
22.	Copper (Cu)	APHA- 3500 Cu-B	mg/L	2	2	N.D.
23.	Zinc (Zn)	APHA- 3500 Zn B	mg/L	3	5	1.24
24.	Boron (B)	APHA 4500 B- C	mg/L	0.3	0.3	N.D.
25.	Chromium (Cr)	APHA 3500 cr B	mg/L	0.05	≤0.05	N.D.
26.	Selenium (Se)	APHA- 3500 Se C	mg/L	0.01	0.01	N.D.
27.	Cyanide (CN)	APHA 4500-CN	mg/L	0.07	≤0.05	N.D.
28.	E-Coli	APHA:9222 D	Number/100 mL	Must not be detectable in any 100 ml sample	0 Number/100 mL	0
29.	Total Coliform	APHA:9222 B	Number/100 mL	Must not be detectable in any 100 ml sample	0 Number/100 mL	0

NDWQS National Drinking Water Quality Standards **WHO** World Health Organization
N D Not Detected

Signature of Analyst: ***Signature of Chief Chemist***

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DRINKING WATER ANALYSIS REPORT

Reference Number	BHPP/ENV/128-2024	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Sampling Location:**	GRC Camp Office (Sanghar)
Sampling Date:	04-10-2024	**Reporting Date:**	11-10-2024
Source: **GPS Coordinates;**	Tap Water (End User) 34.584478, 73.373817	**Analysis Method**	APHA/USEPA Standard Methods

Sr. No.	Parameters	Standard Methods	Units	WHO	NDWQS	Results
1.	pH	APHA-4500H+ B	--	6.5-8.5	6.5-8.5	7.6
2.	Temperature	---	°C	---	----	19
3.	Taste & Odor	In-house	--	Non-Objectionable	Non Objectionable	Non Objectionable
4.	Color	APHA-2120 B/C	TCU	≤ 15	<15	7
5.	Turbidity	APHA-2130 B	NTU	<5	<5	4
6.	Total Dissolved Solids (TDS)	APHA-2540 C	mg/L	< 1000	<1000	354
7.	Total Hardness as $CaCO_3$	APHA-2340 C	mg/L	-------	<500	277
8.	Nitrate (NO_3)	APHA-4500NO3 B	mg/L	50	≤50	2.6
9.	Nitrite (NO_2)	APHA-4500NO2 B	mg/L	3	≤3	0.45
10.	Arsenic (As)	APHA-3500As B	mg/L	0.01	≤0.05	N.D.
11.	Nickel (Ni)	ASTM E3047-16	mg/L	0.02	≤0.02	N.D.
12.	Antimony (Sb)	APHA-3500Sb B	mg/L	0.005	<0.005	N.D.
13.	Chloride (Cl)	APHA-4500Cl- B	mg/L	250	<250	161
14.	Chlorine	APHA-4500 CL	mg/L		0.5-1.5	0.33
15.	Lead (Pb)	APHA-3500 Pb-B	mg/L	0.01	≤0.05	N.D.
16.	Fluoride	APHA-4500F- C	mg/L	1.5	≤1.5	0.59
17.	Aluminum	APHA-3500 Al	mg/L	≤ 0.2	≤0.2	N.D.
18.	Manganese (Mn)	APHA-3500 MN-B	mg/L	0.5	≤0.5	N.D.
19.	Cadmium (Cd)	APHA-3500 Cd-B	mg/L	0.003	0.01	N.D.
20.	Barium (Ba)	APHA-3500 Ba B	mg/L	0.3	0.7	0.26
21.	Mercury (Hg)	APHA-3500 Hg-B	mg/L	0.001	≤0.001	N.D.
22.	Copper (Cu)	APHA- 3500 Cu-B	mg/L	2	2	N.D.
23.	Zinc (Zn)	APHA- 3500 Zn B	mg/L	3	5	1.08
24.	Boron (B)	APHA 4500 B- C	mg/L	0.3	0.3	N.D.
25.	Chromium (Cr)	APHA 3500 cr B	mg/L	0.05	≤0.05	N.D.
26.	Selenium (Se)	APHA- 3500 Se C	mg/L	0.01	0.01	N.D.
27.	Cyanide (CN)	APHA 4500-CN	mg/L	0.07	≤0.05	N.D.
28.	E-Coli	APHA:9222 D	Number/100 mL	Must not be detectable in any 100 ml sample	0 Number/100 mL	0
29.	Total Coliform	APHA:9222 B	Number/100 mL	Must not be detectable in any 100 ml sample	0 Number/100 mL	0

NDWQS National Drinking Water Quality Standards **WHO** World Health Organization
N D Not Detected

Signature of Analyst: ***Signature of Chief Chemist***

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Tell: +92 91 5202323 Cell: +92 3000391053 Email: inenvconsultants@yahoo.com www. iec-consultants.com

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Surface Water Monitoring Results (Third Quarter, 2024)

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SURFACE WATER ANALYSIS REPORT

Reference Number	BHPP/ENV/128-2024	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Sampling Location:**	Dam Site (Paras Valley)
Sampling Date:	04-10-2024	**Reporting Date:**	11-10-2024
Source: **GPS Coordinates**	Kunhar River 34.660247, 73.451592	**Analysis Method**	APHA/USEPA Standard Methods

Sr. No	Parameters	Analysis Method	Units	NEQS	Results
1)	Temperature	-----	°C	40	14
2)	pH	APHA-4500H+ B	--	6-9	8.7
3)	Chemical Oxygen Demand (COD)	APHA-5220-D	mg/l	150	59
4)	Biological Oxygen Demand (BOD5) at 20 °C	APHA, 5210	mg/l	80	48.2
5)	Total Dissolved Solids (TDS)	APHA-2540 C	mg/l	3500	1836
6)	Total Suspended Solids (TSS)	APHA-2540 D	mg/l	200	114
7)	Total Hardness	APHA-2340 C	mg/l	--	159
8)	Oil & Grease	Separation Method	mg/l	10	1.26
9)	Chromium (Hexa & Trivalent)	APHA-3500Cr B	mg/l	1.0	0.57
10)	Total Iron	APHA-3500-Fe-B	mg/l	8.0	3.24
11)	Chloride	APHA-4500Cl- B	mg/l	1000	183
12)	Flouride	APHA-4500F- C	mg/l	10	2.05
13)	Ammonia	ASTM-D1426-15	mg/l	40	3.66
14)	Cadmium	APHA-3500 Cd-B	mg/l	0.1	N.D
15)	Lead	APHA-3500-Pb B	mg/l	0.5	N.D
16)	Arsenic	APHA-3500As B	mg/l	1.0	N.D
17)	Copper	APHA-3500Cu B	mg/l	1.0	N.D
18)	Barium	APHA-3500Ba B	mg/l	1.5	0.12
19)	Selenium	APHA- 3500 Se C	mg/l	0.5	N.D
20)	Silver	APHA-3500Ag-B	mg/l	1.0	N.D
21)	Manganese	APHA-3500-Mn B	mg/l	1.5	0.37
22)	Zinc	APHA-3500-Zn B	mg/l	5.0	0.57
23)	Nickel	ASTM E3047-16	mg/l	1.0	0.04
24)	Boron	APHA-4500B-C	mg/l	6.0	N.D
25)	Mercury	APHA-3500 Hg-B	mg/l	0.01	N.D
26)	Sulphide (S^{-2})	APHA-4500 S_2	mg/l	1.0	0.31
27)	Sulphate (SO_4)	APHA-4500-SO_4 C	mg/l	600	381
28)	An Ionic Detergent (as MBAS)	-----	mg/l	20	1.13
29)	Phenolic Compound (as Phenol)	APHA-5530-D	mg/l	0.1	0.08
30)	Cyanide (as CN) total	APHA 4500-CN	mg/l	1.0	N.D
31)	E-Coli	APHA:9222 D	Number/100 mL	---	Uncountable
32)	Total Coliform	APHA:9222 B	Number/100 mL	---	Uncountable

NEQS: National Environmental Quality Standards for Liquid Effluents **N.D:** Not Detected

Signature of Analyst: Signature of Chief Chemist

Integrated Environment Laboratory

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SURFACE WATER ANALYSIS REPORT

Reference Number	BHPP/ENV/128-2024	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Sampling Location:**	Tailrace Upstream (Barkot)
Sampling Date:	04-10-2024	**Reporting Date:**	11-10-2024
Source: GPS Coordinates	Kunhar River 34.5971541, 73.3700751	**Analysis Method**	APHA/USEPA Standard Methods

Sr. No	Parameters	Analysis Method	Units	NEQS	Results
1)	Temperature	----	°C	40	15
2)	pH	APHA-4500H+ B	--	6-9	8.3
3)	Chemical Oxygen Demand (COD)	APHA-5220-D	mg/l	150	56
4)	Biological Oxygen Demand (BOD5) at 20 °C	APHA, 5210	mg/l	80	43.7
5)	Total Dissolved Solids (TDS)	APHA-2540 C	mg/l	3500	2019
6)	Total Suspended Solids (TSS)	APHA-2540 D	mg/l	200	123
7)	Total Hardness	APHA-2340 C	mg/l	--	177
8)	Oil & Grease	Separation Method	mg/l	10	1.35
9)	Chromium (Hexa & Trivalent)	APHA-3500Cr B	mg/l	1.0	0.61
10)	Total Iron	APHA-3500-Fe-B	mg/l	8.0	3.38
11)	Chloride	APHA-4500Cl- B	mg/l	1000	209
12)	Flouride	APHA-4500F- C	mg/l	10	2.14
13)	Ammonia	ASTM-D1426-15	mg/l	40	3.9
14)	Cadmium	APHA-3500 Cd-B	mg/l	0.1	N.D
15)	Lead	APHA-3500-Pb B	mg/l	0.5	N.D
16)	Arsenic	APHA-3500As B	mg/l	1.0	N.D
17)	Copper	APHA-3500Cu B	mg/l	1.0	N.D
18)	Barium	APHA-3500Ba B	mg/l	1.5	0.006
19)	Selenium	APHA- 3500 Se C	mg/l	0.5	N.D
20)	Silver	APHA-3500Ag-B	mg/l	1.0	N.D
21)	Manganese	APHA-3500-Mn B	mg/l	1.5	0.4
22)	Zinc	APHA-3500-Zn B	mg/l	5.0	0.6
23)	Nickel	ASTM E3047-16	mg/l	1.0	0.008
24)	Boron	APHA-4500B-C	mg/l	6.0	N.D
25)	Mercury	APHA-3500 Hg-B	mg/l	0.01	N.D
26)	Sulphide (S^{-2})	APHA-4500 S_2	mg/l	1.0	0.46
27)	Sulphate (SO_4)	APHA-4500-SO_4 C	mg/l	600	399
28)	An Ionic Detergent (as MBAS)	----	mg/l	20	1.25
29)	Phenolic Compound (as Phenol)	APHA-5530-D	mg/l	0.1	0.016
30)	Cyanide (as CN) total	APHA 4500-CN	mg/l	1.0	N.D
31)	E-Coli	APHA:9222 D	Number/100 mL	---	Uncountable
32)	Total Coliform	APHA:9222 B	Number/100 mL	---	Uncountable

NEQS: National Environmental Quality Standards for Liquid Effluents **N.D:** Not Detected

Signature of Analyst:

Signature of Chief Chemist

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Street No. 09, Main Canal Road, Abshaar Colony Warsak Road, Peshawar, Pakistan

Tell: +92 91 5202323 Cell: +92 3000391053 Email: inenvconsultants@yahoo.com www. iec-consultants.com

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SURFACE WATER ANALYSIS REPORT

Reference Number	BHPP/ENV/128-2024	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Sampling Location:**	Colony Area (Sanghar)
Sampling Date:	04-10-2024	**Reporting Date:**	11-10-2024
Source: **GPS Coordinates**	Kunhar River 34.586503, 73.363695	**Analysis Method**	APHA/USEPA Standard Methods

Sr. No	Parameters	Analysis Method	Units	NEQS	Results
1)	Temperature	-----	°C	40	15
2)	pH	APHA-4500H+ B	--	6-9	8.2
3)	Chemical Oxygen Demand (COD)	APHA-5220-D	mg/l	150	58
4)	Biological Oxygen Demand (BOD5) at 20 °C	APHA, 5210	mg/l	80	45.1
5)	Total Dissolved Solids (TDS)	APHA-2540 C	mg/l	3500	2054
6)	Total Suspended Solids (TSS)	APHA-2540 D	mg/l	200	129
7)	Total Hardness	APHA-2340 C	mg/l	--	182
8)	Oil & Grease	Separation Method	mg/l	10	1.39
9)	Chromium (Hexa & Trivalent)	APHA-3500Cr B	mg/l	1.0	0.6
10)	Total Iron	APHA-3500-Fe-B	mg/l	8.0	3.1
11)	Chloride	APHA-4500Cl- B	mg/l	1000	219
12)	Flouride	APHA-4500F- C	mg/l	10	2.2
13)	Ammonia	ASTM-D1426-15	mg/l	40	3.83
14)	Cadmium	APHA-3500 Cd-B	mg/l	0.1	N.D
15)	Lead	APHA-3500-Pb B	mg/l	0.5	N.D
16)	Arsenic	APHA-3500As B	mg/l	1.0	N.D
17)	Copper	APHA-3500Cu B	mg/l	1.0	N.D
18)	Barium	APHA-3500Ba B	mg/l	1.5	0.008
19)	Selenium	APHA- 3500 Se C	mg/l	0.5	N.D
20)	Silver	APHA-3500Ag-B	mg/l	1.0	N.D
21)	Manganese	APHA-3500-Mn B	mg/l	1.5	0.38
22)	Zinc	APHA-3500-Zn B	mg/l	5.0	0.54
23)	Nickel	ASTM E3047-16	mg/l	1.0	0.005
24)	Boron	APHA-4500B-C	mg/l	6.0	N.D
25)	Mercury	APHA-3500 Hg-B	mg/l	0.01	N.D
26)	Sulphide (S^{-2})	APHA-4500 S_2	mg/l	1.0	0.49
27)	Sulphate (SO_4)	APHA-4500-SO_4 C	mg/l	600	405
28)	An Ionic Detergent (as MBAS)	----	mg/l	20	1.19
29)	Phenolic Compound (as Phenol)	APHA-5530-D	mg/l	0.1	0.02
30)	Cyanide (as CN) total	APHA 4500-CN	mg/l	1.0	N.D
31)	E-Coli	APHA:9222 D	Number/100 mL	---	Uncountable
32)	Total Coliform	APHA:9222 B	Number/100 mL	---	Uncountable

NEQS: National Environmental Quality Standards for Liquid Effluents **N.D:** Not Detected

Signature of Analyst:

Signature of Chief Chemist

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Street No. 09, Main Canal Road, Abshaar Colony Warsak Road, Peshawar, Pakistan

Tell: +92 91 5202323 Cell: +92 3000391053 Email: inenvconsultants@yahoo.com www. iec-consultants.com

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Soil Analysis Results (Third Quarter, 2024)

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SOIL ANALYSIS REPORT

Reference Number	BHPP/ENV/128-2024	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Sampling Location :**	Adit-1 (Thobi)
Monitoring Date:	04-10-2024	**Reporting Date:**	11-10-2024
Source:	Soil Sample		

Sr. No.	Parameters		Results
1	Soil Texture	Sand %	23
		Silt%	55
		Clay %	22
		Texture Class	Silty Clay Loam
2	pH		8.3
3	Electrical Conductivity EC (μSm^{-1})		236
4	Phosphorus ($mgkg^{-1}$)		2.95
5	Sodium Absorption Ratio		3.47

μSm^{-1}: Micro siemens/meter
$mgkg^{-1}$: milligram per Kilogram

Signature of Analyst:

Signature of Chief Chemist

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Street No. 09, Main Canal Road, Abshaar Colony Warsak Road, Peshawar, Pakistan
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SOIL ANALYSIS REPORT

Reference Number	BHPP/ENV/128-2024	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Sampling Location :**	Adit-2 (Ghanol)
Monitoring Date:	04-10-2024	**Reporting Date:**	11-10-2024
Source:	Soil Sample		

Sr. No.	Parameters		Results
1	Soil Texture	Sand %	19
		Silt%	52
		Clay %	29
		Texture Class	Silty Clay Loam
2	pH		8
3	Electrical Conductivity EC (μSm^{-1})		241
4	Phosphorus ($mgkg^{-1}$)		2.87
5	Sodium Absorption Ratio		3.33

μSm^{-1}: micro siemens/meter
$mgkg^{-1}$: milligram per Kilogram

Signature of Analyst:

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SOIL ANALYSIS REPORT

Reference Number	BHPP/ENV/128-2024	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Sampling Location :**	Adit-3 (Kholian)
Monitoring Date:	04-10-2024	**Reporting Date:**	11-10-2024
Source:	Soil Sample		

Sr. No.	Parameters		Results
1	Soil Texture	Sand %	28
		Silt%	53
		Clay %	19
		Texture Class	Silty Clay Loam
2	pH		7.9
3	Electrical Conductivity EC (μSm^{-1})		245
4	Phosphorus ($mgkg^{-1}$)		1.98
5	Sodium Absorption Ratio		3.96

μSm^{-1}: micro siemens/meter
$mgkg^{-1}$: milligram per Kilogram

Signature of Analyst:

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SOIL ANALYSIS REPORT

Reference Number	BHPP/ENV/128-2024	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Sampling Location :**	Powerhouse (Barkot)
Monitoring Date:	04-10-2024	**Reporting Date:**	11-10-2024
Source:	Soil Sample		

Sr. No.	Parameters		Results
1	Soil Texture	Sand %	21
		Silt%	49
		Clay %	30
		Texture Class	Silty Clay Loam
2	pH		8.1
3	Electrical Conductivity EC (μSm^{-1})		236
4	Phosphorus ($mgkg^{-1}$)		3.81
5	Sodium Absorption Ratio		3.64

μSm^{-1}: micro siemens/meter
$mgkg^{-1}$: milligram per Kilogram

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SOIL ANALYSIS REPORT

Reference Number	BHPP/ENV/128-2024	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Sampling Location :**	GRC Camp Office (Sanghar)
Monitoring Date:	04-10-2024	**Reporting Date:**	11-10-2024
Source:	Soil Sample		

Sr. No.	Parameters		Results
1	Soil Texture	Sand %	17
		Silt%	46
		Clay %	37
		Texture Class	Silty Clay Loam
2	pH		8.3
3	Electrical Conductivity EC (μSm^{-1})		226
4	Phosphorus ($mgkg^{-1}$)		2.2
5	Sodium Absorption Ratio		4.18

μSm^{-1}: Micro siemens/meter
$mgkg^{-1}$: milligram per Kilogram

Signature of Analyst:

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Street No. 09, Main Canal Road, Abshaar Colony Warsak Road, Peshawar, Pakistan
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Ambient Air Monitoring Results (Fourth Quarter, 2024) Particulate Matters

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AMBIENT PARTICULATE MATTERS MONITORING REPORT

Reference Number	BHPP/ENV/153-2024	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Monitoring Location:**	Dam Site (Paras Valley)
Monitoring Date:	15-12-2024	**Reporting Date:**	31-12-2024
Source:	Ambient Air	**Monitoring Instrument:**	Henan Oceanus AQMS-09
GPS Coordinates:	34.660470, 73.455497		

Sr. No	Time	Parameters		Results (Average 24 Hrs)	
		$PM_{2.5}$	PM_{10}		
		Units		$PM_{2.5}$	PM_{10}
	Hours of Monitoring	($\mu g/m^3$)	($\mu g/m^3$)		
1.	09:00 A.M	12.25	38.76	13.28 ($\mu g/m^3$)	30.66 ($\mu g/m^3$)
2.	10:00 A.M	11.81	20.86		
3.	11:00 A.M	14.51	41.81		
4.	12:00 P.M	12.38	35.23		
5.	01:00 P.M	9.81	25.65		
6.	02:00 P.M	14.03	33.36		
7.	03:00 P.M	13.45	36.93		
8.	04:00 P.M	13.40	41.79		
9.	05:00 P.M	12.19	29.78		
10.	06:00 P.M	15.22	31.36		
11.	07:00 P.M	11.29	35.30		
12.	08:00 P.M	15.32	25.65		
13.	09:00 P M	13.88	30.75		
14.	10:00 P M	13.48	18.00		
15.	11:00 P M	15.19	26.97		
16.	12:00 A M	10.19	31.81		
17.	01:00 A M	16.11	23.06		
18.	02:00 A M	12.33	38.43		
19.	03:00 A M	10.96	19.04		
20.	04:00 A M	12.13	28.22		
21.	05:00 A M	15.36	40.76		
22.	06:00 A M	16.55	28.69		
23.	07:00 A M	12.17	21.62		
24.	08:00 A M	14.59	32.09		
NEQSAA				35($\mu g/m^3$)	150($\mu g/m^3$)
WHO				15 ($\mu g/m^3$)	45 ($\mu g/m^3$)

NEQSAA: National Environmental Quality Standards for Ambient Air
WHO: World Health Organization
Note:

- Selected measurement units were $\mu g/m^3$ otherwise stated.
- The client is responsible lawful usage of reported data in future.
- The report is not valid for court.

Signature of Analyst: *Signature of Chief Chemist*

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Street No. 09, Main Canal Road, Abshaar Colony Warsak Road, Peshawar, Pakistan
Tell: +92 91 5202323 Cell: +92 3000391053 Email: inenvconsultants@yahoo.com www.iec-consultants.com

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AMBIENT PARTICULATE MATTERS MONITORING REPORT

Reference Number	BHPP/ENV/153-2024	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Monitoring Location:**	Adit-1 (Thobi)
Monitoring Date:	20-12-2024	**Reporting Date:**	31-12-2024
Source:	Ambient Air	**Monitoring Instrument:**	Henan Oceanus AQMS-09
GPS Coordinates:	34.636125, 73.428597		

Sr. No	Time	Parameters		Results (Average 24 Hrs)	
		$PM_{2.5}$	PM_{10}	$PM_{2.5}$	PM_{10}
		Units			
	Hours of Monitoring	($\mu g/m^3$)	($\mu g/m^3$)		
1.	09:00 A.M	23.82	58.64		
2.	10:00 A.M	26.45	66.05		
3.	11:00 A.M	23.74	78.24		
4.	12:00 P.M	19.14	79.05		
5.	01:00 P.M	21.52	74.15		
6.	02:00 P.M	18.96	58.85		
7.	03:00 P.M	24.21	49.75		
8.	04:00 P.M	23.03	76.95		
9.	05:00 P.M	20.43	62.15		
10.	06:00 P.M	20.88	66.75		
11.	07:00 P.M	22.76	50.59		
12.	08:00 P.M	22.68	76.98	21.88 ($\mu g/m^3$)	65.93 ($\mu g/m^3$)
13.	09:00 P.M	19.95	66.05		
14.	10:00 P.M	18.64	76.89		
15.	11:00 P.M	19.37	58.95		
16.	12:00 A.M	25.99	68.51		
17.	01:00 A.M	23.37	54.28		
18.	02:00 A.M	17.64	82.89		
19.	03:00 A.M	20.63	71.34		
20.	04:00 A.M	22.44	78.46		
21.	05:00 A.M	20.58	51.10		
22.	06:00 A.M	22.06	56.96		
23.	07:00 A.M	23.80	53.43		
24.	08:00 A.M	23.09	65.75		
NEQSAA				35($\mu g/m^3$)	150($\mu g/m^3$)
WHO				15 ($\mu g/m^3$)	45 ($\mu g/m^3$)

NEQSAA: National Environmental Quality Standards for Ambient Air
WHO: World Health Organization
Note:

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Signature of Analyst: *Signature of Chief Chemist*

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Street No. 09, Main Canal Road, Abshaar Colony Warsak Road, Peshawar, Pakistan
Tell: +92 91 5202323 Cell: +92 3000391053 Email: inenvconsultants@yahoo.com www. iec-consultants.com

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AMBIENT PARTICULATE MATTERS MONITORING REPORT

Reference Number	BHPP/ENV/153-2024	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Monitoring Location:**	Adit-2 (Ghanool)
Monitoring Date:	16-12-2024	**Reporting Date:**	31-12-2024
Source:	Ambient Air	**Monitoring Instrument:**	Henan Oceanus AQMS-09
GPS Coordinates:	34.619787, 73.417525		

Sr. No	Time	Parameters		Results (Average 24 Hrs)	
		$PM_{2.5}$	PM_{10}		
		Units		$PM_{2.5}$	PM_{10}
	Hours of Monitoring	($\mu g/m^3$)	($\mu g/m^3$)		
1.	09:00 A.M	20.66	48.29		
2.	10:00 A.M	19.08	39.65		
3.	11:00 A.M	19.43	47.48		
4.	12:00 P.M	20.93	45.92		
5.	01:00 P.M	19.68	35.62		
6.	02:00 P.M	18.63	35.87		
7.	03:00 P.M	17.28	31.34		
8.	04:00 P.M	20.48	51.53		
9.	05:00 P.M	18.79	31.34		
10.	06:00 P.M	21.70	51.43		
11.	07:00 P.M	17.50	39.68		
12.	08:00 P.M	18.32	40.58	18.10 ($\mu g/m^3$)	40.53 ($\mu g/m^3$)
13.	09:00 P M	16.56	37.64		
14.	10:00 P M	19.26	34.49		
15.	11:00 P M	16.07	41.30		
16.	12:00 A M	15.26	37.04		
17.	01:00 A M	14.87	53.31		
18.	02:00 A M	13.59	37.66		
19.	03:00 A M	20.04	53.79		
20.	04:00 A M	19.57	30.03		
21.	05:00 A M	13.66	31.18		
22.	06:00 A M	18.28	27.13		
23.	07:00 A M	19.33	44.25		
24.	08:00 A M	15.38	45.33		
NEQSAA				35 ($\mu g/m^3$)	150($\mu g/m^3$)
WHO				15 ($\mu g/m^3$)	45 ($\mu g/m^3$)

NEQSAA: National Environmental Quality Standards for Ambient Air
WHO: World Health Organization
Note:

- Selected measurement units were $\mu g/m^3$ otherwise stated.
- The client is responsible lawful usage of reported data in future.
- The report is not valid for court

Signature of Analyst: Signature of Chief Chemist

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Street No. 09, Main Canal Road, Abshaar Colony Warsak Road, Peshawar, Pakistan
Tell: +92 91 5202323 Cell: +92 3000391053 Email: inenvconsultants@yahoo.com www. iec-consultants.com

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AMBIENT PARTICULATE MATTERS MONITORING REPORT

Reference Number	BHPP/ENV/153-2024	Client Name	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	Monitoring Location:	Adit-3 (Kholian)
Monitoring Date:	17-12-2024	Reporting Date:	31-12-2024
Source:	Ambient Air	Monitoring Instrument:	Henan Oceanus AQMS-09
GPS Coordinates:	34.610253,73.389367		

Sr. No	Time	Parameters		Results (Average 24 Hrs)	
		$PM_{2.5}$	PM_{10}	$PM_{2.5}$	PM_{10}
		Units			
	Hours of Monitoring	($\mu g/m^3$)	($\mu g/m^3$)		
1.	09:00 A.M	17.45	21.78		
2.	10:00 A.M	15.21	32.52		
3.	11:00 A.M	18.22	41.28		
4.	12:00 P.M	14.63	43.95		
5.	01:00 P.M	12.17	45.30		
6.	02:00 P.M	17.64	45.41		
7.	03:00 P.M	16.43	25.56		
8.	04:00 P.M	15.46	23.45		
9.	05:00 P.M	15.22	23.68		
10.	06:00 P.M	16.04	37.27		
11.	07:00 P.M	18.33	29.84		
12.	08:00 P.M	14.58	44.27		
13.	09:00 P M	15.37	43.36	14.78 ($\mu g/m^3$)	31.82 ($\mu g/m^3$)
14.	10:00 P M	15.29	29.36		
15.	11:00 P M	17.30	34.02		
16.	12:00 A M	12.17	22.65		
17.	01:00 A M	10.75	30.56		
18.	02:00 A M	10.94	24.89		
19.	03:00 A M	15.30	28.27		
20.	04:00 A M	13.81	27.23		
21.	05:00 A M	10.58	34.32		
22.	06:00 A M	12.99	23.03		
23.	07:00 A M	12.40	25.57		
24.	08:00 A M	16.53	26.17		
NEQSAA				35 ($\mu g/m^3$)	150($\mu g/m^3$)
WHO				15 ($\mu g/m^3$)	45 ($\mu g/m^3$)

NEQSAA: National Environmental Quality Standards for Ambient Air
WHO: World Health Organization

Note:

- Selected measurement units were $\mu g/m^3$ otherwise stated.
- The client is responsible lawful usage of reported data in future.
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Signature of Analyst: Signature of Chief Chemist

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Street No. 09, Main Canal Road, Abshaar,Colony Warsak Road, Peshawar, Pakistan
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AMBIENT PARTICULATE MATTERS MONITORING REPORT

Reference Number	BHPP/ENV/153-2024	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Monitoring Location:**	Powerhouse (Barkot)
Monitoring Date:	18-12-2024	**Reporting Date:**	31-12-2024
Source: **GPS Coordinates:**	Ambient Air 34.601812, 73.377145	**Monitoring Instrument:**	Henan Oceanus AQMS-09

Sr. No	Time	Parameters		Results (Average 24 Hrs)	
		$PM_{2.5}$	PM_{10}		
		Units		$PM_{2.5}$	PM_{10}
	Hours of Monitoring	($\mu g/m^3$)	($\mu g/m^3$)		
1.	09:00 A.M	33.17	63.96		
2.	10:00 A.M	21.92	62.10		
3.	11:00 A.M	20.74	41.83		
4.	12:00 P.M	20.65	48.09		
5.	01:00 P.M	19.68	52.08		
6.	02:00 P.M	26.85	50.09		
7.	03:00 P.M	26.82	53.01		
8.	04:00 P.M	24.96	41.58		
9.	05:00 P.M	28.58	50.41		
10.	06:00 P.M	25.37	49.20		
11.	07:00 P.M	28.27	61.40		
12.	08:00 P.M	27.09	62.84	25.67 ($\mu g/m^3$)	52.42 ($\mu g/m^3$)
13.	09:00 P M	24.39	42.38		
14.	10:00 P M	23.73	64.70		
15.	11:00 P M	26.82	60.46		
16.	12:00 A M	25.24	62.21		
17.	01:00 A M	24.04	40.48		
18.	02:00 A M	29.98	41.64		
19.	03:00 A M	30.06	61.05		
20.	04:00 A M	23.41	42.22		
21.	05:00 A M	28.45	55.77		
22.	06:00 A M	24.00	42.25		
23.	07:00 A M	28.35	44.62		
24.	08:00 A M	23.56	63.64		
NEQSAA				35 ($\mu g/m^3$)	150($\mu g/m^3$)
WHO				15 ($\mu g/m^3$)	45 ($\mu g/m^3$)

NEQSAA: National Environmental Quality Standards for Ambient Air
WHO: World Health Organization
Note:

- Selected measurement units were $\mu g/m^3$ otherwise stated.
- The client is responsible lawful usage of reported data in future.
- The report is not valid for court.

Signature of Analyst: *Signature of Chief Chemist*

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Street No. 09, Main Canal Road, Abshaar Colony Warsak Road, Peshawar, Pakistan
Tell: +92 91 5202323 Cell: +92 3000391053 Email: inenvconsultants@yahoo.com www. iec-consultants.com

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AMBIENT PARTICULATE MATTERS MONITORING REPORT

Reference Number	BHPP/ENV/153-2024	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Monitoring Location:**	Tailrace Upstream (Barkot)
Monitoring Date:	19-12-2024	**Reporting Date:**	31-12-2024
Source:	Ambient Air	**Monitoring Instrument:**	Henan Oceanus AQMS-09
GPS Coordinates:	34.596088, 73.374512		

Sr. No	Time	Parameters		Results (Average 24 Hrs)	
		$PM_{2.5}$	PM_{10}		
		Units		$PM_{2.5}$	PM_{10}
	Hours of Monitoring	($\mu g/m^3$)	($\mu g/m^3$)		
1.	09:00 A.M	23.34	37.51	20.71 ($\mu g/m^3$)	43.00 ($\mu g/m^3$)
2.	10:00 A.M	13.55	35.15		
3.	11:00 A.M	20.06	48.65		
4.	12:00 P.M	23.96	39.08		
5.	01:00 P.M	24.10	37.04		
6.	02:00 P.M	23.60	31.09		
7.	03:00 P.M	17.91	54.53		
8.	04:00 P.M	25.56	42.93		
9.	05:00 P.M	24.83	51.25		
10.	06:00 P.M	16.63	32.90		
11.	07:00 P.M	17.77	41.34		
12.	08:00 P.M	12.68	56.31		
13.	09:00 P M	12.95	42.04		
14.	10:00 P M	18.10	45.59		
15.	11:00 P M	18.04	43.90		
16.	12:00 A M	16.96	37.77		
17.	01:00 A M	18.63	58.95		
18.	02:00 A M	26.78	30.18		
19.	03:00 A M	21.25	29.86		
20.	04:00 A M	26.83	57.78		
21.	05:00 A M	19.99	52.33		
22.	06:00 A M	26.80	26.93		
23.	07:00 A M	22.48	57.69		
24.	08:00 A M	24.21	41.29		
NEQSAA				35 ($\mu g/m^3$)	150($\mu g/m^3$)
WHO				15 ($\mu g/m^3$)	45 ($\mu g/m^3$)

NEQSAA: National Environmental Quality Standards for Ambient Air
WHO: World Health Organization
Note:

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Signature of Analyst:

Signature of Chief Chemist

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Street No. 09, Main Canal Road, Abshaar Colony Warsak Road, Peshawar, Pakistan
Tell: +92 91 5202323 Cell: +92 3000391053 Email: inenvconsultants@yahoo.com www. iec-consultants.com

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AMBIENT PARTICULATE MATTERS MONITORING REPORT

Reference Number	BHPP/ENV/153-2024	Client Name	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	Monitoring Location:	GRC Camp Office (Sanghar)
Monitoring Date:	21-12-2024	Reporting Date:	31-12-2024
Source: GPS Coordinates:	Ambient Air 34.584562, 73.373878	Monitoring Instrument:	Henan Oceanus AQMS-09

Sr. No	Time	Parameters		Results (Average 24 Hrs)	
		$PM_{2.5}$	PM_{10}		
		Units		$PM_{2.5}$	PM_{10}
	Hours of Monitoring	($\mu g/m^3$)	($\mu g/m^3$)		
1.	09:00 A.M	11.26	48.35		
2.	10:00 A.M	13.46	35.01		
3.	11:00 A.M	12.65	49.73		
4.	12:00 P.M	19.24	46.52		
5.	01:00 P.M	18.41	23.97		
6.	02:00 P.M	11.42	43.48		
7.	03:00 P.M	14.79	40.06		
8.	04:00 P.M	17.22	25.84		
9.	05:00 P.M	15.47	44.94		
10.	06:00 P.M	16.50	23.91		
11.	07:00 P.M	11.76	38.88		
12.	08:00 P.M	14.53	26.94		
13.	09:00 P M	11.82	29.30	14.56 ($\mu g/m^3$)	34.01 ($\mu g/m^3$)
14.	10:00 P M	11.49	25.19		
15.	11:00 P M	17.40	23.70		
16.	12:00 A M	14.22	42.04		
17.	01:00 A M	15.68	42.46		
18.	02:00 A M	15.84	22.14		
19.	03:00 A M	10.69	23.74		
20.	04:00 A M	17.90	23.29		
21.	05:00 A M	19.04	37.65		
22.	06:00 A M	12.66	32.79		
23.	07:00 A M	13.85	26.37		
24.	08:00 A M	12.11	39.89		
NEQSAA				35 ($\mu g/m^3$)	150($\mu g/m^3$)
WHO				15 ($\mu g/m^3$)	45 ($\mu g/m^3$)

NEQSAA: National Environmental Quality Standards for Ambient Air
WHO: World Health Organization
Note:

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Signature of Analyst: *Signature of Chief Chemist*

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Street No. 09, Main Canal Road, Abshaar Colony Warsak Road, Peshawar, Pakistan
Tell: +92 91 5202323 Cell: +92 3000391053 Email: inenvconsultants@yahoo.com www. iec-consultants.com

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AMBIENT PARTICULATE MATTERS MONITORING REPORT

Reference Number	BHPP/ENV/153-2024	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Monitoring Location:**	Colony Area (Sanghar)
Monitoring Date:	22-12-2024	**Reporting Date:**	31-12-2024
Source:	Ambient Air	**Monitoring Instrument:**	Henan Oceanus AQMS-09
GPS Coordinates:	34.587775, 73.366225		

Sr. No	Time	Parameters		Results (Average 24 Hrs)	
		$PM_{2.5}$	PM_{10}		
		Units		$PM_{2.5}$	PM_{10}
	Hours of Monitoring	($\mu g/m^3$)	($\mu g/m^3$)		
1.	09:00 A.M	25.97	65.44		
2.	10:00 A.M	21.81	48.27		
3.	11:00 A.M	23.29	39.33		
4.	12:00 P.M	19.08	66.84		
5.	01:00 P.M	21.13	66.99		
6.	02:00 P.M	25.07	61.40		
7.	03:00 P.M	19.33	60.72		
8.	04:00 P.M	17.53	74.51		
9.	05:00 P.M	19.86	59.95		
10.	06:00 P.M	26.01	55.83		
11.	07:00 P.M	18.95	54.15		
12.	08:00 P.M	18.50	36.80		
13.	09:00 P M	18.48	51.18	21.20 ($\mu g/m^3$)	55.59 ($\mu g/m^3$)
14.	10:00 P M	22.26	57.68		
15.	11:00 P M	18.09	59.62		
16.	12:00 A M	16.65	55.19		
17.	01:00 A M	23.09	46.19		
18.	02:00 A M	19.71	55.18		
19.	03:00 A M	23.47	38.49		
20.	04:00 A M	26.65	49.72		
21.	05:00 A M	27.54	56.97		
22.	06:00 A M	20.03	39.80		
23.	07:00 A M	17.63	73.29		
24.	08:00 A M	18.70	59.61		
NEQSAA				35 ($\mu g/m^3$)	150($\mu g/m^3$)
WHO				15 ($\mu g/m^3$)	45 ($\mu g/m^3$)

NEQSAA: National Environmental Quality Standards for Ambient Air
WHO: World Health Organization
Note:

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Signature of Analyst: ***Signature of Chief Chemist***

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Street No. 09, Main Canal Road, Abshaar Colony Warsak Road, Peshawar, Pakistan
Tell: +92 91 5202323 Cell: +92 3000391053 Email: inenvconsultants@yahoo.com www. iec-consultants.com

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Ambient Gaseous Monitoring Results (Fourth Quarter, 2024)

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AMBIENT GASES MONITORING REPORT

Reference Number	BHPP/ENV/153-2024	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Monitoring Location:**	Dam Site (Paras Valley)
Monitoring Date:	15-12-2024	**Reporting Date:**	31-12-2024
Source: **GPS Coordinates:**	Ambient Air Gases 34.660470, 73.455497	**Monitoring Instrument:**	Henan Oceanus AQMS-09

Sr. No	Time	Parameters			
		CO	NO	NO_2	SO_2
		Units			
	Hours	(mg/m^3)	($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)
1.	09:00 A.M	0.24	13.12	10.49	13.38
2.	10:00 A.M	0.35	11.03	11.90	14.98
3.	11:00 A.M	0.26	11.72	10.40	16.37
4.	12:00 P.M	0.19	10.25	14.75	8.77
5.	01:00 P.M	0.23	12.56	14.95	11.07
6.	02:00 P.M	0.27	10.27	15.25	16.15
7.	03:00 P.M	0.31	10.69	11.11	10.95
8.	04:00 P.M	0.38	8.82	19.08	10.24
9.	05:00 P.M	0.20	12.24	14.00	14.81
10.	06:00 P.M	0.27	12.95	14.29	10.85
11.	07:00 P.M	0.30	13.33	12.62	15.77
12.	08:00 P.M	0.32	13.42	13.04	8.81
13.	09:00 P M	0.25	11.35	16.52	11.47
14.	10:00 P M	0.33	9.73	13.63	8.38
15.	11:00 P M	0.28	8.66	18.66	10.20
16.	12:00 A M	0.25	12.80	15.37	10.16
17.	01:00 A M	0.19	9.82	13.64	10.46
18.	02:00 A M	0.29	12.67	19.22	13.70
19.	03:00 A M	0.37	9.50	15.04	11.88
20.	04:00 A M	0.20	13.44	17.36	15.83
21.	05:00 A M	0.28	9.51	16.61	15.32
22.	06:00 A M	0.32	11.22	15.45	16.18
23.	07:00 A M	0.30	13.67	9.83	8.68
24.	08:00 A M	0.19	13.33	11.83	12.94
Average Concentration		**0.27**	**11.50**	**14.39**	**12.39**
NEQSAA		**05**	**40**	**80**	**120**
WHO		**04**	**---**	**25**	**40**

NEQSAA: National Environmental Quality Standards for Ambient Air
WHO: World Health Organization

Note:

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Street No. 09, Main Canal Road, Abshaar Colony Warsak Road, Peshawar, Pakistan
Tell: +92 91 5202323 Cell: +92 3000391053 Email: inenvconsultants@yahoo.com www. iec-consultants.com

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AMBIENT GASES MONITORING REPORT

Reference Number	BHPP/ENV/153-2024	**Client Name**	CGGC JV CRC
Project Name:	Balakot Hydropower Project (300 MW)	**Monitoring Location:**	Adit-1 (Thobi)
Monitoring Date:	20-12-2024	**Reporting Date:**	31-12-2024
Source: **GPS Coordinates:**	Ambient Air Gases 34.636125, 73.428597	**Monitoring Instrument:**	Henan Oceanus AQMS-09

Sr. No	Time	Parameters			
		CO	NO	NO_2	SO_2
		Units			
	Hours	(mg/m^3)	($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)
1.	09:00 A.M	0.78	10.94	19.25	21.89
2.	10:00 A.M	1.23	13.92	21.87	25.66
3.	11:00 A.M	0.97	11.67	17.75	19.95
4.	12:00 P.M	1.04	13.03	25.22	27.48
5.	01:00 P.M	0.93	12.26	27.59	18.37
6.	02:00 P.M	0.91	12.12	26.37	20.60
7.	03:00 P.M	0.79	10.64	21.64	24.81
8.	04:00 P.M	0.88	17.62	27.24	19.42
9.	05:00 P.M	0.92	11.91	26.92	22.55
10.	06:00 P.M	0.99	16.84	23.69	20.05
11.	07:00 P.M	0.95	13.49	20.66	23.99
12.	08:00 P.M	0.84	15.92	21.71	26.76
13.	09:00 P M	0.75	17.87	24.22	18.08
14.	10:00 P M	1.01	11.67	25.98	19.04
15.	11:00 P M	1.24	15.82	24.52	29.19
16.	12:00 A M	1.17	17.95	21.37	17.78
17.	01:00 A M	0.95	14.34	24.38	22.51
18.	02:00 A M	0.99	14.76	23.05	20.00
19.	03:00 A M	0.75	11.09	21.31	20.86
20.	04:00 A M	1.18	19.29	20.58	20.55
21.	05:00 A M	0.85	11.01	22.72	24.95
22.	06:00 A M	0.90	11.87	17.78	25.50
23.	07:00 A M	1.21	10.72	18.19	26.58
24.	08:00 A M	0.97	13.09	26.11	24.10
Average Concentration		**0.97**	**13.74**	**22.92**	**22.53**
NEQSAA		**05**	**40**	**80**	**120**
WHO		04	---	**25**	40

NEQSAA: National Environmental Quality Standards for Ambient Air
WHO: World Health Organization

Note:

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Signature of Analyst:

Signature of Chief Chemist

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AMBIENT GASES MONITORING REPORT

Reference Number	BHPP/ENV/153-2024	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Monitoring Location:**	Adit-2 (Ghanool)
Monitoring Date:	16-12-2024	**Reporting Date:**	31-12-2024
Source:	Ambient Air Gases	**Monitoring Instrument:**	Henan Oceanus AQMS-09
GPS Coordinates:	34.619787, 73.417525		

Sr. No	Time	Parameters			
		CO	NO	NO_2	SO_2
		Units			
	Hours	(mg/m^3)	($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)
1.	09:00 A.M	0.64	12.17	16.55	15.05
2.	10:00 A.M	0.41	13.40	11.97	15.18
3.	11:00 A.M	0.68	9.06	16.41	15.18
4.	12:00 P.M	0.37	9.44	16.24	10.82
5.	01:00 P.M	0.64	10.62	17.67	14.50
6.	02:00 P.M	0.54	12.17	14.83	14.53
7.	03:00 P.M	0.41	9.96	18.39	12.03
8.	04:00 P.M	0.66	9.98	12.30	13.12
9.	05:00 P.M	0.61	9.57	19.44	14.56
10.	06:00 P.M	0.55	13.34	19.43	13.49
11.	07:00 P.M	0.64	13.19	19.45	10.37
12.	08:00 P.M	0.56	13.57	16.62	13.92
13.	09:00 P M	0.62	12.47	13.53	10.47
14.	10:00 P M	0.68	13.49	16.18	15.21
15.	11:00 P M	0.59	10.82	18.81	13.55
16.	12:00 A M	0.39	8.71	19.17	14.21
17.	01:00 A M	0.59	13.31	14.56	15.61
18.	02:00 A M	0.40	11.19	11.77	15.23
19.	03:00 A M	0.57	11.81	13.45	12.62
20.	04:00 A M	0.43	8.56	16.69	11.51
21.	05:00 A M	0.47	9.08	12.28	11.65
22.	06:00 A M	0.66	11.22	12.10	14.48
23.	07:00 A M	0.44	11.88	14.65	12.32
24.	08:00 A M	0.60	13.57	14.65	13.04
Average Concentration		**0.55**	**11.36**	**15.92**	**13.44**
NEQSAA		**05**	**40**	**80**	**120**
WHO		**04**	**---**	**25**	**40**

NEQSAA: National Environmental Quality Standards for Ambient Air
WHO: World Health Organization

Note:

- Selected measurement units were $\mu g/m^3$ & mg/m^3 otherwise stated.
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Signature of Analyst: *Signature of Chief Chemist:*

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FOR ENVIRONMENTAL MONITORING, ANALYSIS & SURVEYS
Street No. 09, Main Canal Road, Abshaar Colony Warsak Road, Peshawar, Pakistan
Tell: +92 91 5202323 Cell: +92 3000391053 Email: inenvconsultants@yahoo.com www. iec-consultants.com
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AMBIENT GASES MONITORING REPORT

Reference Number	BHPP/ENV/153-2024	**Client Name**	CGGC JV CRC
Project Name:	Balakot Hydropower Project (300 MW)	**Monitoring Location:**	Adit-3 (Kholian)
Monitoring Date:	17-12-2024	**Reporting Date:**	31-12-2024
Source:	Ambient Air Gases	**Monitoring Instrument:**	Henan Oceanus AQMS-09
GPS Coordinates:	34.610253,73.389367		

Sr. No	Time	Parameters			
		CO	NO	NO_2	SO_2
		Units			
	Hours	(mg/m^3)	($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)
1.	09:00 A.M	0.28	11.42	10.70	9.99
2.	10:00 A.M	0.47	11.57	18.24	9.12
3.	11:00 A.M	0.33	9.77	18.08	10.50
4.	12:00 P.M	0.25	9.57	18.29	13.01
5.	01:00 P.M	0.42	8.95	13.24	13.61
6.	02:00 P.M	0.25	8.16	17.96	7.57
7.	03:00 P.M	0.29	8.35	14.48	8.41
8.	04:00 P.M	0.31	11.22	15.53	9.73
9.	05:00 P.M	0.37	8.29	11.94	13.61
10.	06:00 P.M	0.38	7.82	16.58	11.12
11.	07:00 P.M	0.37	11.50	14.32	10.96
12.	08:00 P.M	0.27	9.92	18.16	11.98
13.	09:00 P.M	0.48	11.26	10.72	10.44
14.	10:00 P.M	0.27	7.40	15.02	11.15
15.	11:00 P.M	0.47	10.51	16.86	8.73
16.	12:00 A.M	0.24	8.03	10.85	9.19
17.	01:00 A.M	0.42	8.10	16.84	7.55
18.	02:00 A.M	0.25	10.61	10.39	11.28
19.	03:00 A.M	0.28	10.62	12.49	12.81
20.	04:00 A.M	0.38	10.10	10.35	13.19
21.	05:00 A.M	0.29	11.74	11.84	12.38
22.	06:00 A.M	0.37	8.49	12.41	11.86
23.	07:00 A.M	0.25	9.69	11.75	11.40
24.	08:00 A.M	0.27	8.92	10.09	7.69
Average Concentration		**0.33**	**9.67**	**14.13**	**10.72**
NEQSAA		**05**	**40**	**80**	**120**
WHO		**04**	**---**	**25**	**40**

NEQSAA: National Environmental Quality Standards for Ambient Air
WHO: World Health Organization

Note:

- Selected measurement units were $\mu g/m^3$ & mg/m^3 otherwise stated.
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Signature of Analyst

Signature of Chief Chemist

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Street No. 09, Main Canal Road, Abshaar Colony Warsak Road, Peshawar, Pakistan
Tell: +92 91 5202323 Cell: +92 3000391053 Email: inenvconsultants@yahoo.com www. iec-consultants.com

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AMBIENT GASES MONITORING REPORT

Reference Number	BHPP/ENV/153-2024	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Monitoring Location:**	Powerhouse (Barkot)
Monitoring Date:	18-12-2024	**Reporting Date:**	31-12-2024
Source:	Ambient Air Gases	**Monitoring Instrument:**	Henan Oceanus AQMS-09
GPS Coordinates:	34.601812, 73.377145		

Sr. No	Time	Parameters			
		CO	NO	NO_2	SO_2
		Units			
	Hours	(mg/m^3)	($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)
1.	09:00 A.M	0.53	18.18	24.59	33.26
2.	10:00 A.M	0.50	11.73	23.64	35.70
3.	11:00 A.M	0.53	19.68	20.00	31.82
4.	12:00 P.M	0.49	18.99	15.19	25.93
5.	01:00 P.M	0.66	15.07	22.94	36.21
6.	02:00 P.M	0.48	14.92	21.96	34.92
7.	03:00 P.M	0.46	14.99	16.38	27.67
8.	04:00 P.M	0.53	15.67	19.67	22.68
9.	05:00 P.M	0.61	16.06	19.40	35.03
10.	06:00 P.M	0.59	13.97	18.65	27.34
11.	07:00 P.M	0.67	16.94	20.60	34.06
12.	08:00 P.M	0.64	14.33	24.55	20.21
13.	09:00 P.M	0.44	18.38	21.56	34.80
14.	10:00 P.M	0.55	20.09	25.24	32.52
15.	11:00 P.M	0.50	13.67	19.45	23.92
16.	12:00 A.M	0.60	15.76	23.28	32.22
17.	01:00 A.M	0.61	15.47	16.30	24.38
18.	02:00 A.M	0.60	17.63	19.78	21.37
19.	03:00 A.M	0.52	14.72	20.34	27.12
20.	04:00 A.M	0.57	12.24	21.00	23.22
21.	05:00 A.M	0.56	15.63	18.34	29.64
22.	06:00 A.M	0.60	13.50	15.46	21.70
23.	07:00 A.M	0.65	12.59	18.54	34.06
24.	08:00 A.M	0.43	17.12	16.14	27.39
Average Concentration		**0.56**	**15.72**	**20.12**	**29.05**
NEQSAA		**05**	**40**	**80**	**120**
WHO		**04**	**---**	**25**	**40**

NEQSAA: National Environmental Quality Standards for Ambient Air
WHO: World Health Organization

Note:

- Selected measurement units were $\mu g/m^3$ & mg/m^3 otherwise stated.
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FOR ENVIRONMENTAL MONITORING, ANALYSIS & SURVEYS
Street No. 09, Main Canal Road, Abshaar Colony Warsak Road, Peshawar, Pakistan
Tell: +92 91 5202323 Cell: +92 3000391053 Email: inenvconsultants@yahoo.com www. iec-consultants.com
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AMBIENT GASES MONITORING REPORT

Reference Number	BHPP/ENV/153-2024	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Monitoring Location:**	Tailrace Upstream (Barkot)
Monitoring Date:	19-12-2024	**Reporting Date:**	31-12-2024
Source:	Ambient Air Gases	**Monitoring Instrument:**	Henan Oceanus AQMS-09
GPS Coordinates:	34.596088, 73.374512		

Sr. No	Time	Parameters			
		CO	NO	NO_2	SO_2
		Units			
	Hours	(mg/m^3)	($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)
1.	09:00 A.M	0.61	10.33	29.04	12.62
2.	10:00 A.M	0.44	11.43	22.80	17.03
3.	11:00 A.M	0.47	17.36	19.45	14.00
4.	12:00 P.M	0.54	11.22	19.77	13.10
5.	01:00 P.M	0.42	11.40	20.81	12.43
6.	02:00 P.M	0.59	11.49	23.54	14.47
7.	03:00 P.M	0.60	13.72	16.30	18.23
8.	04:00 P.M	0.49	13.55	18.52	16.75
9.	05:00 P.M	0.75	10.20	19.87	16.24
10.	06:00 P.M	0.64	11.58	27.23	12.17
11.	07:00 P.M	0.72	13.10	26.88	16.68
12.	08:00 P.M	0.56	10.12	18.88	14.14
13.	09:00 P M	0.68	16.53	17.57	12.97
14.	10:00 P M	0.51	9.88	15.37	15.25
15.	11:00 P M	0.62	11.74	15.99	17.36
16.	12:00 A M	0.41	13.17	19.96	13.31
17.	01:00 A M	0.73	10.23	19.12	16.98
18.	02:00 A M	0.48	13.44	18.79	15.97
19.	03:00 A M	0.61	13.63	22.23	14.81
20.	04:00 A M	0.72	16.00	15.07	14.51
21.	05:00 A M	0.51	14.64	18.79	14.60
22.	06:00 A M	0.65	15.58	16.26	16.60
23.	07:00 A M	0.77	14.73	15.87	16.53
24.	08:00 A M	0.73	14.50	25.79	13.87
Average Concentration		**0.59**	**12.90**	**20.16**	**15.02**
NEQSAA		**05**	**40**	**80**	**120**
WHO		**04**	**---**	**25**	**40**

NEQSAA: National Environmental Quality Standards for Ambient Air
WHO: World Health Organization

Note:

- Selected measurement units were $\mu g/m^3$ & mg/m^3 otherwise stated.
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Signature of Chief Chemist

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Street No. 09, Main Canal Road, Abshaar Colony Warsak Road, Peshawar, Pakistan
Tell: +92 91 5202323 Cell: +92 3000391053 Email: inenvconsultants@yahoo.com www. iec-consultants.com

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AMBIENT GASES MONITORING REPORT

Reference Number	BHPP/ENV/153-2024	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Monitoring Location:**	GRC Camp Office (Sanghar)
Monitoring Date:	21-12-2024	**Reporting Date:**	31-12-2024
Source: **GPS Coordinates:**	Ambient Air Gases 34.584562, 73.373878	**Monitoring Instrument:**	Henan Oceanus AQMS-09

Sr. No	Time	Parameters			
		CO	NO	NO_2	SO_2
		Units			
	Hours	(mg/m^3)	($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)
1.	09:00 A.M	0.39	10.29	9.76	13.88
2.	10:00 A.M	0.38	7.99	17.74	12.80
3.	11:00 A.M	0.38	10.47	17.07	12.40
4.	12:00 P.M	0.27	8.69	13.39	9.88
5.	01:00 P.M	0.32	11.75	14.29	14.86
6.	02:00 P.M	0.26	11.55	11.69	11.54
7.	03:00 P.M	0.25	8.65	8.97	12.34
8.	04:00 P.M	0.31	9.06	10.17	11.28
9.	05:00 P.M	0.27	10.53	9.84	10.92
10.	06.00 P.M	0.34	7.55	16.56	11.16
11.	07:00 P.M	0.32	8.00	12.50	9.93
12.	08:00 P.M	0.31	9.48	9.66	13.94
13.	09:00 P M	0.43	7.41	11.34	14.68
14.	10:00 P M	0.37	9.23	17.65	11.01
15.	11:00 P M	0.43	11.41	18.79	14.22
16.	12:00 A M	0.29	11.89	10.98	13.59
17.	01:00 A M	0.35	10.94	13.19	14.64
18.	02:00 A M	0.40	10.29	18.97	13.54
19.	03:00 A M	0.35	9.91	16.83	15.67
20.	04:00 A M	0.42	10.24	17.49	14.87
21.	05:00 A M	0.35	10.60	14.63	11.13
22.	06:00 A M	0.41	11.48	11.16	12.22
23.	07:00 A M	0.37	9.32	11.16	13.07
24.	08:00 A M	0.31	8.91	16.89	12.52
Average Concentration		**0.34**	**9.82**	**13.78**	**12.75**
NEQSAA		**05**	**40**	**80**	**120**
WHO		04	---	25	40

NEQSAA: National Environmental Quality Standards for Ambient Air
WHO: World Health Organization

Note:

- Selected measurement units were $\mu g/m^3$& mg/m^3 otherwise stated.
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Signature of Analyst:

Signature of Chief Chemist

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FOR ENVIRONMENTAL MONITORING, ANALYSIS & SURVEYS

Street No. 09, Main Canal Road, Abshaar Colony Warsak Road, Peshawar, Pakistan
Tell: +92 91 5202323 Cell: +92 3000391053 Email: inenvconsultants@yahoo.com www. iec-consultants.com

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AMBIENT GASES MONITORING REPORT

Reference Number	BHPP/ENV/153-2024	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Monitoring Location:**	Colony Area (Snaghar)
Monitoring Date:	22-12-2024	**Reporting Date:**	31-12-2024
Source: **GPS Coordinates:**	Ambient Air Gases 34.587775, 73.366225	**Monitoring Instrument:**	Henan Oceanus AQMS-09

Sr. No	Time	Parameters			
		CO	NO	NO_2	SO_2
		Units			
	Hours	(mg/m^3)	($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)
1.	09:00 A.M	0.53	12.05	22.82	10.93
2.	10:00 A.M	0.60	10.57	16.13	15.52
3.	11:00 A.M	0.41	10.35	18.06	13.45
4.	12:00 P.M	0.61	10.45	14.15	10.23
5.	01:00 P.M	0.45	13.53	21.40	10.96
6.	02:00 P.M	0.48	12.72	15.16	10.05
7.	03:00 P.M	0.42	12.70	18.92	10.26
8.	04:00 P.M	0.40	11.89	17.10	17.56
9.	05:00 P.M	0.58	10.58	19.47	10.39
10.	06:00 P.M	0.39	10.24	15.92	18.31
11.	07:00 P.M	0.51	10.23	17.06	10.01
12.	08:00 P.M	0.49	12.82	22.51	15.77
13.	09:00 P M	0.51	11.58	22.27	14.11
14.	10:00 P M	0.53	13.31	13.59	13.62
15.	11:00 P M	0.59	10.62	21.06	18.27
16.	12:00 A M	0.56	12.50	16.73	12.19
17.	01:00 A M	0.59	12.38	18.14	11.97
18.	02:00 A M	0.54	11.68	23.20	12.65
19.	03:00 A M	0.50	12.38	18.89	12.77
20.	04:00 A M	0.59	11.70	17.84	12.52
21.	05:00 A M	0.40	12.44	23.24	15.29
22.	06:00 A M	0.44	10.65	16.80	16.07
23.	07:00 A M	0.48	12.31	16.53	16.32
24.	08:00 A M	0.47	12.89	20.17	11.31
Average Concentration		**0.50**	**11.77**	**18.63**	**13.36**
NEQSAA		**05**	**40**	**80**	**120**
WHO		**04**	**---**	**25**	**40**

NEQSAA: National Environmental Quality Standards for Ambient Air
WHO: World Health Organization

Note:

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Signature of Analyst: ***Signature of Chief Chemist***

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FOR ENVIRONMENTAL MONITORING, ANALYSIS & SURVEYS

Street No. 09, Main Canal Road, Abshaar Colony Warsak Road, Peshawar, Pakistan
Tell: +92 91 5202323 Cell: +92 3000391053 Email: inenvconsultants@yahoo.com www. iec-consultants.com

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Ambient Noise Level Monitoring Results (Fourth Quarter, 2024)

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AMBIENT NOISE MONITORING REPORT

Reference Number	BHPP/ENV/153-2024	Client Name	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	Monitoring Location:	Dam Site (Paras Valley)
Monitoring Date:	15-12-2024	Reporting Date:	31-12-2024
Source: GPS Coordinates:	Ambient Noise 34.660470, 73.455497	Monitoring Instrument:	Noise Meter-IEC651-Type-2

Sr. No.	Monitoring Time	Unit	Minimum	Maximum	Leq
1.	09:00 A.M	dB(A)	58.8	63.5	61.15
2.	10:00 A.M		60.6	65.5	63.05
3.	11:00 A.M		60.3	66.5	63.4
4.	12:00 P.M		56.8	62.3	59.55
5.	01:00 P.M		63	66.8	64.9
6.	02:00 P.M		63.4	66.9	65.15
7.	03:00 P.M		62.2	67.6	64.9
8.	04:00 P.M		60.3	64	62.15
9.	05:00 P.M		51	56.1	53.55
10.	06:00 P.M		55.4	60.2	57.8
11.	07:00 P.M		53.8	58.7	56.25
12.	08:00 P.M		53.4	59.9	56.65
13.	09:00 P M		53.5	64.3	58.9
14.	10:00 P M		57.8	61.4	59.6
15.	11:00 P M		55.5	63	59.25
16.	12:00 A M		57.8	65.6	61.7
17.	01:00 A M		53.7	58.3	56
18.	02:00 A M		53.9	63.6	58.75
19.	03:00 A M		57.4	62.8	60.1
20.	04:00 A M		55.7	60.2	57.95
21.	05:00 A M		54.5	59.6	57.05
22.	06:00 A M		54	63.6	58.8
23.	07:00 A M		55.5	60.3	57.9
24.	08:00 A M		57.8	62.2	60

NEQS limit : 45-55 dB
WHO limit: 70 dB

NEQS: National Environmental Quality Standards WHO: World Health Organization
Leq: Log Equivalent Continuous Sound Level

Note:

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- The report is not valid for court.

Signature of Analyst: Signature of Chief Chemist

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FOR ENVIRONMENTAL MONITORING, ANALYSIS & SURVEYS

Street No. 09, Main Canal Road, Abshaar Colony Warsak Road, Peshawar, Pakistan
Tell: +92 91 5202323 Cell: +92 3000391053 Email: inenvconsultants@yahoo.com www. iec-consultants.com

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AMBIENT NOISE MONITORING REPORT

Reference Number	BHPP/ENV/153-2024	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Monitoring Location:**	Adit-1 (Thobi)
Monitoring Date:	20-12-2024	**Reporting Date:**	31-12-2024
Source: **GPS Coordinates:**	Ambient Noise 34.636125, 73.428597	**Monitoring Instrument:**	Noise Meter-IEC651-Type-2

Sr. No.	Monitoring Time	Unit	Minimum	Maximum	Leq
1.	09:00 A.M	dB(A)	64.3	67.1	65.7
2.	10:00 A.M		64.1	66.9	65.5
3.	11:00 A.M		63.9	66.7	65.3
4.	12:00 P.M		63.7	66.5	65.1
5.	01:00 P.M		63.4	66.2	64.8
6.	02:00 P.M		63.2	66	64.6
7.	03:00 P.M		63	65.8	64.4
8.	04:00 P.M		62.8	65.6	64.2
9.	05:00 P.M		62.6	65.4	64
10.	06:00 P.M		55.4	62.2	58.8
11.	07:00 P.M		55.1	61.9	58.5
12.	08:00 P.M		54.9	61.7	58.3
13.	09:00 P M		54.7	61.5	58.1
14.	10:00 P M		54.5	61.3	57.9
15.	11:00 P M		54.3	61.1	57.7
16.	12:00 A M		54	60.8	57.4
17.	01:00 A M		53.8	60.6	57.2
18.	02:00 A M		53.6	60.4	57
19.	03:00 A M		53.4	60.2	56.8
20.	04:00 A M		53.2	59.9	56.55
21.	05:00 A M		52.9	59.7	56.3
22.	06:00 A M		52.7	59.5	56.1
23.	07:00 A M		50.8	58.3	54.55
24.	08:00 A M		57	64.7	60.85

NEQS limit : 45-55 dB
WHO limit: 70 dB

NEQS: National Environmental Quality Standards **WHO:** World Health Organization
Leq: Log Equivalent Continuous Sound Level

Note:

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Signature of Analyst:

Signature of Chief Chemist

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FOR ENVIRONMENTAL MONITORING, ANALYSIS & SURVEYS.

Street No. 09, Main Canal Road, Abshaar Colony Warsak Road, Peshawar, Pakistan
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AMBIENT NOISE MONITORING REPORT

Reference Number	BHPP/ENV/153-2024	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Monitoring Location:**	Adit-2 (Ghanool)
Monitoring Date:	16-12-2024	**Reporting Date:**	31-12-2024
Source: **GPS Coordinates:**	Ambient Noise 34.619787, 73.417525	**Monitoring Instrument:**	Noise Meter-IEC651-Type-2

Sr. No.	Monitoring Time	Unit	Minimum	Maximum	Leq
1.	09:00 A.M	dB(A)	63.6	67.3	65.45
2.	10:00 A.M		65.4	69.3	67.35
3.	11:00 A.M		65.1	70.3	67.7
4.	12:00 P.M		61.6	66.1	63.85
5.	01:00 P.M		60.1	64.1	62.1
6.	02:00 P.M		62.6	67.2	64.9
7.	03:00 P.M		67	71.4	69.2
8.	04:00 P.M		65.1	67.8	66.45
9.	05:00 P.M		60.6	65.2	62.9
10.	06:00 P.M		50.9	55.5	53.2
11.	07:00 P.M		49.3	54	51.65
12.	08:00 P.M		48.9	55.2	52.05
13.	09:00 P M		49	59.6	54.3
14.	10:00 P M		53.3	56.7	55
15.	11:00 P M		51	58.3	54.65
16.	12:00 A M		53.3	60.9	57.1
17.	01:00 A M		49.2	53.6	51.4
18.	02:00 A M		49.4	58.9	54.15
19.	03:00 A M		52.9	58.1	55.5
20.	04:00 A M		51.2	55.5	53.35
21.	05:00 A M		50	54.9	52.45
22.	06:00 A M		49.5	58.9	54.2
23.	07:00 A M		51.1	56.7	53.9
24.	08:00 A M		53.3	57.5	55.4

NEQS limit : 45-55 dB
WHO limit: 70 dB

NEQS: National Environmental Quality Standards **WHO:** World Health Organization
Leq: Log Equivalent Continuous Sound Level

Note:

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Signature of Analyst: *Signature of Chief Chemist*

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FOR ENVIRONMENTAL MONITORING, ANALYSIS & SURVEYS
Street No. 09, Main Canal Road, Abshaar Colony Warsak Road, Peshawar, Pakistan
Tell: +92 91 5202323 Cell: +92 3000391053 Email: inenvconsultants@yahoo.com www. iec-consultants.com
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AMBIENT NOISE MONITORING REPORT

Reference Number	BHPP/ENV/153-2024	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Monitoring Location:**	Adit-3 (Kholian)
Monitoring Date:	17-12-2024	**Reporting Date:**	31-12-2024
Source:	Ambient Noise	**Monitoring Instrument:**	Noise Meter-IEC651-Type-2
GPS Coordinates:	34.610253,73.389367		

Sr. No.	Monitoring Time	Unit	Minimum	Maximum	Leq
1.	09:00 A.M	dB(A)	60.6	63.5	62.05
2.	10:00 A.M		60.4	63.2	61.8
3.	11:00 A.M		60.1	63	61.55
4.	12:00 P.M		59.9	62.8	61.35
5.	01:00 P.M		59.7	62.6	61.15
6.	02:00 P.M		59.5	62.4	60.95
7.	03:00 P.M		59.3	62.2	60.75
8.	04:00 P.M		59.1	61.9	60.5
9.	05:00 P.M		57.8	60.7	59.25
10.	06:00 P.M		57.6	60.5	59.05
11.	07:00 P.M		57.4	60.3	58.85
12.	08:00 P.M		57.2	60.1	58.65
13.	09:00 P M		57	59.9	58.45
14.	10:00 P M		56.8	59.6	58.2
15.	11:00 P M		46.7	49.6	48.15
16.	12:00 A M		46.4	49.3	47.85
17.	01:00 A M		46.2	49.1	47.65
18.	02:00 A M		46	48.9	47.45
19.	03:00 A M		45.8	48.7	47.25
20.	04:00 A M		45.6	48.4	47
21.	05:00 A M		45.3	48.2	46.75
22.	06:00 A M		45.1	48	46.55
23.	07:00 A M		44.9	47.8	46.35
24.	08:00 A M		48.7	50.4	49.55

NEQS limit : 45-55 dB
WHO limit: 70 dB

NEQS: National Environmental Quality Standards **WHO:** World Health Organization
Leq: Log Equivalent Continuous Sound Level

Note:

- Selected measurement units were dB (A) otherwise stated.
- The client is responsible lawful usage of reported data in future.
- The report is not valid for court.

Signature of Analyst: *Signature of Chief Chemist*

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AMBIENT NOISE MONITORING REPORT

Reference Number	BHPP/ENV/153-2024	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Monitoring Location:**	Powerhouse (Barkot)
Monitoring Date:	18-12-2024	**Reporting Date:**	31-12-2024
Source: **GPS Coordinates:**	Ambient Noise 34.601812, 73.377145	**Monitoring Instrument:**	Noise Meter-IEC651-Type-2

Sr. No.	Monitoring Time	Unit	Minimum	Maximum	Leq
1.	09:00 A.M	dB(A)	63.5	70.2	66.9
2.	10:00 A.M		63.3	69.9	66.6
3.	11:00 A.M		63	69.7	66.4
4.	12:00 P.M		62.8	69.5	66.2
5.	01:00 P.M		62.6	69.3	66.0
6.	02:00 P.M		62.4	69.1	65.8
7.	03:00 P.M		62.2	68.9	65.6
8.	04:00 P.M		62	68.6	65.3
9.	05:00 P.M		60.7	67.4	64.1
10.	06:00 P.M		60.5	67.2	63.9
11.	07:00 P.M		60.3	67	63.7
12.	08:00 P.M		60.1	66.8	63.5
13.	09:00 P M		59.9	66.6	63.3
14.	10:00 P M		59.7	66.3	63.0
15.	11:00 P M		49.6	56.3	53.0
16.	12:00 A M		49.3	56	52.7
17.	01:00 A M		49.1	55.8	52.5
18.	02:00 A M		48.9	55.6	52.3
19.	03:00 A M		48.7	55.4	52.1
20.	04:00 A M		48.5	55.1	51.8
21.	05:00 A M		48.2	54.9	51.6
22.	06:00 A M		48	54.7	51.4
23.	07:00 A M		47.8	54.5	51.2
24.	08:00 A M		51.6	57.1	54.4

NEQS limit: 45-55 dB
WHO limit: 70 dB

NEQS: National Environmental Quality Standards **WHO:** World Health Organization
Leq: Log Equivalent Continuous Sound Level

Note:

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Signature of Analyst: *Signature of Chief Chemist*

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AMBIENT NOISE MONITORING REPORT

Reference Number	BHPP/ENV/153-2024	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Monitoring Location:**	Tailrace Upstream (Barkot)
Monitoring Date:	19-12-2024	**Reporting Date:**	31-12-2024
Source: **GPS Coordinates:**	Ambient Noise 34.596088, 73.374512	**Monitoring Instrument:**	Noise Meter-IEC651-Type-2

Sr. No.	Monitoring Time	Unit	Minimum	Maximum	Leq
1.	09:00 A.M	dB(A)	59.3	66.1	62.7
2.	10:00 A.M		59.1	65.8	62.45
3.	11:00 A.M		58.8	65.6	62.2
4.	12:00 P.M		58.6	65.4	62
5.	01:00 P.M		58.4	65.2	61.8
6.	02:00 P.M		58.2	65	61.6
7.	03:00 P.M		58	64.8	61.4
8.	04:00 P.M		57.8	64.5	61.15
9.	05:00 P.M		56.5	63.3	59.9
10.	06:00 P.M		56.3	63.1	59.7
11.	07:00 P.M		56.1	62.9	59.5
12.	08:00 P.M		55.9	62.7	59.3
13.	09:00 P M		55.7	62.5	59.1
14.	10:00 P M		55.5	62.2	58.85
15.	11:00 P M		45.4	52.2	48.8
16.	12:00 A M		45.1	51.9	48.5
17.	01:00 A M		44.9	51.7	48.3
18.	02:00 A M		44.7	51.5	48.1
19.	03:00 A M		44.5	51.3	47.9
20.	04:00 A M		44.3	51	47.65
21.	05:00 A M		44	50.8	47.4
22.	06:00 A M		43.8	50.6	47.2
23.	07:00 A M		43.6	50.4	47
24.	08:00 A M		47.4	53	50.2

NEQS limit : 45-55 dB
WHO limit: 70 dB

NEQS: National Environmental Quality Standards **WHO:** World Health Organization
Leq: Log Equivalent Continuous Sound Level

Note:

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AMBIENT NOISE MONITORING REPORT

Reference Number	BHPP/ENV/153-2024	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Monitoring Location:**	GRC Camp Office (Sanghar)
Monitoring Date:	21-12-2024	**Reporting Date:**	31-12-2024
Source: **GPS Coordinates:**	Ambient Noise 34.584562, 73.373878	**Monitoring Instrument:**	Noise Meter-IEC651-Type-2

Sr. No.	Monitoring Time	Unit	Minimum	Maximum	Leq
1.	09:00 A.M	dB(A)	58.2	61.6	59.9
2.	10:00 A.M		60	63.6	61.8
3.	11:00 A.M		59.7	64.6	62.15
4.	12:00 P.M		56.2	60.4	58.3
5.	01:00 P.M		62.4	64.9	63.65
6.	02:00 P.M		62.8	65	63.9
7.	03:00 P.M		61.6	65.7	63.65
8.	04:00 P.M		59.7	62.1	60.9
9.	05:00 P.M		50.4	54.2	52.3
10.	06:00 P.M		54.8	58.3	56.55
11.	07:00 P.M		53.2	56.8	55
12.	08:00 P.M		52.8	58	55.4
13.	09:00 P M		52.9	62.4	57.65
14.	10:00 P M		57.2	59.5	58.35
15.	11:00 P M		54.9	61.1	58
16.	12:00 A M		57.2	63.7	60.45
17.	01:00 A M		53.1	56.4	54.75
18.	02:00 A M		53.3	61.7	57.5
19.	03:00 A M		56.8	60.9	58.85
20.	04:00 A M		55.1	58.3	56.7
21.	05:00 A M		53.9	57.7	55.8
22.	06:00 A M		53.4	61.7	57.55
23.	07:00 A M		54.9	58.4	56.65
24.	08:00 A M		57.2	60.3	58.75

NEQS limit : 55-65 dB
WHO limit: 70 dB

NEQS: National Environmental Quality Standards **WHO:** World Health Organization
Leq: Log Equivalent Continuous Sound Level

Note:

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Signature of Analyst: ***Signature of Chief Chemist***

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AMBIENT NOISE MONITORING REPORT

Reference Number	BHPP/ENV/153-2024	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Monitoring Location:**	Colony Area (Sanghar)
Monitoring Date:	22-12-2024	**Reporting Date:**	31-12-2024
Source: **GPS Coordinates:**	Ambient Noise 34.587775, 73.366225	**Monitoring Instrument:**	Noise Meter-IEC651-Type-2

Sr. No.	Monitoring Time	Unit	Minimum	Maximum	Leq
1.	09:00 A.M	dB(A)	60.1	64.7	62.4
2.	10:00 A.M		59.9	64.5	62.2
3.	11:00 A.M		59.7	64.3	62
4.	12:00 P.M		59.5	64.1	61.8
5.	01:00 P.M		59.2	63.8	61.5
6.	02:00 P.M		59	63.6	61.3
7.	03:00 P.M		58.8	63.4	61.1
8.	04:00 P.M		58.6	63.2	60.9
9.	05:00 P.M		58.4	63	60.7
10.	06:00 P.M		45.2	49.8	47.5
11.	07:00 P.M		44.9	49.5	47.2
12.	08:00 P.M		44.7	49.3	47
13.	09:00 P.M		44.5	49.1	46.8
14.	10:00 P.M		44.3	48.9	46.6
15.	11:00 P.M		44.1	48.7	46.4
16.	12:00 A.M		43.8	48.4	46.1
17.	01:00 A.M		43.6	48.2	45.9
18.	02:00 A.M		43.4	48	45.7
19.	03:00 A.M		43.2	47.8	45.5
20.	04:00 A.M		43	47.5	45.25
21.	05:00 A.M		42.7	47.3	45
22.	06:00 A.M		42.5	47.1	44.8
23.	07:00 A.M		40.6	45.9	43.25
24.	08:00 A.M		46.8	52.3	49.55

NEQS limit : 45-55 dB
WHO limit: 70 dB

NEQS: National Environmental Quality Standards **WHO:** World Health Organization
Leq: Log Equivalent Continuous Sound Level

Note:

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Signature of Analyst: ***Signature of Chief Chemist***

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Drinking Water Monitoring Results (Fourth Quarter, 2024)

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DRINKING WATER ANALYSIS REPORT

Reference Number	BHPP/ENV/153-2024	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Sampling Location:**	Dam Site (Paras Valley)
Sampling Date:	22-12-2024	**Reporting Date:**	31-12-2024
Source: **GPS Coordinates;**	Spring Water (Source) 34.653167, 73.445678	**Analysis Method**	APHA/USEPA Standard Methods

Sr. No.	Parameters	Standard Methods	Units	WHO	NDWQS	Results
1.	pH	APHA-4500H+ B	–	6.5-8.5	6.5-8.5	7.7
2.	Temperature	---	°C	---	----	11
3.	Taste & Odor	In-house	–	Non-Objectionable	Non Objectionable	Non Objectionable
4.	Color	APHA-2120 B/C	TCU	≤ 15	<15	3
5.	Turbidity	APHA-2130 B	NTU	<5	<5	1.7
6.	Total Dissolved Solids (TDS)	APHA-2540 C	mg/L	< 1000	<1000	249
7.	Total Hardness as $CaCO_3$	APHA-2340 C	mg/L	-------	<500	163
8.	Nitrate (NO_3)	APHA-4500NO3 B	mg/L	50	≤50	2.88
9.	Nitrite (NO_2)	APHA-4500NO2 B	mg/L	3	≤3	0.21
10.	Arsenic (As)	APHA-3500As B	mg/L	0.01	≤0.05	N.D
11.	Nickel (Ni)	ASTM E3047-16	mg/L	0.02	≤0.02	0.003
12.	Antimony (Sb)	APHA-3500Sb B	mg/L	0.005	<0.005	N.D
13.	Chloride (Cl)	APHA-4500Cl- B	mg/L	250	<250	138
14.	Chlorine	APHA-4500 CL	mg/L		0.5-1.5	0.54
15.	Lead (Pb)	APHA-3500 Pb-B	mg/L	0.01	≤0.05	N.D
16.	Fluoride	APHA-4500F- C	mg/L	1.5	≤1.5	0.41
17.	Aluminum	APHA-3500 Al	mg/L	≤ 0.2	≤0.2	N.D
18.	Manganese (Mn)	APHA-3500 MN-B	mg/L	0.5	≤0.5	N.D
19.	Cadmium (Cd)	APHA-3500 Cd-B	mg/L	0.003	0.01	N.D
20.	Barium (Ba)	APHA-3500 Ba B	mg/L	0.3	0.7	0.21
21.	Mercury (Hg)	APHA-3500 Hg-B	mg/L	0.001	≤0.001	N.D
22.	Copper (Cu)	APHA- 3500 Cu-B	mg/L	2	2	0.30
23.	Zinc (Zn)	APHA- 3500 Zn B	mg/L	3	5	2.42
24.	Boron (B)	APHA 4500 B- C	mg/L	0.3	0.3	N.D
25.	Chromium (Cr)	APHA 3500 cr B	mg/L	0.05	≤0.05	N.D
26.	Selenium (Se)	APHA- 3500 Se C	mg/L	0.01	0.01	N.D
27.	Cyanide (CN)	APHA 4500-CN	mg/L	0.07	≤0.05	N.D
28.	E-Coli	APHA:9222 D	Number/100 mL	Must not be detectable in any 100 ml sample	0 Number/100 mL	0
29.	Total Coliform	APHA:9222 B	Number/100 mL	Must not be detectable in any 100 ml sample	0 Number/100 mL	0

NDWQS National Drinking Water Quality Standards WHO World Health Organization

N D Not Detected

Signature of Analyst: Signature of Chief Chemist

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DRINKING WATER ANALYSIS REPORT

Reference Number	BHPP/ENV/153-2024	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Sampling Location:**	Dam Site (Paras Valley)
Sampling Date:	22-12-2024	**Reporting Date:**	31-12-2024
Source: **GPS Coordinates;**	Water Cooler (End User) 34.660653, 73.455772	**Analysis Method**	APHA/USEPA Standard-Methods

Sr. No.	Parameters	Standard Methods	Units	WHO	NDWQS	Results
1.	pH	APHA-4500H+ B	--	6.5-8.5	6.5-8.5	7.6
2.	Temperature	---	°C	---	----	12
3.	Taste & Odor	In-house	--	Non-Objectionable	Non Objectionable	Non Objectionable
4.	Color	APHA-2120 B/C	TCU	≤ 15	<15	7
5.	Turbidity	APHA-2130 B	NTU	<5	<5	4.2
6.	Total Dissolved Solids (TDS)	APHA-2540 C	mg/L	< 1000	<1000	276
7.	Total Hardness as $CaCO_3$	APHA-2340 C	mg/L	-------	<500	152
8.	Nitrate (NO_3)	APHA-4500NO3 B	mg/L	50	≤50	3.37
9.	Nitrite (NO_2)	APHA-4500NO2 B	mg/L	3	≤3	0.46
10.	Arsenic (As)	APHA-3500As B	mg/L	0.01	≤0.05	N.D
11.	Nickel (Ni)	ASTM E3047-16	mg/L	0.02	≤0.02	0.008
12.	Antimony (Sb)	APHA-3500Sb B	mg/L	0.005	<0.005	N.D
13.	Chloride (Cl)	APHA-4500Cl- B	mg/L	250	<250	144
14.	Chlorine	APHA-4500 CL	mg/L		0.5-1.5	0.40
15.	Lead (Pb)	APHA-3500 Pb-B	mg/L	0.01	≤0.05	N.D
16.	Fluoride	APHA-4500F- C	mg/L	1.5	≤1.5	0.33
17.	Aluminum	APHA-3500 Al	mg/L	≤ 0.2	≤0.2	N.D
18.	Manganese (Mn)	APHA-3500 MN-B	mg/L	0.5	≤0.5	N.D
19.	Cadmium (Cd)	APHA-3500 Cd-B	mg/L	0.003	0.01	N.D
20.	Barium (Ba)	APHA-3500 Ba B	mg/L	0.3	0.7	0.16
21.	Mercury (Hg)	APHA-3500 Hg-B	mg/L	0.001	≤0.001	N.D
22.	Copper (Cu)	APHA- 3500 Cu-B	mg/L	2	2	0.32
23.	Zinc (Zn)	APHA- 3500 Zn B	mg/L	3	5	1.74
24.	Boron (B)	APHA 4500 B- C	mg/L	0.3	0.3	N.D
25.	Chromium (Cr)	APHA 3500 cr B	mg/L	0.05	≤0.05	N.D
26.	Selenium (Se)	APHA- 3500 Se C	mg/L	0.01	0.01	N.D
27.	Cyanide (CN)	APHA 4500-CN	mg/L	0.07	≤0.05	N.D
28.	E-Coli	APHA:9222 D	Number/100 mL	Must not be detectable in any 100 ml sample	0 Number/100 mL	0
29.	Total Coliform	APHA:9222 B	Number/100 mL	Must not be detectable in any 100 ml sample	0 Number/100 mL	0

NDWQS National Drinking Water Quality Standards **WHO** World Health Organization
N D Not Detected

Signature of Analyst: *Signature of Chief Chemist*

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DRINKING WATER ANALYSIS REPORT

Reference Number	BHPP/ENV/153-2024	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Sampling Location:**	Adit-1 (Thobi)
Sampling Date:	22-12-2024	**Reporting Date:**	31-12-2024
Source: **GPS Coordinates;**	Spring Water (Source) 34.636125, 73.428597	**Analysis Method**	APHA/USEPA Standard Methods

Sr. No.	Parameters	Standard Methods	Units	WHO	NDWQS	Results
1.	pH	APHA-4500H+ B	--	6.5-8.5	6.5-8.5	7.3
2.	Temperature	---	°C	---	----	11
3.	Taste & Odor	In-house	--	Non-Objectionable	Non Objectionable	Non Objectionable
4.	Color	APHA-2120 B/C	TCU	≤ 15	<15	7
5.	Turbidity	APHA-2130 B	NTU	<5	<5	4.4
6.	Total Dissolved Solids (TDS)	APHA-2540 C	mg/L	< 1000	<1000	273
7.	Total Hardness as $CaCO_3$	APHA-2340 C	mg/L	-------	<500	178
8.	Nitrate (NO_3)	APHA-4500NO3 B	mg/L	50	≤50	2.58
9.	Nitrite (NO_2)	APHA-4500NO2 B	mg/L	3	≤3	0.33
10.	Arsenic (As)	APHA-3500As B	mg/L	0.01	≤0.05	N.D
11.	Nickel (Ni)	ASTM E3047-16	mg/L	0.02	≤0.02	0.006
12.	Antimony (Sb)	APHA-3500Sb B	mg/L	0.005	<0.005	N.D
13.	Chloride (Cl)	APHA-4500Cl- B	mg/L	250	<250	132
14.	Chlorine	APHA-4500 CL	mg/L		0.5-1.5	0.57
15.	Lead (Pb)	APHA-3500 Pb-B	mg/L	0.01	≤0.05	N.D
16.	Fluoride	APHA-4500F- C	mg/L	1.5	≤1.5	0.59
17.	Aluminum	APHA-3500 Al	mg/L	≤ 0.2	≤0.2	N.D
18.	Manganese (Mn)	APHA-3500 MN-B	mg/L	0.5	≤0.5	N.D
19.	Cadmium (Cd)	APHA-3500 Cd-B	mg/L	0.003	0.01	N.D
20.	Barium (Ba)	APHA-3500 Ba B	mg/L	0.3	0.7	0.33
21.	Mercury (Hg)	APHA-3500 Hg-B	mg/L	0.001	≤0.001	N.D
22.	Copper (Cu)	APHA- 3500 Cu-B	mg/L	2	2	0.15
23.	Zinc (Zn)	APHA- 3500 Zn B	mg/L	3	5	1.45
24.	Boron (B)	APHA 4500 B- C	mg/L	0.3	0.3	N.D
25.	Chromium (Cr)	APHA 3500 cr B	mg/L	0.05	≤0.05	N.D
26.	Selenium (Se)	APHA- 3500 Se C	mg/L	0.01	0.01	N.D
27.	Cyanide (CN)	APHA 4500-CN	mg/L	0.07	≤0.05	N.D
28.	E-Coli	APHA:9222 D	Number/100 mL	Must not be detectable in any 100 ml sample	0 Number/100 mL	0
29.	Total Coliform	APHA:9222 B	Number/100 mL	Must not be detectable in any 100 ml sample	0 Number/100 mL	0

NDWQS National Drinking Water Quality Standards WHO World Health Organization
N D Not Detected

Signature of Analyst: *Signature of Chief Chemist*

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DRINKING WATER ANALYSIS REPORT

Reference Number	BHPP/ENV/153-2024	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Sampling Location:**	Adit-1 (Thobi)
Sampling Date:	22-12-2024	**Reporting Date:**	31-12-2024
Source: **GPS Coordinates;**	Tap Water (End User) 34.636125, 73.428597	**Analysis Method**	APHA/USEPA Standard Methods

Sr. No.	Parameters	Standard Methods	Units	WHO	NDWQS	Results
1.	pH	APHA-4500H+ B	--	6.5-8.5	6.5-8.5	7.8
2.	Temperature	---	°C	---	----	11
3.	Taste & Odor	In-house	--	Non-Objectionable	Non Objectionable	Non Objectionable
4.	Color	APHA-2120 B/C	TCU	≤ 15	<15	6
5.	Turbidity	APHA-2130 B	NTU	<5	<5	2.6
6.	Total Dissolved Solids (TDS)	APHA-2540 C	mg/L	< 1000	<1000	202
7.	Total Hardness as $CaCO_3$	APHA-2340 C	mg/L	-------	<500	162
8.	Nitrate (NO_3)	APHA-4500NO3 B	mg/L	50	≤50	3.91
9.	Nitrite (NO_2)	APHA-4500NO2 B	mg/L	3	≤3	0.38
10.	Arsenic (As)	APHA-3500As B	mg/L	0.01	≤0.05	N.D
11.	Nickel (Ni)	ASTM E3047-16	mg/L	0.02	≤0.02	0.004
12.	Antimony (Sb)	APHA-3500Sb B	mg/L	0.005	<0.005	N.D
13.	Chloride (Cl)	APHA-4500Cl- B	mg/L	250	<250	128
14.	Chlorine	APHA-4500 CL	mg/L		0.5-1.5	0.48
15.	Lead (Pb)	APHA-3500 Pb-B	mg/L	0.01	≤0.05	N.D
16.	Fluoride	APHA-4500F- C	mg/L	1.5	≤1.5	0.55
17.	Aluminum	APHA-3500 Al	mg/L	≤ 0.2	≤0.2	N.D
18.	Manganese (Mn)	APHA-3500 MN-B	mg/L	0.5	≤0.5	N.D
19.	Cadmium (Cd)	APHA-3500 Cd-B	mg/L	0.003	0.01	N.D
20.	Barium (Ba)	APHA-3500 Ba B	mg/L	0.3	0.7	0.38
21.	Mercury (Hg)	APHA-3500 Hg-B	mg/L	0.001	≤0.001	N.D
22.	Copper (Cu)	APHA- 3500 Cu-B	mg/L	2	2	0.13
23.	Zinc (Zn)	APHA- 3500 Zn B	mg/L	3	5	2.21
24.	Boron (B)	APHA 4500 B- C	mg/L	0.3	0.3	N.D
25.	Chromium (Cr)	APHA 3500 cr B	mg/L	0.05	≤0.05	N.D
26.	Selenium (Se)	APHA- 3500 Se C	mg/L	0.01	0.01	N.D
27.	Cyanide (CN)	APHA 4500-CN	mg/L	0.07	≤0.05	N.D
28.	E-Coli	APHA:9222 D	Number/100 mL	Must not be detectable in any 100 ml sample	0 Number/100 mL	0
29.	Total Coliform	APHA:9222 B	Number/100 mL	Must not be detectable in any 100 ml sample	0 Number/100 mL	0

NDWQS National Drinking Water Quality Standards WHO World Health Organization

N D Not Detected

Signature of Analyst: *Signature of Chief Chemist*

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Street No. 09, Main Canal Road, Abshaar Colony Warsak Road, Peshawar, Pakistan

Tell: +92 91 5202323 Cell: +92 3000391053 Email: inenvconsultants@yahoo.com www. iec-consultants.com

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DRINKING WATER ANALYSIS REPORT

Reference Number	BHPP/ENV/163-2024	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Sampling Location:**	Adit-2 (Ghanol)
Sampling Date:	22-12-2024	**Reporting Date:**	31-12-2024
Source: **GPS Coordinates;**	Spring Water 34.619367, 73.417288	**Analysis Method**	APHA/USEPA Standard Methods

Sr. No.	Parameters	Standard Methods	Units	WHO	NDWQS	Results
1.	pH	APHA-4500H+ B	--	6.5-8.5	6.5-8.5	7.7
2.	Temperature	---	°C	---	----	11
3.	Taste & Odor	In-house	--	Non-Objectionable	Non Objectionable	Non Objectionable
4.	Color	APHA-2120 B/C	TCU	≤ 15	<15	4
5.	Turbidity	APHA-2130 B	NTU	<5	<5	4.5
6.	Total Dissolved Solids (TDS)	APHA-2540 C	mg/L	< 1000	<1000	253
7.	Total Hardness as $CaCO_3$	APHA-2340 C	mg/L	------	<500	148
8.	Nitrate (NO_3)	APHA-4500NO3 B	mg/L	50	≤50	1.63
9.	Nitrite (NO_2)	APHA-4500NO2 B	mg/L	3	≤3	0.26
10.	Arsenic (As)	APHA-3500As B	mg/L	0.01	≤0.05	N.D
11.	Nickel (Ni)	ASTM E3047-16	mg/L	0.02	≤0.02	0.002
12.	Antimony (Sb)	APHA-3500Sb B	mg/L	0.005	<0.005	N.D
13.	Chloride (Cl)	APHA-4500Cl- B	mg/L	250	<250	145
14.	Chlorine	APHA-4500 CL	mg/L		0.5-1.5	0.43
15.	Lead (Pb)	APHA-3500 Pb-B	mg/L	0.01	≤0.05	N.D
16.	Fluoride	APHA-4500F- C	mg/L	1.5	≤1.5	0.65
17.	Aluminum	APHA-3500 Al	mg/L	≤ 0.2	≤0.2	N.D
18.	Manganese (Mn)	APHA-3500 MN-B	mg/L	0.5	≤0.5	N.D
19.	Cadmium (Cd)	APHA-3500 Cd-B	mg/L	0.003	0.01	N.D
20.	Barium (Ba)	APHA-3500 Ba B	mg/L	0.3	0.7	0.29
21.	Mercury (Hg)	APHA-3500 Hg-B	mg/L	0.001	≤0.001	N.D
22.	Copper (Cu)	APHA- 3500 Cu-B	mg/L	2	2	0.39
23.	Zinc (Zn)	APHA- 3500 Zn B	mg/L	3	5	1.53
24.	Boron (B)	APHA 4500 B- C	mg/L	0.3	0.3	N.D
25.	Chromium (Cr)	APHA 3500 cr B	mg/L	0.05	≤0.05	N.D
26.	Selenium (Se)	APHA- 3500 Se C	mg/L	0.01	0.01	N.D
27.	Cyanide (CN)	APHA 4500-CN	mg/L	0.07	≤0.05	N.D
28.	E-Coli	APHA:9222 D	Number/100 mL	Must not be detectable in any 100 ml sample	0 Number/100 mL	0
29.	Total Coliform	APHA:9222 B	Number/100 mL	Must not be detectable in any 100 ml sample	0 Number/100 mL	0

NDWQS National Drinking Water Quality Standards **WHO** World Health Organization
N D Not Detected

Signature of Analyst:

Signature of Chief Chemist

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Street No. 09, Main Canal Road, Abshaar Colony Warsak Road, Peshawar, Pakistan
Tell: +92 91 5202323 Cell: +92 3000391053 Email: inenvconsultants@yahoo.com www. iec-consultants.com

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DRINKING WATER ANALYSIS REPORT

Reference Number	BHPP/ENV/153-2024	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Sampling Location:**	Adit-2 (Ghanol)
Sampling Date:	22-12-2024	**Reporting Date:**	31-12-2024
Source: **GPS Coordinates;**	Tap Water (End User) 34.620250, 73.417595	**Analysis Method**	APHA/USEPA Standard Methods

Sr. No.	Parameters	Standard Methods	Units	WHO	NDWQS	Results
1.	pH	APHA-4500H+ B	--	6.5-8.5	6.5-8.5	7.3
2.	Temperature	---	°C	---	----	9
3.	Taste & Odor	In-house	--	Non-Objectionable	Non Objectionable	Non Objectionable
4.	Color	APHA-2120 B/C	TCU	≤ 15	<15	6
5.	Turbidity	APHA-2130 B	NTU	<5	<5	3.1
6.	Total Dissolved Solids (TDS)	APHA-2540 C	mg/L	< 1000	<1000	279
7.	Total Hardness as $CaCO_3$	APHA-2340 C	mg/L	-------	<500	139
8.	Nitrate (NO_3)	APHA-4500NO3 B	mg/L	50	≤50	1.85
9.	Nitrite (NO_2)	APHA-4500NO2 B	mg/L	3	≤3	0.29
10.	Arsenic (As)	APHA-3500As B	mg/L	0.01	≤0.05	N.D
11.	Nickel (Ni)	ASTM E3047-16	mg/L	0.02	≤0.02	0.004
12.	Antimony (Sb)	APHA-3500Sb B	mg/L	0.005	<0.005	N.D
13.	Chloride (Cl)	APHA-4500Cl- B	mg/L	250	<250	138
14.	Chlorine	APHA-4500 CL	mg/L		0.5-1.5	0.41
15.	Lead (Pb)	APHA-3500 Pb-B	mg/L	0.01	≤0.05	N.D
16.	Fluoride	APHA-4500F- C	mg/L	1.5	≤1.5	0.59
17.	Aluminum	APHA-3500 Al	mg/L	≤ 0.2	≤0.2	N.D
18.	Manganese (Mn)	APHA-3500 MN-B	mg/L	0.5	≤0.5	N.D
19.	Cadmium (Cd)	APHA-3500 Cd-B	mg/L	0.003	0.01	N.D
20.	Barium (Ba)	APHA-3500 Ba B	mg/L	0.3	0.7	0.27
21.	Mercury (Hg)	APHA-3500 Hg-B	mg/L	0.001	≤0.001	N.D
22.	Copper (Cu)	APHA- 3500 Cu-B	mg/L	2	2	0.27
23.	Zinc (Zn)	APHA- 3500 Zn B	mg/L	3	5	1.58
24.	Boron (B)	APHA 4500 B- C	mg/L	0.3	0.3	N.D
25.	Chromium (Cr)	APHA 3500 cr B	mg/L	0.05	≤0.05	N.D
26.	Selenium (Se)	APHA- 3500 Se C	mg/L	0.01.	0.01	N.D
27.	Cyanide (CN)	APHA 4500-CN	mg/L	0.07	≤0.05	N.D
28.	E-Coli	APHA:9222 D	Number/100 mL	Must not be detectable in any 100 ml sample	0 Number/100 mL	0
29.	Total Coliform	APHA:9222 B	Number/100 mL	Must not be detectable in any 100 ml sample	0 Number/100 mL	0

NDWQS National Drinking Water Quality Standards **WHO** World Health Organization
N D Not Detected

Signature of Analyst: *Signature of Chief Chemist*

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DRINKING WATER ANALYSIS REPORT

Reference Number	BHPP/ENV/153-2024	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Sampling Location:**	Adit-3 (Kholian)
Sampling Date:	22-12-2024	**Reporting Date:**	31-12-2024
Source: **GPS Coordinates;**	Spring Water (Source) 34.605195, 73.394487	**Analysis Method**	APHA/USEPA Standard Methods

Sr. No.	Parameters	Standard Methods	Units	WHO	NDWQS	Results
1.	pH	APHA-4500H+ B	--	6.5-8.5	6.5-8.5	7.4
2.	Temperature	---	°C	---	----	10
3.	Taste & Odor	In-house	--	Non-Objectionable	Non Objectionable	Non Objectionable
4.	Color	APHA-2120 B/C	TCU	≤ 15	<15	3
5.	Turbidity	APHA-2130 B	NTU	<5	<5	2.7
6.	Total Dissolved Solids (TDS)	APHA-2540 C	mg/L	< 1000	<1000	254
7.	Total Hardness as $CaCO_3$	APHA-2340 C	mg/L	------	<500	136
8.	Nitrate (NO_3)	APHA-4500NO3 B	mg/L	50	≤50	6.54
9.	Nitrite (NO_2)	APHA-4500NO2 B	mg/L	3	≤3	1.43
10.	Arsenic (As)	APHA-3500As B	mg/L	0.01	≤0.05	N.D
11.	Nickel (Ni)	ASTM E3047-16	mg/L	0.02	≤0.02	0.090
12.	Antimony (Sb)	APHA-3500Sb B	mg/L	0.005	<0.005	N.D
13.	Chloride (Cl)	APHA-4500Cl- B	mg/L	250	<250	133
14.	Chlorine	APHA-4500 CL	mg/L		0.5-1.5	0.32
15.	Lead (Pb)	APHA-3500 Pb-B	mg/L	0.01	≤0.05	N.D
16.	Fluoride	APHA-4500F- C	mg/L	1.5	≤1.5	0.51
17.	Aluminum	APHA-3500 Al	mg/L	≤ 0.2	≤0.2	N.D
18.	Manganese (Mn)	APHA-3500 MN-B	mg/L	0.5	≤0.5	N.D
19.	Cadmium (Cd)	APHA-3500 Cd-B	mg/L	0.003	0.01	N.D
20.	Barium (Ba)	APHA-3500 Ba B	mg/L	0.3	0.7	0.48
21.	Mercury (Hg)	APHA-3500 Hg-B	mg/L	0.001	≤0.001	N.D
22.	Copper (Cu)	APHA- 3500 Cu-B	mg/L	2	2	0.35
23.	Zinc (Zn)	APHA- 3500 Zn B	mg/L	3	5	1.19
24.	Boron (B)	APHA 4500 B- C	mg/L	0.3	0.3	N.D
25.	Chromium (Cr)	APHA 3500 cr B	mg/L	0.05	≤0.05	N.D
26.	Selenium (Se)	APHA- 3500 Se C	mg/L	0.01	0.01	N.D
27.	Cyanide (CN)	APHA 4500-CN	mg/L	0.07	≤0.05	N.D
28.	E-Coli	APHA:9222 D	Number/100 mL	Must not be detectable in any 100 ml sample	0 Number/100 mL	0
29.	Total Coliform	APHA:9222 B	Number/100 mL	Must not be detectable in any 100 ml sample	0 Number/100 mL	0

NDWQS National Drinking Water Quality Standards **WHO** World Health Organization
N D Not Detected

Signature of Analyst: *Signature of Chief Chemist*

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Street No. 09, Main Canal Road, Abshaar Colony Warsak Road, Peshawar, Pakistan
Tell: +92 91 5202323 Cell: +92 3000391053 Email: inenvconsultants@yahoo.com www. iec-consultants.com
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DRINKING WATER ANALYSIS REPORT

Reference Number	BHPP/ENV/153-2024	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Sampling Location:**	Adit-3 (Kholian)
Sampling Date:	22-12-2024	**Reporting Date:**	31-12-2024
Source: **GPS Coordinates:**	Pipe Water (End User) 34.608942, 73.383133	**Analysis Method**	APHA/USEPA Standard Methods

Sr. No.	Parameters	Standard Methods	Units	WHO	NDWQS	Results
1.	pH	APHA-4500H+ B	--	6.5-8.5	6.5-8.5	7.4
2.	Temperature	---	°C	---	----	9
3.	Taste & Odor	In-house	--	Non-Objectionable	Non Objectionable	Non Objectionable
4.	Color	APHA-2120 B/C	TCU	≤ 15	<15	4
5.	Turbidity	APHA-2130 B	NTU	<5	<5	2.3
6.	Total Dissolved Solids (TDS)	APHA-2540 C	mg/L	< 1000	<1000	278
7.	Total Hardness as $CaCO_3$	APHA-2340 C	mg/L	-------	<500	144
8.	Nitrate (NO_3)	APHA-4500NO3 B	mg/L	50	≤50	7.70
9.	Nitrite (NO_2)	APHA-4500NO2 B	mg/L	3	≤3	1.89
10.	Arsenic (As)	APHA-3500As B	mg/L	0.01	≤0.05	N.D
11.	Nickel (Ni)	ASTM E3047-16	mg/L	0.02	≤0.02	0.050
12.	Antimony (Sb)	APHA-3500Sb B	mg/L	0.005	<0.005	N.D
13.	Chloride (Cl)	APHA-4500Cl- B	mg/L	250	<250	141
14.	Chlorine	APHA-4500 CL	mg/L		0.5-1.5	0.29
15.	Lead (Pb)	APHA-3500 Pb-B	mg/L	0.01	≤0.05	N.D
16.	Fluoride	APHA-4500F- C	mg/L	1.5	≤1.5	0.84
17.	Aluminum	APHA-3500 Al	mg/L	≤ 0.2	≤0.2	N.D
18.	Manganese (Mn)	APHA-3500 MN-B	mg/L	0.5	≤0.5	N.D
19.	Cadmium (Cd)	APHA-3500 Cd-B	mg/L	0.003	0.01	N.D
20.	Barium (Ba)	APHA-3500 Ba B	mg/L	0.3	0.7	0.56
21.	Mercury (Hg)	APHA-3500 Hg-B	mg/L	0.001	≤0.001	N.D
22.	Copper (Cu)	APHA- 3500 Cu-B	mg/L	2	2	0.22
23.	Zinc (Zn)	APHA- 3500 Zn B	mg/L	3	5	1.47
24.	Boron (B)	APHA 4500 B- C	mg/L	0.3	0.3	N.D
25.	Chromium (Cr)	APHA 3500 cr B	mg/L	0.05	≤0.05	N.D
26.	Selenium (Se)	APHA- 3500 Se C	mg/L	0.01.	0.01	N.D
27.	Cyanide (CN)	APHA 4500-CN	mg/L	0.07	≤0.05	N.D
28.	E-Coli	APHA:9222 D	Number/100 mL	Must not be detectable in any 100 ml sample	0 Number/100 mL	0
29.	Total Coliform	APHA:9222 B	Number/100 mL	Must not be detectable in any 100 ml sample	0 Number/100 mL	0

NDWQS National Drinking Water Quality Standards WHO World Health Organization
N D Not Detected

Signature of Analyst: Signature of Chief Chemist

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DRINKING WATER ANALYSIS REPORT

Reference Number	BHPP/ENV/153-2024	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Sampling Location:**	Powerhouse (Barkot)
Sampling Date:	22-12-2024	**Reporting Date:**	31-12-2024
Source: **GPS Coordinates;**	Water Cooler 34.603747, 73.379525	**Analysis Method**	APHA/USEPA Standard Methods

Sr. No.	Parameters	Standard Methods	Units	WHO	NDWQS	Results
1.	pH	APHA-4500H+ B	--	6.5-8.5	6.5-8.5	7.6
2.	Temperature	---	°C	---	----	10
3.	Taste & Odor	In-house	--	Non-Objectionable	Non Objectionable	Non Objectionable
4.	Color	APHA-2120 B/C	TCU	≤ 15	<15	4
5.	Turbidity	APHA-2130 B	NTU	<5	<5	2.6
6.	Total Dissolved Solids (TDS)	APHA-2540 C	mg/L	< 1000	<1000	268
7.	Total Hardness as $CaCO_3$	APHA-2340 C	mg/L	------	<500	133
8.	Nitrate (NO_3)	APHA-4500NO3 B	mg/L	50	≤50	1.64
9.	Nitrite (NO_2)	APHA-4500NO2 B	mg/L	3	≤3	0.42
10.	Arsenic (As)	APHA-3500As B	mg/L	0.01	≤0.05	N.D
11.	Nickel (Ni)	ASTM E3047-16	mg/L	0.02	≤0.02	0.006
12.	Antimony (Sb)	APHA-3500Sb B	mg/L	0.005	<0.005	N.D
13.	Chloride (Cl)	APHA-4500Cl- B	mg/L	250	<250	141
14.	Chlorine	APHA-4500 CL	mg/L		0.5-1.5	0.43
15.	Lead (Pb)	APHA-3500 Pb-B	mg/L	0.01	≤0.05	N.D
16.	Fluoride	APHA-4500F- C	mg/L	1.5	≤1.5	0.46
17.	Aluminum	APHA-3500 Al	mg/L	≤ 0.2	≤0.2	N.D
18.	Manganese (Mn)	APHA-3500 MN-B	mg/L	0.5	≤0.5	N.D
19.	Cadmium (Cd)	APHA-3500 Cd-B	mg/L	0.003	0.01	N.D
20.	Barium (Ba)	APHA-3500 Ba B	mg/L	0.3	0.7	0.13
21.	Mercury (Hg)	APHA-3500 Hg-B	mg/L	0.001	≤0.001	N.D
22.	Copper (Cu)	APHA- 3500 Cu-B	mg/L	2	2	0.06
23.	Zinc (Zn)	APHA- 3500 Zn B	mg/L	3	5	1.13
24.	Boron (B)	APHA 4500 B- C	mg/L	0.3	0.3	N.D
25.	Chromium (Cr)	APHA 3500 cr B	mg/L	0.05	≤0.05	N.D
26.	Selenium (Se)	APHA- 3500 Se C	mg/L	0.01	0.01	N.D
27.	Cyanide (CN)	APHA 4500-CN	mg/L	0.07	≤0.05	N.D
28.	E-Coli	APHA:9222 D	Number/100 mL	Must not be detectable in any 100 ml sample	0 Number/100 mL	0
29.	Total Coliform	APHA:9222 B	Number/100 mL	Must not be detectable in any 100 ml sample	0 Number/100 mL	0

NDWQS National Drinking Water Quality Standards WHO World Health Organization

N D Not Detected

Signature of Analyst: Signature of Chief Chemist

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Tell: +92 91 5202323 Cell: +92 3000391053 Email: inenvconsultants@yahoo.com www. iec-consultants.com

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SURFACE WATER ANALYSIS REPORT

Reference Number	BHPP/ENV/153-2024	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Sampling Location:**	Dam Site (Paras Valley)
Sampling Date:	22-12-2024	**Reporting Date:**	31-12-2024
Source: **GPS Coordinates**	Kunhar River 34.660247, 73.451592	**Analysis Method**	APHA/USEPA Standard Methods

Sr. No	Parameters	Analysis Method	Units	NEQS	Results
1)	Temperature	-----	°C	40	8
2)	pH	APHA-4500H+ B	--	6-9	7.9
3)	Chemical Oxygen Demand (COD)	APHA-5220-D	mg/l	150	48
4)	Biological Oxygen Demand (BOD5) at 20 °C	APHA, 5210	mg/l	80	34.2
5)	Total Dissolved Solids (TDS)	APHA-2540 C	mg/l	3500	959
6)	Total Suspended Solids (TSS)	APHA-2540 D	mg/l	200	106
7)	Total Hardness	APHA-2340 C	mg/l	--	97.3
8)	Oil & Grease	Separation Method	mg/l	10	1.2
9)	Chromium (Hexa & Trivalent)	APHA-3500Cr B	mg/l	1.0	0.38
10)	Total Iron	APHA-3500-Fe-B	mg/l	8.0	3.11
11)	Chloride	APHA-4500Cl- B	mg/l	1000	161
12)	Flouride	APHA-4500F- C	mg/l	10	1.85
13)	Ammonia	ASTM-D1426-15	mg/l	40	3.24
14)	Cadmium	APHA-3500 Cd-B	mg/l	0.1	N.D
15)	Lead	APHA-3500-Pb B	mg/l	0.5	N.D
16)	Arsenic	APHA-3500As B	mg/l	1.0	N.D
17)	Copper	APHA-3500Cu B	mg/l	1.0	N.D
18)	Barium	APHA-3500Ba B.	mg/l	1.5	0.06
19)	Selenium	APHA- 3500 Se C	mg/l	0.5	N.D
20)	Silver	APHA-3500Ag-B	mg/l	1.0	N.D
21)	Manganese	APHA-3500-Mn B	mg/l	1.5	0.31
22)	Zinc	APHA-3500-Zn B	mg/l	5.0	0.54
23)	Nickel	ASTM E3047-16	mg/l	1.0	0.02
24)	Boron	APHA-4500B-C	mg/l	6.0	N.D
25)	Mercury	APHA-3500 Hg-B	mg/l	0.01	N.D
26)	Sulphide (S^{-2})	APHA-4500 S_2	mg/l	1.0	0.28
27)	Sulphate (SO_4)	APHA-4500-SO_4 C	mg/l	600	324
28)	An Ionic Detergent (as MBAS)	----	mg/l	20	1.08
29)	Phenolic Compound (as Phenol)	APHA-5530-D	mg/l	0.1	0.05
30)	Cyanide (as CN) total	APHA 4500-CN	mg/l	1.0	N.D
31)	E-Coli	APHA:9222 D	Number/100 mL	---	Uncountable
32)	Total Coliform	APHA:9222 B	Number/100 mL	---	Uncountable

NEQS: National Environmental Quality Standards for Liquid Effluents N.D: Not Detected

Signature of Analyst: Signature of Chief Chemist

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SURFACE WATER ANALYSIS REPORT

Reference Number	BHPP/ENV/153-2024	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Sampling Location:**	Tailrace Upstream (Barkot)
Sampling Date:	22-12-2024	**Reporting Date:**	31-12-2024
Source: **GPS Coordinates**	Kunhar River 34.5971541, 73.3700751	**Analysis Method**	APHA/USEPA Standard Methods

Sr. No	Parameters	Analysis Method	Units	NEQS	Results
1)	Temperature	-----	°C	40	8
2)	pH	APHA-4500H+ B	--	6-9	7.8
3)	Chemical Oxygen Demand (COD)	APHA-5220-D	mg/l	150	51
4)	Biological Oxygen Demand (BOD5) at 20 °C	APHA, 5210	mg/l	80	36.4
5)	Total Dissolved Solids (TDS)	APHA-2540 C	mg/l	3500	1038
6)	Total Suspended Solids (TSS)	APHA-2540 D	mg/l	200	117
7)	Total Hardness	APHA-2340 C	mg/l	--	142
8)	Oil & Grease	Separation Method	mg/l	10	1.29
9)	Chromium (Hexa & Trivalent)	APHA-3500Cr B	mg/l	1.0	0.56
10)	Total Iron	APHA-3500-Fe-B	mg/l	8.0	3.21
11)	Chloride	APHA-4500Cl- B	mg/l	1000	184
12)	Flouride	APHA-4500F- C	mg/l	10	1.76
13)	Ammonia	ASTM-D1426-15	mg/l	40	3.53
14)	Cadmium	APHA-3500 Cd-B	mg/l	0.1	N.D
15)	Lead	APHA-3500-Pb B	mg/l	0.5	N.D
16)	Arsenic	APHA-3500As B	mg/l	1.0	N.D
17)	Copper	APHA-3500Cu B	mg/l	1.0	N.D
18)	Barium	APHA-3500Ba B	mg/l	1.5	0.002
19)	Selenium	APHA- 3500 Se C	mg/l	0.5	N.D
20)	Silver	APHA-3500Ag-B	mg/l	1.0	N.D
21)	Manganese	APHA-3500-Mn B	mg/l	1.5	0.34
22)	Zinc	APHA-3500-Zn B	mg/l	5.0	0.57
23)	Nickel	ASTM E3047-16	mg/l	1.0	0.006
24)	Boron	APHA-4500B-C	mg/l	6.0	N.D
25)	Mercury	APHA-3500 Hg-B	mg/l	0.01	N.D
26)	Sulphide (S^{-2})	APHA-4500 S_2	mg/l	1.0	0.41
27)	Sulphate (SO_4)	APHA-4500-SO_4 C	mg/l	600	325
28)	An Ionic Detergent (as MBAS)	----	mg/l	20	1.01
29)	Phenolic Compound (as Phenol)	APHA-5530-D	mg/l	0.1	0.01
30)	Cyanide (as CN) total	APHA 4500-CN	mg/l	1.0	N.D
31)	E-Coli	APHA:9222 D	Number/100 mL	---	Uncountable
32)	Total Coliform	APHA:9222 B	Number/100 mL	---	Uncountable

NEQS: National Environmental Quality Standards for Liquid Effluents **N.D:** Not Detected

Signature of Analyst

Signature of Chief Chemist

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SURFACE WATER ANALYSIS REPORT

Reference Number	BHPP/ENV/153-2024	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Sampling Location:**	Colony Area (Sanghar)
Sampling Date:	22-12-2024	**Reporting Date:**	31-12-2024
Source: **GPS Coordinates**	Kunhar River 34.585503, 73.363695	**Analysis Method**	APHA/USEPA Standard Methods

Sr. No	Parameters	Analysis Method	Units	NEQS	Results
1)	Temperature	-----	°C	40	9
2)	pH	APHA-4500H+ B	--	6-9	7.8
3)	Chemical Oxygen Demand (COD)	APHA-5220-D	mg/l	150	53
4)	Biological Oxygen Demand (BOD5) at 20 °C	APHA, 5210	mg/l	80	37.4
5)	Total Dissolved Solids (TDS)	APHA-2540 C	mg/l	3500	938
6)	Total Suspended Solids (TSS)	APHA-2540 D	mg/l	200	112
7)	Total Hardness	APHA-2340 C	mg/l	--	162
8)	Oil & Grease	Separation Method	mg/l	10	1.24
9)	Chromium (Hexa & Trivalent)	APHA-3500Cr B	mg/l	1.0	0.45
10)	Total Iron	APHA-3500-Fe-B	mg/l	8.0	2.61
11)	Chloride	APHA-4500Cl- B	mg/l	1000	188
12)	Flouride	APHA-4500F- C	mg/l	10	2.06
13)	Ammonia	ASTM-D1426-15	mg/l	40	3.27
14)	Cadmium	APHA-3500 Cd-B	mg/l	0.1	N.D
15)	Lead	APHA-3500-Pb B	mg/l	0.5	N.D
16)	Arsenic	APHA-3500As B	mg/l	1.0	N.D
17)	Copper	APHA-3500Cu B	mg/l	1.0	N.D
18)	Barium	APHA-3500Ba B	mg/l	1.5	0.006
19)	Selenium	APHA- 3500 Se C	mg/l	0.5	N.D
20)	Silver	APHA-3500Ag-B	mg/l	1.0	N.D
21)	Manganese	APHA-3500-Mn B	mg/l	1.5	0.31
22)	Zinc	APHA-3500-Zn B	mg/l	5.0	0.49
23)	Nickel	ASTM E3047-16	mg/l	1.0	0.003
24)	Boron	APHA-4500B-C	mg/l	6.0	N.D
25)	Mercury	APHA-3500 Hg-B	mg/l	0.01	N.D
26)	Sulphide (S^{-2})	APHA-4500 S_2	mg/l	1.0	0.42
27)	Sulphate (SO_4)	APHA-4500-SO_4 C	mg/l	600	389
28)	An Ionic Detergent (as MBAS)	----	mg/l	20	1.02
29)	Phenolic Compound (as Phenol)	APHA-5530-D	mg/l	0.1	0.01
30)	Cyanide (as CN) total	APHA 4500-CN	mg/l	1.0	N.D
31)	E-Coli	APHA:9222 D	Number/100 mL	---	Uncountable
32)	Total Coliform	APHA:9222 B	Number/100 mL	---	Uncountable

NEQS: National Environmental Quality Standards for Liquid Effluents N.D: Not Detected

Signature of Analyst: *Signature of Chief Chemist*

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WASTEWATER ANALYSIS REPORT

Reference Number	BHPP/ENV/153-2024	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Sampling Location:**	CGGC Camp (Paras)
Sampling Date:	22-12-2024	**Reporting Date:**	31-12-2024
Source: **GPS Coordinates**	Septic Tank (Upstream) 34.664460, 73.460856	**Analysis Method**	APHA/USEPA Standard Methods

Sr. No	Parameters	Analysis Method	Units	NEQS	Results
1)	Temperature	-----	°C	40	11
2)	pH	APHA-4500H+ B	--	6-9	8.4
3)	Chemical Oxygen Demand (COD)	APHA-5220-D	mg/l	150	116.3
4)	Biological Oxygen Demand (BOD5) at 20 °C	APHA, 5210	mg/l	80	72.9
5)	Total Dissolved Solids (TDS)	APHA-2540 C	mg/l	3500	2867
6)	Total Suspended Solids (TSS)	APHA-2540 D	mg/l	200	177
7)	Total Hardness	APHA-2340 C	mg/l	--	193
8)	Oil & Grease	Separation Method	mg/l	10	6.9
9)	Chromium (Hexa & Trivalent)	APHA-3500Cr B	mg/l	1.0	0.76
10)	Total Iron	APHA-3500-Fe-B	mg/l	8.0	3.7
11)	Chloride	APHA-4500Cl- B	mg/l	1000	594
12)	Flouride	APHA-4500F- C	mg/l	10	6.7
13)	Ammonia	ASTM-D1426-15	mg/l	40	16.7
14)	Cadmium	APHA-3500 Cd-B	mg/l	0.1	0.05
15)	Lead	APHA-3500-Pb B	mg/l	0.5	0.37
16)	Arsenic	APHA-3500As B	mg/l	1.0	N D
17)	Copper	APHA-3500Cu B	mg/l	1.0	0.62
18)	Barium	APHA-3500Ba B	mg/l	1.5	N.D
19)	Selenium	APHA- 3500 Se C	mg/l	0.5	N.D
20)	Silver	APHA-3500Ag-B	mg/l	1.0	N.D
21)	Manganese	APHA-3500-Mn B	mg/l	1.5	0.58
22)	Zinc	APHA-3500-Zn B	mg/l	5.0	1.38
23)	Nickel	ASTM E3047-16	mg/l	1.0	0.67
24)	Boron	APHA-4500B-C	mg/l	6.0	N.D
25)	Mercury	APHA-3500 Hg-B	mg/l	0.01	N.D
26)	Sulphide (S^{-2})	APHA-4500 S_2	mg/l	1.0	0.73
27)	Sulphate (SO_4)	APHA-4500-SO_4 C	mg/l	600	482
28)	An Ionic Detergent (as MBAS)	----	mg/l	20	10.7
29)	Phenolic Compound (as Phenol)	APHA-5530-D	mg/l	0.1	0.06
30)	Cyanide (as CN) total	APHA 4500-CN	mg/l	1.0	N.D

NEQS: National Environmental Quality Standards for Liquid Effluents N.D: Not Detected

Signature of Analyst: Signature of Chief Chemist

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WASTEWATER ANALYSIS REPORT

Reference Number	BHPP/ENV/153-2024	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Sampling Location:**	CGGC Camp (Paras)
Sampling Date:	22-12-2024	**Reporting Date:**	31-12-2024
Source:	Septic Tank (Downstream)	**Analysis Method**	APHA/USEPA Standard Methods
GPS Coordinates	34.663601, 73.460314		

Sr. No	Parameters	Analysis Method	Units	NEQS	Results
1)	Temperature	-----	°C	40	11
2)	pH	APHA-4500H+ B	--	6-9	8.7
3)	Chemical Oxygen Demand (COD)	APHA-5220-D	mg/l	150	108
4)	Biological Oxygen Demand (BOD5) at 20 °C	APHA, 5210	mg/l	80	69.9
5)	Total Dissolved Solids (TDS)	APHA-2540 C	mg/l	3500	2459
6)	Total Suspended Solids (TSS)	APHA-2540 D	mg/l	200	294
7)	Total Hardness	APHA-2340 C	mg/l	--	308.4
8)	Oil & Grease	Separation Method	mg/l	10	7.4
9)	Chromium (Hexa & Trivalent)	APHA-3500Cr B	mg/l	1.0	0.85
10)	Total Iron	APHA-3500-Fe-B	mg/l	8.0	6.93
11)	Chloride	APHA-4500Cl- B	mg/l	1000	679
12)	Flouride	APHA-4500F- C	mg/l	10	3.22
13)	Ammonia	ASTM-D1426-15	mg/l	40	21.5
14)	Cadmium	APHA-3500 Cd-B	mg/l	0.1	N.D
15)	Lead	APHA-3500-Pb B	mg/l	0.5	0.37
16)	Arsenic	APHA-3500As B	mg/l	1.0	0.46
17)	Copper	APHA-3500Cu B	mg/l	1.0	N.D
18)	Barium	APHA-3500Ba B	mg/l	1.5	0.41
19)	Selenium	APHA- 3500 Se C	mg/l	0.5	0.13
20)	Silver	APHA-3500Ag-B	mg/l	1.0	0.67
21)	Manganese	APHA-3500-Mn B	mg/l	1.5	1.1
22)	Zinc	APHA-3500-Zn B	mg/l	5.0	2.95
23)	Nickel	ASTM E3047-16	mg/l	1.0	0.28
24)	Boron	APHA-4500B-C	mg/l	6.0	1.2
25)	Mercury	APHA-3500 Hg-B	mg/l	0.01	N.D
26)	Sulphide (S^{-2})	APHA-4500 S_2	mg/l	1.0	0.83
27)	Sulphate (SO_4)	APHA-4500-SO_4 C	mg/l	600	521
28)	An Ionic Detergent (as MBAS)	----	mg/l	20	4.95
29)	Phenolic Compound (as Phenol)	APHA-5530-D	mg/l	0.1	0.04
30)	Cyanide (as CN) total	APHA 4500-CN	mg/l	1.0	N.D

NEQS: National Environmental Quality Standards for Liquid Effluents **N.D:** Not Detected

Signature of Analyst:

Signature of Chief Chemist

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SOIL ANALYSIS REPORT

Reference Number	BHPP/ENV/153-2024	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Sampling Location :**	Adit-1 (Thobi)
Monitoring Date:	22-12-2024	**Reporting Date:**	31-12-2024
Source:	Soil Sample		

Sr. No.	Parameters		Results
1	Soil Texture	Sand %	28
		Silt%	46
		Clay %	26
		Texture Class	Silty Clay Loam
2	pH		8.1
3	Electrical Conductivity EC (μSm^{-1})		225
4	Phosphorus ($mgkg^{-1}$)		2.76
5	Sodium Absorption Ratio		3.18

μSm^{-1}: Micro siemens/meter
$mgkg^{-1}$: milligram per Kilogram

Signature of Analyst: *Signature of Chief Chemist*

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SOIL ANALYSIS REPORT

Reference Number	BHPP/ENV/153-2024	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Sampling Location :**	Adit-2 (Ghanol)
Monitoring Date:	22-12-2024	**Reporting Date:**	31-12-2024
Source:	Soil Sample		

Sr. No.	Parameters		Results
1	Soil Texture	Sand %	23
		Silt%	46
		Clay %	31
		Texture Class	Silty Clay Loam
2	pH		7.9
3	Electrical Conductivity EC (μSm^{-1})		244
4	Phosphorus ($mgkg^{-1}$)		2.73
5	Sodium Absorption Ratio		3.29

μSm^{-1}: micro siemens/meter
$mgkg^{-1}$: milligram per Kilogram

Signature of Analyst:

Signature of Chief Chemist

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SOIL ANALYSIS REPORT

Reference Number	BHPP/ENV/153-2024	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Sampling Location :**	Adit-3 (Kholian)
Monitoring Date:	22-12-2024	**Reporting Date:**	31-12-2024
Source:	Soil Sample		

Sr. No.	Parameters		Results
1	Soil Texture	Sand %	33
		Silt%	51
		Clay %	16
		Texture Class	Silty Clay Loam
2	pH		8.2
3	Electrical Conductivity EC (μSm^{-1})		239
4	Phosphorus ($mgkg^{-1}$)		1.66
5	Sodium Absorption Ratio		3.58

μSm^{-1}: micro siemens/meter
$mgkg^{-1}$: milligram per Kilogram

Signature of Analyst:

Signature of Chief Chemist

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SOIL ANALYSIS REPORT

Reference Number	BHPP/ENV/153-2024	Client Name	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	Sampling Location :	Powerhouse (Barkot)
Monitoring Date:	22-12-2024	Reporting Date:	31-12-2024
Source:	Soil Sample		

Sr. No.	Parameters		Results
1	Soil Texture	Sand %	25
		Silt%	43
		Clay %	32
		Texture Class	Silty Clay Loam
2	pH		8
3	Electrical Conductivity EC (μSm^{-1})		241
4	Phosphorus ($mgkg^{-1}$)		3.52
5	Sodium Absorption Ratio		3.39

μSm^{-1}: micro siemens/meter
$mgkg^{-1}$: milligram per Kilogram

Signature of Analyst:

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SOIL ANALYSIS REPORT

Reference Number	BHPP/ENV/153-2024	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Sampling Location :**	GRC Camp Office (Sanghar)
Monitoring Date:	22-12-2024	**Reporting Date:**	31-12-2024
Source:	Soil Sample		

Sr. No.	Parameters		Results
1	Soil Texture	Sand %	19
		Silt%	43
		Clay %	38
		Texture Class	Silty Clay Loam
2	pH		8.2
3	Electrical Conductivity EC (μSm^{-1})		221
4	Phosphorus ($mgkg^{-1}$)		2.37
5	Sodium Absorption Ratio		4.2

μSm^{-1}: Micro siemens/meter
$mgkg^{-1}$: milligram per Kilogram

Signature of Analyst: *Signature of Chief Chemist*

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Annexure 3: Incidents Record of the EPC Contractor

Incidents Record of the EPC Contractor (July to December 2024)

S/No	Accident/ Incident No	Accident/ Incident Date	Location	Accident/Incident Details	Injury Detail	Injured Person Name	Current Status
1.	ENR-01	8/8/2024	A3- batching plant aggerate washing facility	Oil stains on the surface of the batching plant sedimentation tank	-	-	Removed all oil stains on the water surface
2.	IANR-17	23/8/2024	Dam site	Stress in the workplace causes accident	Minor Injury to the left finger	M. Awais	Resumed duty
3.	IANR-18	8/9/2024	Sangar	Distracted driving	shoulder was fractured and minor abrasions on his head, chest, ear, hands, and legs	Muhammad Shujaat Khan	Resumed duty
		8/9/2024	Sangar	Distracted driving	229. Minor abrasions on eye, hand, and legs	Muhammad Abbas	Resumed duty
4.	IANR-19	5/12/2024	Adit3 Headrace Tunnel	Falling debris and the collapse of the headrace tunnel crown	Head and leg injuries	Muhammad Ilyas	Hospitalized
		5/12/2024	Adit3 Headrace Tunnel	Falling debris and the collapse of the headrace tunnel crown	Head and leg injuries	Mazhar Hussain	Rest at home
		5/12/2024	Adit3 Headrace Tunnel	Falling debris and the collapse of the headrace tunnel crown	Head and leg injuries	Naqash Ahmed	deceased
5.	IANR-20	5/12/2024	Dam Site Near N-15	Workplace stress leads to risky actions and accidents.	Abrasion on chest.	Masood	Rest at home
6.	IANR-20	5/12/2024	Dam Site Near N-15	Workplace stress leads to risky actions and accidents.	Abrasion on chest.	Masood	Rest at home
7.	IANR-21	9/12/2024	Dam Site Near N-15	Lack of HSE Knowledge	Nose injury	Mahaz Ali	Hospitalized
8.	IANR-22	12/13/2024	Adit 2 Tunnel	Scaffolding tube bounce back and hit him near his right eyebrow	Visible Injury near his Right eye brow	M. Hameed	Resumed duty
9.	IANR-23	12/16/2024	Dam Site	A Large stone slipped from the hand of the worker during dismantling of sedimentation tank resulting in injury to his right hand.	Minor Injury on right hand	Faisal Shah	Resumed duty

S/No	Accident/ Incident No	Accident/ Incident Date	Location	Accident/Incident Details	Injury Detail	Injured Person Name	Current Status
10.	IANR-24	12/16/2024	Adit3 Headrace Tunnel	The right side of the tunnel collapsed due to water seepage	Not applicable	Not applicable	Not applicable
11.	IANR-25	12/16/2024	Dam Site	During cutting of Lattice Girder, steel cutter disc broke and hit the right shoe of the worker resulting in injury to his foot.	Minor open wound on his right feet	M. Farooq	Resumed duty
12.	IANR-26	12/18/2024	Adit 3	A Fire broke out at A3 behind Chinese camp due to short circuit,	Asset damage in case of burnt cables.	Not Applicable	Not applicable
13.	IANR-27	12/19/2024	Adit 3	During operating of Pneumatic hammer drill, the air pipe detached from drill and hit him on his dorsal side of right hand.	Minor injury on right hand dorsal side	Shakeel Ahmad	Resumed duty
14.	IANR-28	12/23/2024	Dam Site	Mr. Akhtar was manually picking up a steel pipe, the pipe slipped from his hand and struck his foot, causing an injury to his foot.	Minor Abrasion to his foot	Akhtar Shah	Resumed duty
15.	IANR-29	12/24/2024	Adit 3	Mr. Azad Muhammad was busy in drilling operation at A2 tunnel. Meanwhile small stone fell down from working platform and cause minor injury to his right eye.	Minor Abrasion to his right eye	Azad Muhammad	Resumed duty
16.	IANR-29	12/30/2024	Dam Site	Due to brake failure a private dumper collided with the diesel tanker that was filling Diesel in a company dumper.	Asset damage	Asset damage	Not Applicable

Annexure 3 (A): Detailed Fatal Incident Report

INCIDENT NOTIFICATION FORM

Project:	**BHPP**	**Incident Date:**	**05-12-2024**
Location:	**HRT U/S from Adit-3**	**Incident Time:**	**12:20**
Equipment Involved:	**Wire mesh, rock bolt and drill machine.**	**Operation in Progress:**	**Drilling of rock bolt, fixing of wire mesh and performing support work after the first layer of the shotcrete.**

Weather: ☒ Clear ☐ Dark ☐ Rain ☐ Snow ☐ High Winds ☐ Other (describe):
Visibility: ☒ Artificial Light ☐ Dark ☐ Dawn ☐ Daylight ☐ Dusk

Reporting Level of Incident:

☒ Fatality ☒ Lost Time ☐ Restricted Work ☒ Medical Aid ☐ First Aid	☐ Near Miss ☒ Equipment Damage ☐ Property Damage ☐ Fire/Explosion	☐ Business Interruption ☐ Security/Trespass/Theft ☐ Mobile Equipment ☐ Vehicle ☐ Spill/Release	☐ Government Reportable ☐ Non-reportable ☐ Contravention ☐ Public Complaint

Contractor Incident: ☒ Yes ☐ No **Contractor name: CGGC-GRC JV**

Report Prepared by: Syed Ali Fawad Shah PMC	**Supervisor's Name: Syed Ali Fawad Shah (PMC) H&S Monitor**
Signature: Date:10.12-2024	Tel. No. 03326900410 Date: 11-12-2024

AFFECTED PERSONS (Worker Positions)
Mr. Mazhar Hussain S/O Azeez-Ur- Rehman CNIC # 13501-9140513-7 (Labour)
Mr. Muhammad Ilyas S/O Muhammad Miskeen CNIC # 13501-1317196-5 (Labour)
Mr. Naqash Ahmed S/O Chamman Hussain CNIC # 13501-1778045-7 (Labour)

DESCRIPTION OF INCIDENT (Describe what, when, why, who and how. Use separate pages if required. Attach photos if applicable.)

On December 5, 2024, around 12:20 PM, an accident occurred at Headrace Tunnel (Ch: 8+932.5, upstream) from Adit -3, during drilling, fixing, and installation of wire mesh, as part of support work. Unfortunately, the left part of the crown collapsed while workers were busy refurbishing and lifting the wire mesh. Suddenly, rocks fell o the workers and the working platform. The volume of the collapsed debris was approximately 0.714 m³ (V = L x W x D = 1.7 m x 0.7 m x 0.6 m = 0.714 m³).

The injured workers were hit by loose rocks and, as a result, fell from a platform at a height of 5 meters due to the severe impact of the falling debris. Three workers, namely Mr. Muhammad Ilyas, Mr. Mazhar Hussain, and Mr. Naqash Ahmed, were seriously injured. The foreman, HSE officer, and other laborers immediately rescued the injured workers, providing first aid treatment. Contractor's HSE Officer Mr. Rashid and Foreman Mr. Khizer then escorted the victims to Balakot Tehsil Hospital usin company vehicles.

Following the hospital administration's instructions, the injured workers were immediately referred to Mansehra District Hospital for further treatment via three separate ambulances. At Mansehra District Hospital, Mr. Mazhar Hussain was admitted, while the other two injured workers were further referred to Ayub Medical Complex as per the advice of the Mansehra District Hospital, without any delay.

WITNESSES- Provide separate witness reports

Name	Position	Contact Information
Toufeeq S/O Maqbool Ur Rehman	Labour	03494542674
Rehmat Ali S/O Chamman Hussain (B/O Victim)	Labour	03417141325
Mr. M. Basheer S/O Haji Mian Ibrahim	CSA	03405846192
Mr. Rashid Hussain	HSE Office	03459016435
Mr. Abdul Salm	QC Engine	0345-0536875

NOTIFICATIONS

What internal notifications have been made?	What external notifications have been made?
DTL communicated with PMC H&S Monitor and Contractor's site and administration personnel	After confirmation from the site and detailed visit, the H&S Monitor of PMC informed the Employer's DD- HSE and Gender. TL PMC and PD BHPP had

INCIDENT NOTIFICATION FORM 1

INTERNAL. This information is accessible to ADB Management and staff. It may be shared outside ADB with appropriate permission.

INCIDENT NOTIFICATION FORM

after hearing the news of the incident. PMC H&S Monitor took PMC Tunnel Engineer, Geologist, Inspector and the Contractor's QHSE team and sub-contractor staff and had a detailed visit to the incident location. TL PMC also visited the site with the HSE officer and made video of the site for further record.	conversation on the incident. An official Emergency HSE meeting was held on 6th, Dec. 2024 around 11:00 AM with the PEDO, PMC and Contractor's top management to discuss the incident/accident in detail.

INJURY INFORMATION (if applicable)

Position: 1. Naqash Ahmed got serious injuries to his head and his leg also got hit. 2. M. Ilyas got injuries to his nose and head. 3. Mazhar Hussain got minor abrasion to his head.	Current condition: 1. Died next day around 7:30 AM on 06-12-2024 2. Under treatment. 3. Discharged from the hospital on the same day 05-12-2024.

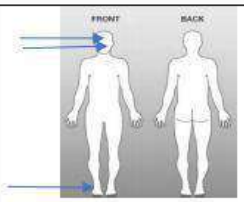
Was injured person(s) taken to hospital? Yes ☒ No ☐

(If yes, provide name and location of the hospital)

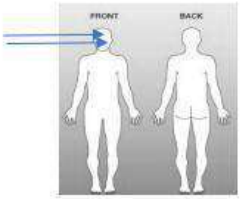
Due to the severe incident three labors Muhammad Ilyas, Mazhar Hussain and Naqash Ahmed were injured. Foreman, HSE officer and other labors first rescue the injured persons for first aid treatment and then Contractor's HSE officer Mr. Rashid and foreman Mr. Khizer were escorted the victims to Balakot Tehsil Hospital on company vehicles. After the instruction of the hospital administration the injured persons were immediately referred to Mansehra district hospital for treatment through three different ambulances, where Mr. Mazhar was hospitalized in Mansehra district hospital and rest of the two injured person were further referred to Ayub Medical Complex as per the advice of the Mansehra district hospital without any delay.

Indicate the area of injury, if applicable, on the diagram to the right, and describe the injury in the space below:

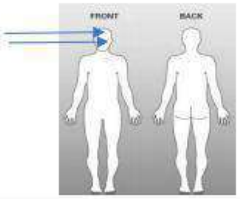
1. Naqash Ahmed got injuries to his leg, head and nose.



2. M. Ilyas got injuries to his nose and head.



3. Mazhar Hussain got multiple minor injuries on his head.



VEHICLE INFORMATION (if applicable)

Driver's Name:	Driver's License No.:
Year, Make & Model:	Driver's Phone Number:
License Plate or Serial Number:	Insurer and Policy No.:
Was seat belt done up? ☐ Yes ☐ No	Was a cell phone being used? ☐ Yes ☐ No
Were police notified? Yes ☐ No ☐	Name of police officer:

INCIDENT NOTIFICATION FORM 2

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INCIDENT NOTIFICATION FORM

Road conditions: ☐ Dry ☐ Gravel ☐ Wet ☐ Icy	Other Info/Attachments:

Spill/Release Information (if applicable)

Product: **Volume:** **Quantity Recovered:**

Initial Causal Analysis of Incident:

Code

Direct Cause: (what / how)

Debris were fall down during drilling, fixing wire mesh and support work after first layer of the shotcrete.

Root Cause: (why)

Violation/Refusal of the Quality Control Engineer and HSE officers' instructions by Mr. Mongh:

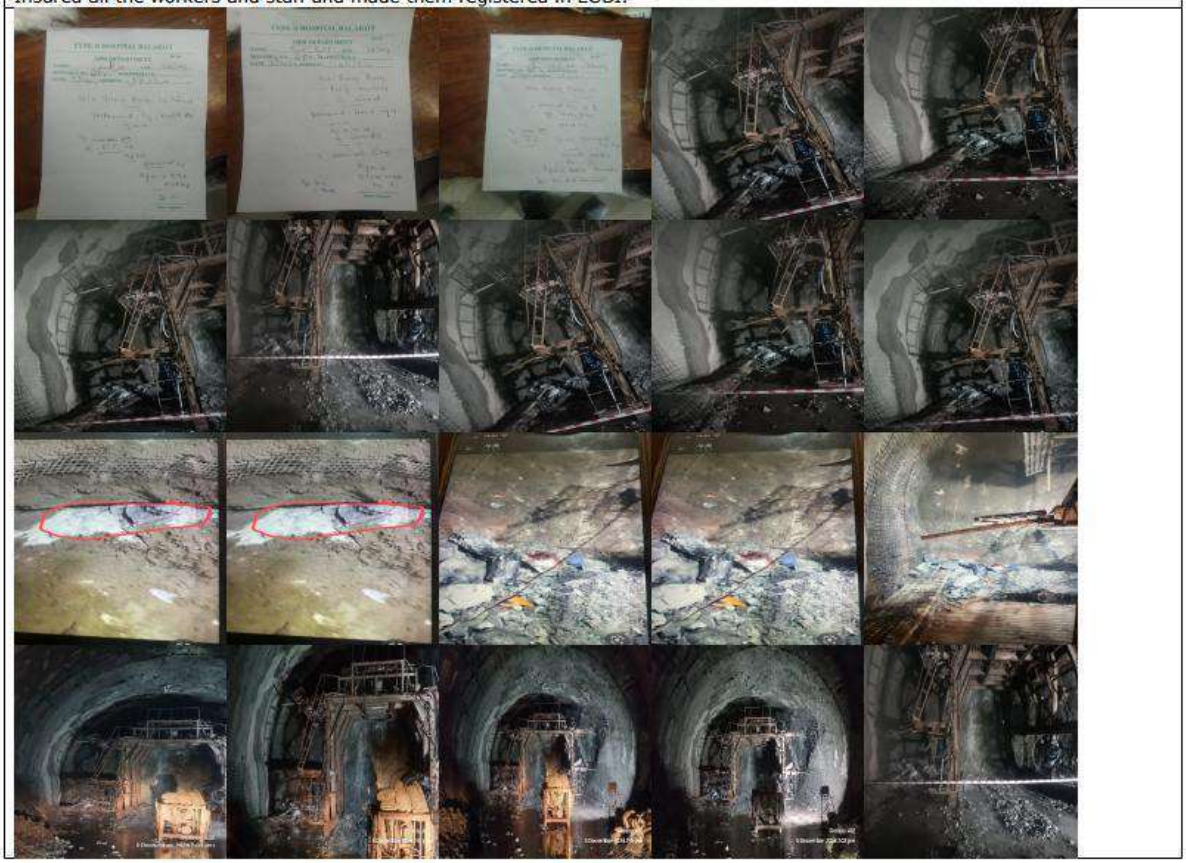
On the day of the incident, the PMC Geologist and Junior Engineer were on a joint inside the HRT from Adit-3 visit with Contractor's team including; QC Engineer and HSE officer, where drilling of the rock bolt and fixing of the wire mesh was in progress. At that time HSE officer and QC engineer have noticed that few stones were falling down from the crown.
QC engineer and HSE officer have instructed to both the foremen (Pakistani and Chinese) to stop the drilling of rock bolt and shift the machine at back side.
Furthermore, HSE officer instructed to both the foremen to conduct re-scaling and then resume the face activity. Pakistani foreman has agreed but Chinese foreman has refused to follow the HSE instruction and responded that they have no time for it. Mr. Mongh has re-start the drilling of the rock bolt without conducting re-scaling and ignore the HSE, QC and geologist instructions. In lunch break he continued the activity in the absence of the HSE officer, confined space attendant, and QC engineer.
Hence of the above mention evidences showed the root cause of the incident was the mis-commitment of the management (Mr. Mongh), violate the HSE procedures and neglect the HSE and QC instructions.

Corrective Actions to Prevent Recurrence:

Shifted the injured persons to the hospital for treatment on immediate basis which escorted by the foreman and HSE officer.
H&S monitor instructed to stop the activity, evacuate the site, barricade the affected area and preserve the scene. Instructed for re-scaling and clear the suspected area.
PMC started investigation from the eye witnesses and took pictures.
TL visited the site and made video of the site.
The execution team to follow the instruction of the HSE team strictly in future.
Conduct a thorough review of current methodologies, procedures, and equipment to ensure compliance with approved standards.
Replace outdated or defective machinery and tools with ones that meet required safety criteria.
Reinforce adherence to HSE guidelines through regular training and monitoring.
Establish a robust coordination mechanism among all subcontractors to ensure seamless communication and safe execution of tasks.
Must Take the undertaking by the sub-contractor to follow the HSE procedure otherwise immediately fire the violator weather he is Chinese or Pakistani.
Use double insulated cables and pass it through PVC pipes.
Scaling will perform three times rather than twice before allow to work inside the tunnel.
Follow the geologist instruction and provide them all the geological tool like geological hammers, touches etc. to inspect the area thoroughly.
Take the concerns of the geologist and the HSE for clearance. Prepare a format for taking clearance by all stake holders.
Instructed to the sub-contractor for purchasing more walkie talkies. Sub -contractor have ordered to the vendor for 12 more walkie talkies.
Instructed to the sub-contractor for continuous deputation of the confined space attendant and HSE officer till workers will work inside the tunnel and give them over time along with the workers.
In lunch time no work will be allowed and if deem necessary then involved confined space attendant, HSE officer and geologist.
All electrical equipment checks and verification must be completed by the competent electricians on daily basis.
Standardized PPEs should provide to all workers and took the picture of the distribution.
Helmet should be grade third with chin strap.
Re-construct the drainage line and sump in the tunnel again.
Remove the sludge from the tunnel on daily basis if generated.
Increase more light and maintain the 80 to 100 lux in the tunnel.
Increase the frequency of the lux survey, gas test, noise intensity survey and vibrometer measurements.
Instructed to prepare the elevated platform in-which rubber washers will use to restrict the current from one part of the platform to another. Increase the strength of the platform.

INCIDENT NOTIFICATION FORM

Respirator of 3M should provide to the drillers and the shotcrete workers.
Before blast geologist will verify the quantity of the explosive and HSE will give the clearance for the control blast.
Ambulance or emergency vehicles should stand-by all the time outside each tunnel.
Contractor's Clinic should be open 24/7 with full medicines and equipment.
Use wooden stand for trailing cables or hang on the walls of the tunnel.
Interview all the HSE officers and safety staff by the HSE of the PEDO and PMC jointly. Qualify the assessment exam is mandatory for each HSE officer.
Keep all the method statements, permit, drawings along with tool box talk in the permit box.
All execution team and other departments should follow the HSE instructions. If violate then immediately action for removal/ firing by the Contractor.
Increase the number of the fire extinguishers in the tunnel.
Conducted joint meeting on 6-12-2024 with PMC, PEDO and Contractor and discussed all the aspect of the incident.
Conducted two meetings with the Director of the Sub-contractor and his whole site team to apply more control measures on the site for preventing the recurrence of the such incident in future on 09-12-2024 and 12-12-2024 respectively.
Insured all the workers and staff and made them registered in EOBI.



INCIDENT NOTIFICATION FORM

Note: Refer to the "Root Cause Investigation & Corrective Action Form" for further detail.

INCIDENT ROOT CAUSE INVESTIGATION AND CORRECTIVE ACTION FORM

Project:	**Balakot Hydropower Project**	**Incident Date:**	**5th. December, 2024**
Location:	**HRT Upstream from Adit-3**	**Incident Time:**	**12:20 PM**
Incident Title:	**Accident happened on 5th. December, 2024 at Adit-3 Headrace tunnel during drilling of rock bolt, lifting & Installation of wire mesh.**		

Has the Incident Notification Form been completed? ☒ Yes ☐ No
If not, complete the incident notification form before completing this form.

☒ Fatality ☒ Lost Time ☐ Restricted Work ☒ Medical Aid ☐ First Aid	☐ Near Miss ☐ Equipment Damage ☒ Property Damage ☐ Fire/Explosion	☐ Business Interruption ☐ Security/Trespass/Theft ☐ Mobile Equipment ☐ Vehicle ☐ Spill/Release	☐ Government Reportable ☐ Non-reportable ☐ Contravention ☐ Public Complaint

Report Prepared by: Syed Ali Fawad Shah (PMC) Signature: Date:30-12-2024	**Supervisor's Name:** Syed Ali Fawad Shah H&S Expert PMC Signature: Date: 30-12-2024

This form is used to help analyze incident **root causes** and **contributing factors**. Incidents rarely arise due to one single cause, and there are often multiple contributing factors that are involved in an incident.
A **cause** is a condition that produces an effect. If a cause is eliminated, the effect is eliminated.
A **contributing factor** is a condition that influences the effect but does not cause the effect. If the contributing factor is eliminated, the effect is not necessarily eliminated but may be influenced in other ways, such as being less severe, less likely, proceeding more slowly, or other similar effects.

DESCRIPTION OF INCIDENT (Use separate pages if required. Attach photos if applicable.)

On December 5, 2024, around 12:20 PM, an accident occurred at Headrace Tunnel (Ch: 8+932.5, upstream) from Adit -3, during drilling, fixing, and installation of wire mesh, as part of support work. Unfortunately, the left part of the crown collapsed while workers were busy refurbishing and lifting th wire mesh. Suddenly, rocks fell on the workers and the working platform. The volume of the collapsed debris was approximately 0.714 m³ (V = L x W x D = 1.7 m x 0.7 m x 0.6 m = 0.714 m³). The injured workers were hit by loose rocks and, as a result, fell from a platform at a height of 5 meters due t the severe impact of the falling debris. Three workers, namely Mr. Muhammad Ilyas, Mr. Mazhar Hussain, and Mr. Naqash Ahmed, were seriously injured. The foreman, HSE officer, and other laborers immediately rescued the injured workers, providing first aid treatment. Contractor's HSE Officer Mr. Rashid and Foreman Mr. Khizer then escorted the victims to Balakot Tehsil Hospital using company vehicles. Following the hospital administratior instructions, the injured workers were immediately referred to Mansehra District Hospital for further treatment via three separate ambulances. At Mansehra District Hospital, Mr. Mazhar Hussain was admitted, while the other two injured workers were further referred to Ayub Medical Complex as per the advice of the Mansehra District Hospital, without any delay.

Root Cause and Contributing Factor Analysis (add more pages if necessary for any section)

LEADING EVENTS ANALYSIS (Describe the events leading up to the incident that were different to a normal sequence of events for this activity. Consider whether changes from normal sequences of events were causes or contributing factors to the incident.) (Refer to Chapter 6 of the ADB OCHS Guide for detail)

Violation/Refusal of the Quality Control Engineer and HSE officers' instructions by Mr. Mongh:

On the day of the incident, the PMC Geologist and Junior Engineer were on a joint inside the HRT from Adit-3 visit with Contractor's team including; QC Engineer and HSE officer, where drilling of the rock bolt and fixing of the wire mesh was in progress. At that time HSE officer and QC engineer have noticed that few stones were falling down from the crown. QC engineer and HSE officer have instructed to both the foremen (Pakistani and Chinese) to stop the drilling of rock bolt and shift the machine at back side. Furthermore, HSE officer instructed to both the foremen to conduct re-scaling and then resume the face activity. Pakistani foreman has agreed but Chinese foreman has refused to follow the HSE instruction and responded that they have no time for it. Mr. Mongh has re-start the drilling of the rock bolt without conducting re-scaling and ignore the HSE, QC and geologist instructions. In lunch break he continued the activity in the absence of the HSE officer, confined space attendant, and QC engineer.
Hence of the above mention evidences showed the root cause of the incident was the mis-commitment/refusal of the management (Mr. Mongh), violate the HSE procedures and neglect the HSE and QC instructions.

INCIDENT ROOT CAUSE INVESTIGATION AND CORRECTIVE ACTION FORM

Were the proper safe work practices and procedures being used by the workers in the events leading up to the incident? If not, why not?

Work was performed in the absence of QC engineer, HSE officer and the confined space attendant in the lunch break. HSE officer and QC engineer instruction of re-scaling was by-passed and work was restarted in the absence of them by the Chinese foreman although Pakistani foreman accepted the instruction but Mr. Mongh said no time for the re-scaling. Hence root cause of the accident was ignorance of the QC and HSE instructions and violate the HSE procedure.

Were relevant legislation and standards being followed by the workers in the events leading up to the incident? If not, why not?

All relevant legislation and standards were being followed by the workers in the events leading up to the incident.

Were there any mechanical failures or defects that led to the incident? If yes, describe below:

There was no mechanical failures and defects reported that led to the incident.

Were the proper safety devices in place and being used? Were workers using proper personal protective equipment (PPE)? If not, why not?

Yes, all the workers were properly wearing personal protective equipment's such as safety helmet, gloves, safety shoes while working in Adit-3 tunnel for refurbishing, drilling rock bolt and lifting of wire mesh.

Did the actions or lack of actions of anyone at the worksite contribute to the incident? If yes, describe below:

Action of the foreman Mr. Mongh led to the fatal incident because he by-passes the HSE and Qc engineer instruction to Conduct re-scaling of the left crown. But Mr. Mongh said no time for re-scaling.
Secondly, he restarts the drilling and wire mesh fix activity in the absence of the HSE officer, confined space attendant and the Qc engineer during lunch break.
HSE officer and QC engineer had stopped the work and removed the machine at the back of the face and instructed that work will resume after re-scaling. Hence Mr. Mongh re-start the work in their absence.

Were there any unusual conditions that contributed to the incident, such as (but not limited to) weather, other activities in the area, or anything else that was not typical for the task?

INCIDENT ROOT CAUSE INVESTIGATION AND CORRECTIVE ACTION FORM

Yes, stones were felt down during drilling and fixing the wire mesh.

Did the workers present at the incident respond in a safe and appropriate way? Describe below:
The workers present at site responded to this accident in a timely manner. The site foreman Mohsin and HSE Officer immediately escorted the injured persons to Balakot Tehsil Hospital on company vehicles. After the hospital administration advice, the injured persons were referred to Mansehra District Hospital on three different Ambulances. Where Mr. Mazhar was hospitalized and rest of the two were further referred to the Ayub medical complex under the escort of foreman Mr. Mohsin.

Were the workers adequately trained to respond to the incident? If not, what training would have helped to lead to a better outcome?
Yes, the workers were properly skilled and trained to respond any such incident as recently on 27th.November and 28th. November 2024, most of them participated in the training sessions which conducted by Rescue 1122 on fire extinguishing, evacuation, how to give CPR, drowning rescue drill, how to stop bleeding and how to deal with emergency situations etc.
On 16th. Nov 2024 for the blasts, drillers and electricians training session was conducted by the Muzaffarabad Poly technical institute.

Are there adequate procedures in place to respond to similar incidents? If not, what procedures need to be developed?
The procedures are already in place to respond similar incidents. However, these procedures require strict implementation in order to avoid any further incidents in the future. Like HSE officer and the confined space attendant should be present till the workers were working inside the tunnel.

Check any causes and contributing factors from the following list. If necessary, add additional causes and contributing factors.

INCIDENT ROOT CAUSE INVESTIGATION AND CORRECTIVE ACTION FORM

☐ Operating equipment without training ☐ Operating equipment without proper care ☐ Operating equipment without safety devices in place or with inoperable safety devices ☐ Inadequate warning to workers of a safety issue ☐ Inadequate barriers or barricades ☐ Using defective tools or equipment ☐ Proper equipment unavailable ☐ Improper loading ☐ Poor housekeeping practices ☐ Repetitive action injury ☐ Poor maintenance of tools/equipment ☐ Hazardous conditions (gas, dust, fumes)	☐ Inadequate site security ☐ Inadequate worker protection from toxic substances ☐ Inadequate PPE ☐ Improper use of PPE ☐ Inadequate lighting ☐ Inadequate ventilation ☐ Inadequate supervision ☐ Inadequate training ☐ Fatigue ☐ Worker(s) under the influence of substances such as alcohol or medications ☒ Fair geological condition as it was not good ☒ By-pass the HSE and QC instruction ☒ Management commitment

List the contributing factors and their involvement as a cause of the incident.

Contributing Factors	Involvement
Neglect the site geological condition by the site foremen.	Minor
When QC and HSE stopped the work due to dropping of the stones during drilling and fixing wire mesh and instructed for re-scaling but the Chinese foreman ignored their instruction.	Moderate
Work was re-start by Mr. Mongh in the absence of the QC engineer, confined space attendant and the HSE officer in Lunch break without the approval of the HSE.	High

Describe the root cause (s) below:

Management pressure of the work and undermine the HSE instructions. Ignore the geological condition of the site.

Corrective Action Analysis

List the corrective actions already taken or planned to prevent a similar incident from occurring. Indicate whether the corrective action is already complete and who is responsible for implementing it.

Corrective Action	Person Responsible	Status?
Firstly, HSE officers are strictly instructed to not allow any work without their consent and approval. If they feel anything deviate from normal, they could stop the activity.	Mr. Rashid Hussain	Done
Secondly, the sub-contractor was strictly instructed for proper scaling of crown. If the scaling has completed twice and still any suspended stones and rocks observed at crown and sides of tunnel, they would again perform scaling for the third time, in order to avoid any as such unsafe condition and accident in near future.	Mr. Mohsin	Done
"Stand down" TBT session was held with entire work force on 10th. December,2024 and to share the acquired lesson to others as well.	Mr. Rashid Hussain	Done

INCIDENT ROOT CAUSE INVESTIGATION AND CORRECTIVE ACTION FORM

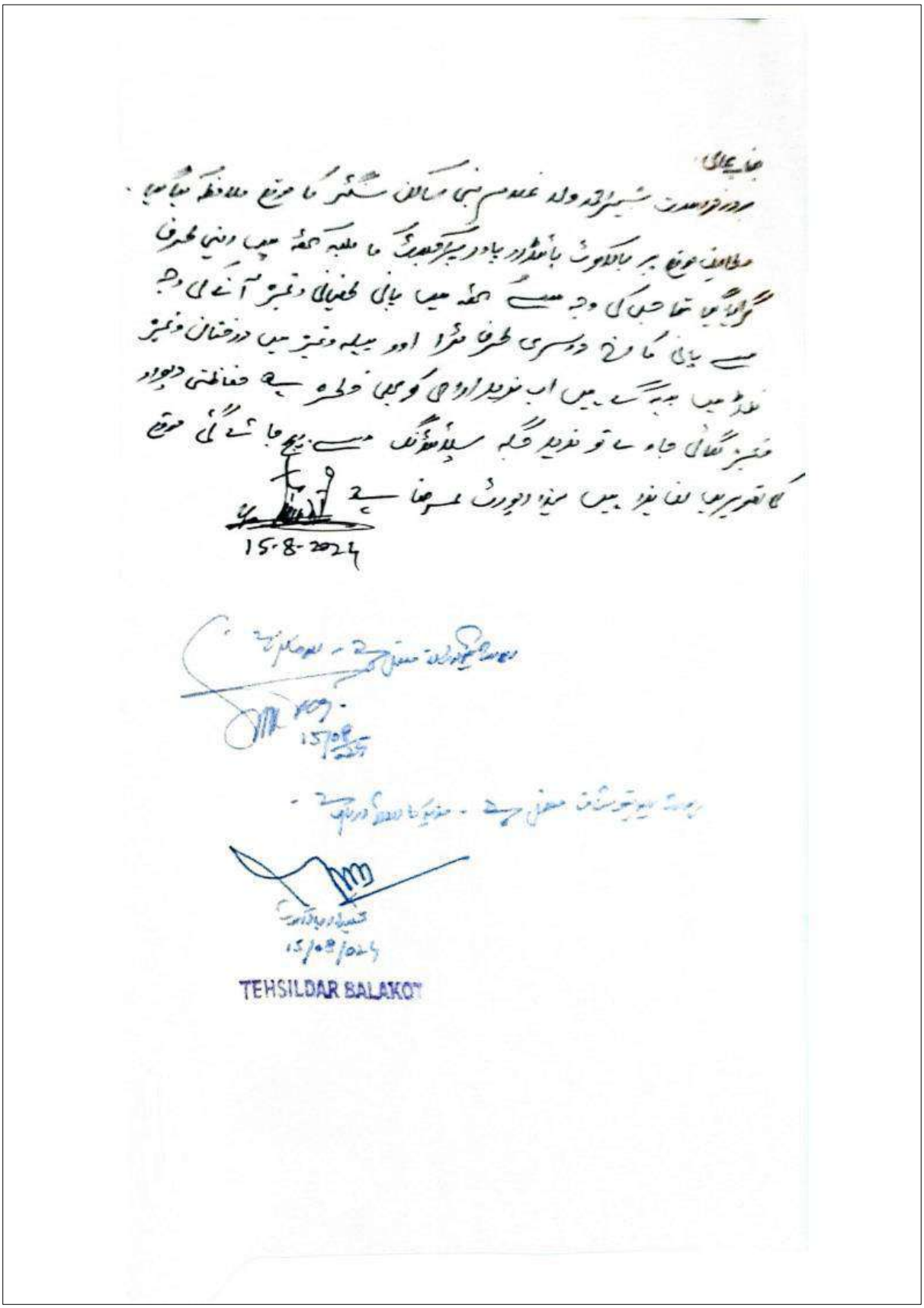
Ambulance or emergency vehicles should stand-by all the time outside each tunnel. Contractor's Clinic should open 24/7 with full medicines and equipment.	Mr. Qaisar and Mr. Li Yong	Done
Keep all the method statements, permit, drawings along with tool box talk in the permit box.	All Site in-charges	Open
Took the undertaking by the sub-contractor to follow the HSE procedure otherwise immediately fire the violator weather he is Chinese or Pakistani.	Sub-contractor	Done
Take the concerns of the geologist and the HSE for clearance. Prepare a format for taking clearance by all the stake holders.	Sub-contractor	Open
Use double insulated cables and pass it through PVC pipes.	Sub-contractor	Open
Instructed to the sub-contractor for purchasing more walkie talkies. Sub -contractor have ordered to the vendor for 12 more walkie talkies.	Sub-contractor	Done
Instructed to the sub-contractor for continuous deputation of the confined space attendant and HSE officer till workers will work inside the tunnel and give them over time along with the workers.	Sub-contractor	Open
In lunch time no work will be allowed and if deem necessary then involved confined space attendant, HSE officer and geologist.	Sub-contractor	Open
All electrical equipment checks and verified by the competent electricians on daily basis.	Sub-contractor	Done
Re-construct the drainage line and sump in the tunnel again.	Sub-contractor	Done
Remove the sludge from the tunnel on daily basis if generated.	Sub-contractor	Done
Instructed to prepare the elevated platform in-which rubber washers will use to restrict the current from one part of the platform to another. Increase the strength of the platform.	Sub-contractor	Working
Use wooden stand for trailing cables or hang on the walls of the tunnel.	Sub-contractor	Open
Keep all the method statements, permit, drawings along with tool box talk in the permit box.	Sub-contractor	Open
Increase the number of the fire extinguishers in the tunnel.	Sub-contractor	Done
Insured all the workers and staff and made their registration in EOBI.	CGGC-GRC-JV	Under process
Summarize any further information learned from this root cause and contributing factor analysis, including any information that needs to be shared with the workers or worksite management.		

INCIDENT ROOT CAUSE INVESTIGATION AND CORRECTIVE ACTION FORM

Not applicable.

Annexure 4: Copies of Environmental Complaint and Overall Status of Complaints Registered During Reporting Period (July-December 2024)

Copies of the Environmental Complaint Received during the Reporting Period



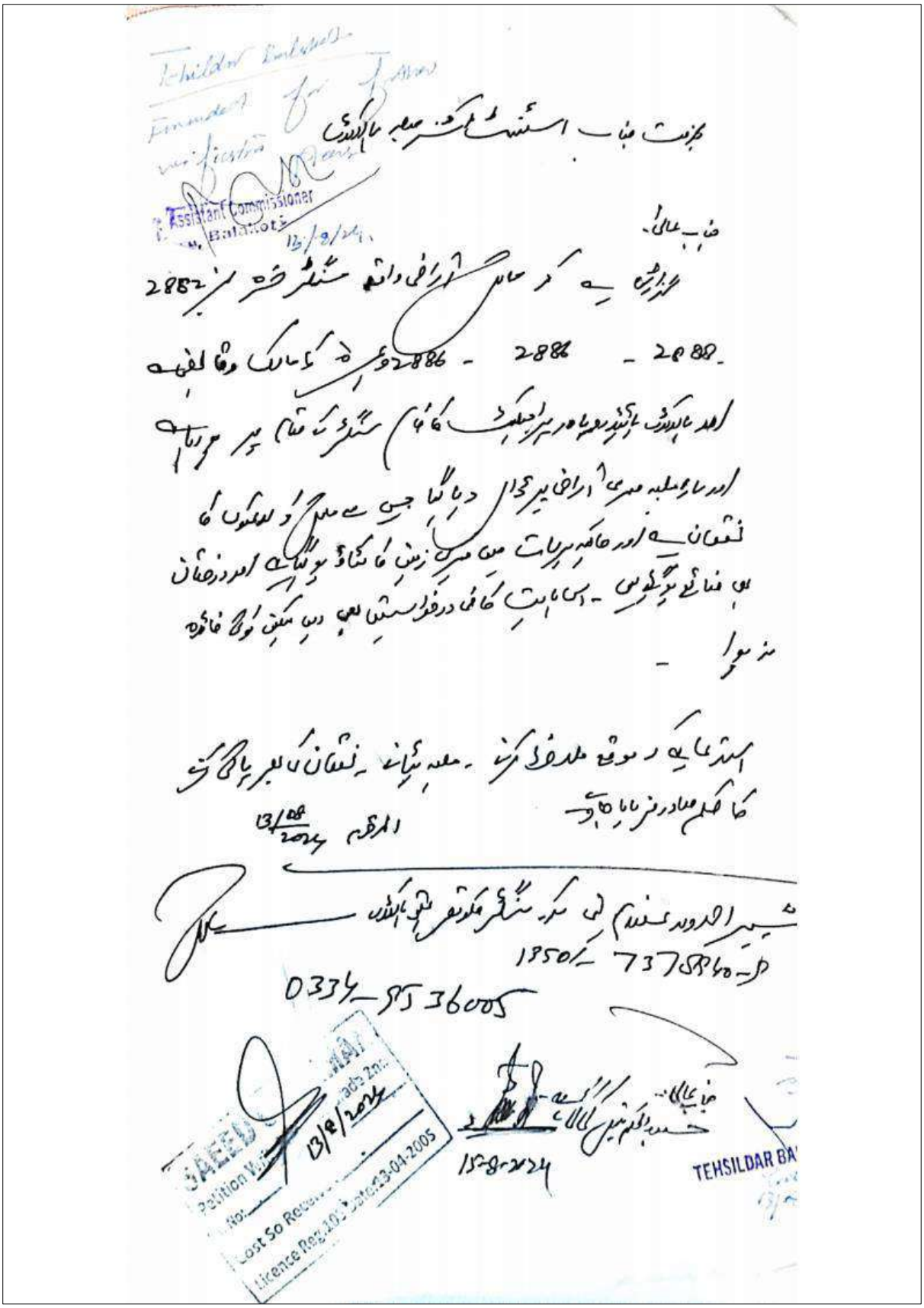
15-8-2024

15/08/2024

15/08/2024

TEHSILDAR BALAKOT

1/5



OFFICE OF THE ASSISTANT COMMISSIONER BALAKOT

No. 1809-10 /BHPP/AC(B)
Dated. 26 / 08 /2024

1. The Project Director, PEDO, BHPP Project Balakot
2. The Project Manager, CGGC, BHPP, Sanghar A-2 site, Tehsil Balakot

bject:- **APPLICATION SUBMITTED BY MR. SHABIR AHMED S/O GHULAM NABI R/O SANGHAR TEHSIL BALAKOT & REGARDING REDRESSAL OF GRIEVENCES / COMPENSATION OF DAMAGES.**

A self-explanatory application submitted by Mr. Shabir Ahmed S/o Ghulam Nabi R/o anghar Tehsil Balakot regarding redressal of grievance / compensation of damages is enclosed erewith along with detail report of Revenue Field Staff, for further necessary action as per law, lease.

ASSISTANT COMMISSIONER
BALAKOT

No. 1811-12 /BHPP/AC(B)

Copy forwarded to:-

1. The Deputy Commissioner, Mansehra for information please.
2. The Mr. Shabir Ahmed S/o Ghulam Nabi R/o Sanghar for information with reference to his application.

ASSISTANT COMMISSIONER
BALAKOT

بخدمت جناب پروجیکٹ ڈائریکٹر PEDO بالاکوٹ

گزارش خدمت ہے کہ سائل کی اراضی ڈیم کے سامنے نالا سے متاثر ہے اور اس سے پہلے ڈپٹی کمشنر صاحب اور اے سی صاحب سپیکر خیبر پختونخوا سے قانونی طور پر آپ کو خبردار کیا تھا۔ آپ نے اس کاروئی کو لوکل کمیٹی کی طرف ریفر کیا۔ جب کہ لوکل کمیٹی نے ہمارا موقف نہیں سنا جبکہ ہماری اس کاروئی کو لوکل کمیٹی سے ہٹ کے الگ کمیٹی بنائی جائے جو ہمارے اس موقف کو سنے اور ہماری جو اراضی متاثر ہو رہی ہے اس کا دفاع کیا جائے۔

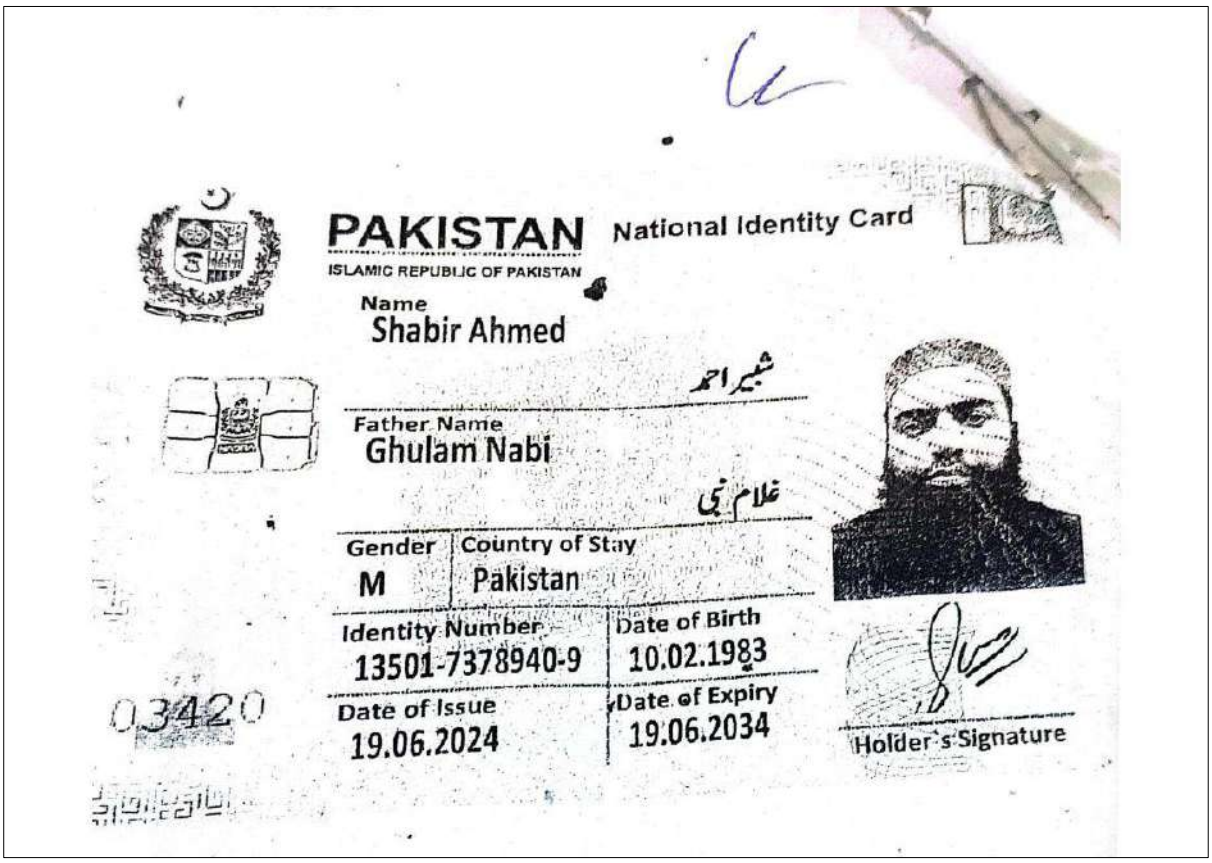
لہذا آپ سے گزارش ہے کہ ہماری اس بات کو سنا جائے اور تمام کاغذات آپ کے پاس موجود ہیں۔ جس میں تحصیل دار صاحب سے لیکر پٹواری تک تمام کاغذات اس فائل میں موجود ہیں۔

مورخہ: 23-12-2024

نام: شبیر احمد ولد غلام نبی ساکنہ سنگو تحصیل بالاکوٹ ضلع مانسہرہ

موبائل نمبر: 0334-9536005

شناختی کارڈ نمبر: 13501-7378940-9


PAKISTAN
National Identity Card
ISLAMIC REPUBLIC OF PAKISTAN
Name
Shabir Ahmed
شبیر احمد
Father Name
Ghulam Nabi
غلام نبی
Gender
M
Country of Stay
Pakistan
Identity Number
13501-7378940-9
Date of Birth
10.02.1983
Date of Issue
19.06.2024
Date of Expiry
19.06.2034
03420
Holder's Signature

Copy of GRM Register Exhibiting Details of Complaints Received by the Social Section of the PIU

GRIEVANCES REGISTER OF BHP PROJECT

S. No	Date of Lodging Grievance	Name, Address and Contact Number of the Complainer	Nature of Complaint	Mode of Complaint Verbally, Telephonically or in writing	Action Taken	Remarks
09	04-03.24	Yasir Ali Hussaini, Paras	Nomination of 3 members of GRC due to [illegible]	Written + Verbal	During a meeting with GRC, the members replied that their concerns were addressed, hence be withdrawn	Withdrawn
		"1st JULY	2024	ONWARDS"		
01	24-07-24	S. Nasir Hameed Shah	Structure Passage Blockage	Written	The contractor was immediately contacted to clear the Passage for easy [illegible] of material	Resolved.
02	01-10-24	S-Nasir Hamed Shah	Structure Demolition by the CGGC	Written	Contractor called for meeting, Inquired on 4th oct. Contractor committed that they will submit proper written reply.	
03	8/10/24	GRC Bela Sacha.	Requested for some more time after Adm. Notice period.	Written	More time provided	Closed/Resolved
04	8/10/24	Wasif Shah, GRC B.sacha	Passage clearness by security personnel	Written	Passage cleared	Closed/Resolved.
05	17/10/24	Ibrar Shah, Paras	Non-Provision of contracts, Business	Written Email from ADB	Called a meeting at PIU - The PIU team met with contractor to adjust the people in businesses if any.	closed/Resolved.
06	13/12/24	Atiq & Brothers, Sangar	Non-Provision of Jobs & unfair compensation in revenue records.	Written Email from ADB (TITO)	called them to PIU office & made them understand, one brother immediately employed by contractor.	Resolved.

Annexure 5: Copy of Vocational Training Completion Certificate

Copy of First Vocational Training Completion Certificate

GOVERNMENT SKILL DEVELOPMENT CENTRE
HASSA, BALAKOT
Ph # 0997 – 500300
Email: gsdcbalakot@gmail.com

KP-TEVTA/MAN/GSDC // 239 **Dated: 30/12/2024**

To,

EPC Contractor's of Balakot Hydropower Project (BHPP)- District Mansehra.

SUBJECT: The Completion of Vocational Training for the Land affectees of the Balakot Hydropower project (BHPP) in various trades at the Government Skill Development Center in Hassa, Balakot.

Dear Sir,

With reference to the above cited subject title, it is hereby certified that 18 students comprising of (07 Male and 11 female) enrolled at various trades including Tailoring, Beautician, Computer Operation, and Electrician at the Government Skill Development Center in Hassa Balakot on May 02, 2024 has successfully completed their short courses at the said College. The final test and examination for the enrolled land affectees (7 Male -11 female) of the Balakot Hydropower Project was held on October 10, 2024 at the Government Skill Development Center in Hassa Balakot. The completion certificate is expected to be awarded in March 2025.

Principal GSDC Balakot
Engr. Mohsen Ullah Dawar

Annexure 6: Copies of CAPs Issued to the EPC Contractor during the Reporting Period

Corrective Action Plan (Environmental Safeguards)- October 2024

S/No	Observation/Issue	Required Action	Responsibility	Timing	PMC/PIU Inspection/Follow-up Date
1	Exposed electrical wiring	Exposed electrical wires and installations pose serious risks to human lives. Contacting these exposed wires or installations may cause serious injuries or death. All exposed electrical wires, boards, and other equipment at camps, workshops, batching plants, and all active worksites shall sufficiently be insulated, covered, and well-protected.	EPC Contractor	Immediate	October 28, 2024
2	Small-sized (6kg) fire extinguishers at batching plants	The fire extinguishers available at batching plants may not be sufficient in size and capacity to extinguish fire at the batching plants. A combination of large (minimum 9kg) and small-sized (6kg) fire extinguishers shall be made available at all batching plant sites.	EPC Contractor	October 30, 2024	November 5, 2024
3	Low-quality safety helmets are used by the laborers engaged in construction and earthwork activities.	The safety helmets, currently under the use of labors engaged in various construction activities including stone masonry and earthworks, appear to be not of good quality. They may not protect users from the impact of falling debris etc. All such helmets shall be replaced with good-quality safety helmets to ensure the protection of the workforce from head injuries in case of the occurrence of incident(s)	EPC Contractor	October 28, 2024	November 5, 2024
4	Improper storage of admixtures containers.	The admixture containers at sites are stored without the provision of proper platforms. Concrete platforms of sufficient dimensions shall be constructed at all sites where admixture containers are either stored or intended for future storage of such containers.	EPC Contractor	Immediate	November 5, 2024
5	Oil spillage at workshops/batching plant sites and disposal of oily rags along the Ganhool Nullah.	The unpaved vehicle parking areas and oil change facilities cause soil contamination at camps, workshops, and batching plant sites. Concrete platforms shall be constructed at parking areas, particularly at the A3 Batching plant while oil collection trays and oil spillage kits shall be provided at these and all other such sites. Oily rags along the Ganhool Nullah shall immediately be collected and properly disposed of as hazardous waste.	EPC Contractor	October 30, 2024	November 5, 2024

S/No	Observation/Issue	Required Action	Responsibility	Timing	PMC/PIU Inspection/Follow-up Date
6	Construction of retaining wall and channelization of water at the junction of R3 and R4 access roads.	The loose-filled materials at the R3 and R4 access roads junction in the localized valley may erode in case of a heavy precipitation event causing pollution of the Kunhar River and damage to the roads. A retaining shall be constructed at the terminal end of the valley (on the left bank of the Kunhar River) to prevent the entry of soil into the river. Also, proper channelization of the flowing water from the upper reaches of the valley is needed. The design of the retaining wall and other structures shall be submitted to the PMC for review and approval thereof, followed by immediate construction of such facilities.	EPC Contractor	November 4, 2024	November 30, 2024
7	No provision for hard barricading at the road leading to the EPC Contractor's main camp and fugitive dust on the approach road.	The approach road to the EPC Contractor's main camp has a vivid downward slope with depressions on both sides which poses risks to its users. Also, due to the unpaved nature of this road, the fugitive dust causes health risks to the camp occupants. Hard barricading shall be provided on both sides of the approach road while regular sprinkling of water shall be ensured till completion of the surfacing works (hard pavement) of the road.	EPC Contractor	Immediate	November 5, 2024
8	Structural cracks in washrooms in the EPC Contractor's Sangar site camp.	The development of structural cracks in a building can cause structural failure resulting in the collapse of a building. The structural cracks that appeared in washrooms in particular and elsewhere, in general, shall immediately be repaired to protect the camp occupants from any serious injuries or losses.	EPC Contractor	Immediate	November 5, 2024
9	Environmental audit of the EPC Contractor's main camp.	The EPC Contractor has recently been shifted from the A2 main camp to the new existing camp (previously used by the Sukki Kinari HPP staff) located on the left bank of the Kunhar River in Paras village adjacent to the N-15 road. The consultant shall conduct environmental auditing of such facility to identify gaps and to propose necessary measures to fill those gaps.	PMC	October 30, 2024	November 10, 2024

Gaps Identified and the Proposed Mitigation Measures (Environmental Audit of the EPC Contractor's Camp)

S/No	Gaps Identified	Potential Impacts	Proposed Mitigation Measures
1	No hard barricading on the access road to the camp.	The access road has a steep slope and has gained several meters in height due to filling. This creates risks for vehicles and the general public of falling from a height.	i. Install hard barricade (pre-cast concrete safety barriers/jersey barriers) on both sides of the access road. ii. There shall be reflective strips on the barricades towards the roadside. iii. The safety barriers shall be installed till the residential facility reserved for the Pakistani staff of the project and at the paved access to the main gate of the main camp. iv. The safety barriers shall be maintained throughout the construction period or construction of permanent safety barriers on the road approaching the permanent bridge which is to be constructed as part of the permanent works.
2	No lighting on the access road to the camp and to the suspension bridge across the Kunhar River.	The access road is used not only by the camp occupants but also by local residents and livestock. As a result, the lack of proper barricades and the darkness at night create a risk of accidents, which could lead to serious injuries for both people and animals.	i Installation of lighting facility at appropriate intervals all along the access road. ii The access road lighting shall be maintained throughout the construction period or till the installation of permanent lights.
3	Dust generation due to vehicle movement on the access road.	The dust generated at the access road will cause: • air pollution • health hazards • soiling effects on plants	i Regular sprinkling on the road during the construction phase. ii Necessary surfacing of the road as part of the permanent arrangement.
4	Soil erosion from the access roadside slopes	i The side slope erosion may cause structural failure of the access road. ii The eroded materials will roll down to the Kunhar River causing river pollution. iii Risks to vehicle accidents.	i The side slope of the access road shall be stabilized/compacted as part of the road construction. ii The slope should have vegetation cover or should be stone-pitched to prevent soil erosion.
5	No fence to isolate part of the camp outside of the camp boundary wall.	i Wild animals can attack the camp occupants. ii Stray dogs can freely enter the camp premises and can attack the staff. iii The absence of a fence and unrestricted entry of unauthorized persons into the camp is a security risk. iv All of the above can cause fatal incidents.	i A fence shall be installed at the boundary of the facility in a manner to ensure the locals move freely outside of the fence. ii A gate shall be installed within the facility premises to prevent unauthorized entry into the facility.

S/No	Gaps Identified	Potential Impacts	Proposed Mitigation Measures
6	Deficient signage in the camp.	The absence of a main information board that provides essential details, along with the lack of clearly marked emergency exits, could hinder the planned response to emergencies and the subsequent evacuation from the camp. This may result in injuries or even loss of life among the camp occupants.	i The information board of appropriate size shall be installed at the camp entrance (inside the camp) exhibiting vital information, camp layout, and emergency contact numbers enabling the camp occupants to efficiently act in case of emergency. ii Such information will also guide the camp visitors towards their intended room/block instead of seeking support from the security personnel as there are no reception or guide arrangements at the main gate. iii Signages and other information on pana flexes in the Chinese language shall be replaced with those containing information in Chinese and English language. A large number of Pakistani professionals and support staff are working in the camp who are not able to comprehend information written in the Chinese language.
7	Surface runoff from the camp to the Kunhar River.	The surface runoff, effluent from the septic tank, and drains are discharging at three locations outside of the camp. There is neither any drainage system to train the water/effluent to the river nor any grating system to prevent the entry of plastic bags, rigs, and other trapped solid waste, into the Kunhar River which may cause pollution of the river.	i. Construction of grating/trash rack in the drains at appropriate locations inside the camp. Various hard materials, rigs, wooden pieces, plastic bags, etc. trapped at the grating should regularly be removed and properly disposed of. ii. Construction of proper drainage outside the camp. iii. Regular third-party quarterly instrumental monitoring of the effluent/surface flow to assess the discharge compliance with the NEQS (The points/locations shall be added to the instrumental monitoring points).
8	Discharge of treated effluent to the Kunhar River.	If not treated properly, the effluent from the septic tank may cause soil and river pollution.	i. Construction of a manhole of sufficient size at the terminal point of the drainage pipe. ii. Construction of proper drains from the manhole to dispose of the effluent. iii. Regular third-party quarterly instrumental monitoring of the treated effluent to determine whether the treated effluent falls within the NEQS guiding values or not. If the treated effluent concentration falls beyond the acceptable limits as per NEQS, necessary additional measures shall be taken.
9	No color-coded solid-waste bins.	i No segregation of waste and no proper disposal. ii Transportation of hazardous waste to the non-hazardous waste disposal site.	Immediate provision of color-coded solid waste bins as specified in the SSEMP.

S/No	Gaps Identified	Potential Impacts	Proposed Mitigation Measures
		iii Exposure of the camp staff to the hazards associated with the hazardous waste.	
10	Improper storage of materials.	i Storage of hazardous and non-hazardous materials increases health hazards. ii If hazardous materials are not properly stored and covered, they may cause water and soil pollution in case of precipitation.	i Non-useable materials like wooden flanks, iron frames, PVC pipes, tires, and other such materials shall properly be stored in the designated area. ii The store area shall be covered and shall have a concrete pad. iii The gas cylinders shall not be stored in a place designated for the aforementioned materials or where explosive materials are stored or those materials which quickly catch fire.
11	Poor housekeeping in residential facility for Pakistani staff.	i The poor housekeeping and unhygienic living conditions may increase the staff's vulnerability to various diseases. ii If daily use materials and equipment are not stored and orderly arranged, they can cause incidents like fire, etc.	i. Construction of a fence to isolate the camp premises and installation of a gate to prevent unauthorized entry into the camp. ii. Provide a proper storage area. iii. Regular cleaning of the camp premises, building/ rooms, etc. iv. Designate and develop parking areas for vehicles and motorbikes. v. Arrangement for recreational/game facility in the camp. vi. Construction of a drainage system to drain out the surface water from the facility. vii. General cleaning of the facility regularly. viii. Provide first aid boxes in the facility. ix. Installation of an information board exhibiting essential information. x. Provision of: • adequate ventilation facilities; • safe and reliable water supply; • hygienic sanitary facilities and sewerage system; • recreational facilities; and • proper arrangement for solid waste collection and disposal.