Environmental Monitoring Report

PUBLIC

January to June 2023 Report
October 2023

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
CM	Construction Manager
CSSP	Construction Safety and Security Plan
EE	Environment Expert
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EPA	Environmental Protection Agency
EPC	Engineer, Procure and Construct
ERT	Emergency Response Team
GOP	Government of Pakistan
HSE	Health, Safety and Environment
IRRE	Institute for Research on River Ecology
km	Kilometer
KPK	Khyber Pakhtunkhwa
L/S	Left Side
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	Project Manager
PMC	Project Management Consultants
R/S	Right Side
ROW	Right of Way
SOPs	Standard Operating Procedures
SSEMP	Site Specific Environmental Management Plan
WHO	World Health Organization
WMO	Watershed Management Organization

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ANNEXURES

1 INTRODUCTION

1.1 Preamble

1. This is the 4th Semi-Annual Environmental Monitoring Report (SAEMR) for the Balakot Hydropower Project (300 MW) covering reporting period from January to June, 2023.

1.2 Headline Information

2. During the reporting period, the Project Basic and Detail Engineering Design, land acquisition, installation of batching plants, construction of EPC Contractor's camps, workshops, permanent access roads, earthworks and adits' portals remained in progress. Also, temporary works were substantially completed during the reporting period.

3. The EPC Contractor's main camp, established at Adit-2, was inaugurated by the Chief Executive Officer, Pakhtunkhwa Energy Development Organization on May 04, 2023. Chinese management and technical staff on the Balakot HPP (300 MW) are stationed in the camp whereby a separate block, at the camp entrance, has been allocated to the Special Security Unit (SSU) deployed for the security of the Chinese staff.

4. Although, the Employer has granted physical possession of dam site to the EPC Contractor on March 27, 2023, however, no physical work commenced during the reporting period. Copy of the possession letter is attached as **Annexure-01.**

5. On May 22, 2023, the Asian Development Bank (ADB) conveyed concurrence to the Project Implementation Unit (PIU) in respect of " Proposal for Revision in the Project Specific BAP" containing changes proposed in the institutional arrangement of the project specific BAP and composition of the BAP Management Committee.

6. To reflect the effect of changes in the BAP institutional arrangement, and design changes made at the dam site, the PMC initiated necessary updation of the EIA report in the last week of the reporting period.

7. During the reporting period, two virtual meetings of the Project financiers (ADB and AIIB), PIU and PMC were held wherein HSE portfolio progress was shared with the participants. The virtual meeting held on March 08, 2023, was primarily focused on Basin-wide BAP progress while in the second meeting, held on May 22, 2023, HSE safeguard progress was presented to the ADB Safeguard Review Mission.

8. During the reporting period, the EPC Contractor approached to various relevant departments to secure No Objection Certificates (NOCs) for the safe disposal of hazardous and non-hazardous waste however, issuance of NOCs remained awaited till end of the reporting period. Copies of the correspondences are attached as **Annexure-02.**

9. During the reporting period, the EPC Contractor conducted quarterly instrumental environmental monitoring at Site. Detail comparison with the baseline results for air quality, noise pollution, water quality and soil analysis etc. have been given in **Section 5** of the report.

2 PROJECT DESCRIPTION AND CURRENT ACTIVITIES

2.1 Project Description

10. Balakot Hydropower Project (300 MW) is 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 the Khyber Pakhtunkhwa province. Upon completion, 1143 Giga Watt hour (GWh) of clean energy will be delivered to the National Grid on yearly basis.

11. The Project dam site is located at Paras village, around 2 km downstream of the Sukki Kinari Hydropower Project (870 MW) tailrace while the powerhouse site is proposed at Ghanool village of Balakot. The 9.1 km long headrace tunnel of 8 meters (m) diameter will divert 154 m^3/sec design flow of the Kunhar River water to the powerhouse to generate 300 Mega Watt (MW) of electricity. The Project residential colony is identified in Sangar village.

12. 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.

13. As exhibited in the EPC Contract, following is the brief Scope of Works.

- Project Basic and Detail Design
- Temporary Works
- Diversion works
- Construction of dam
- Intake structures.
- Adit tunnels (Adit 1,2 & 3)
- Headrace tunnel
- Surge shaft
- Powerhouse
- Access roads (temporary and permanent)
- Residential colony
- Switchyard
- Transmission line

14. Project brief salient features are given 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

Hydrology and Design Flows	
River	Kunhar
Catchment area at dam site (km^2)	1939
Design Discharge (m^3/s)	154
Design Flood (m^3/s) T= 10 000 years	3500
Probable Maximum Flood (m^3/s)	5000
Reservoir	
Normal Operation Level (NOL)	1288.0
Minimum Operation Level (MOL)	1283.0
Surface area (at MOL) (km^2)	0.28
Length of Reservoir (at NOL) (km)	2.20
Gross storage capacity (at NOL) ($x10^6\ m^3$)	3.56
Live storage (at NOL) ($x10^6\ m^3$)	1.20
Dam Structure	
Type	Concrete Gravity Arch
Dam crest elevation (masl)	1292.0
Maximum height above river bed (m)	35.0
Maximum height above foundation (m)	58.0
Crest length (m)	130.0
Spillways and Low Level Outlets / Flushing Sluices	
Spillway type	Upper Gated Ogee Crest Spillway + low level Gated Spillway
Upper spillway crest elevation (masl)	1278.0
Upper spillway gates No. and type	3 (radial gates)
Upper spillway gates size (W x H) (m)	11 x 10
Low level spillway invert elevation (masl)	1258.0
Low level spillway gates no. and type	2 (sluice gates)
Low level spillway size (WxH) (m)	6 x 8
Sediment Management	
Sediment Bypass Tunnel type	Gated Intake followed by Archway Tunnel
Intake size (WxH)(m)	7.5 x 4.5
Inlet invert elevation (masl)	1261.0
Tunnel cross section (W x H) (m)	archway (7.5 x 8.0)
Tunnel length (m)	650
Tunnel slope (%)	1.5
Outlet invert elevation (masl)	1248.0
Submerged guiding structure crest elevation (masl)	1272.0
Submerged weir/guiding structure height (m)	21 (estimated maximum above foundation)

River Diversion	
Construction Flood (T= 20 years) (m^3/s)	900
Diversion type	Openings left in the dam body for the low level spillway and a left bank diversion tunnel.
Upstream Coffer dam type	Concrete gravity solution (which will be further converted to guiding structure)
Upstream Coffer dam crest elevation (masl)	1272.0
Downstream Coffer dam type	Concrete gravity solution
Downstream Coffer dam crest elevation (masl)	1252.5
Diversion tunnel type	Archway (concrete lined)
Diversion tunnel no. (-)	1
Diversion tunnel size (WxH) (m)	Archway (7.5 x 8.0)
Diversion tunnel length (m)	650
Diversion tunnel slope (%)	1.5
Diversion tunnel inlet invert El. (masl)	1261.0
Diversion tunnel outlet invert El. (masl)	1248.0
Power Intake Structure	
Intake type	Horizontal intake
Trash rack No.	4
Trash rack size (W x H) (m)	8 x 1 0
Service gates No.	2
Service gates size (W x H) (m)	4 x 8
Intake crest elevation (masl).	1271
Headrace Tunnel	
Tunnel section	Circular concrete lined (8.0 m inner diameter)
Length up to surge tank (m)	9137
Tunnel slope (%)	0.56%
Upstream Surge Shaft	
Type	Concrete lined circular surge shaft
Internal diameter (m)	14.5
Surge shaft height (m)	122
Surge shaft bottom elevation (masl)	1220.0
Pressure Tunnel/Shaft and Penstock	
Pressure tunnel/shaft main section type and size	Steel lined circular cross section (5.6 m internal diameter)
Pressure tunnel/shaft length (m)	152
Penstock length (m)	88
Branch Section Type	Manifold (3 branches)
Size of each branch (m)	3.2 m internal diameter conduits
Max. Length of branch (m)	~30

Powerhouse and Substation	
Powerhouse type	Conventional underground cavern
Main cavern general dimensions (LxWxH) (m)	71 x 20 x 34
Turbine type	Francis
No. of units	3
Turbine axis elevation (masl)	1054.0
No. of generators	3
Transformer / Substation type	Underground cavern (adjacent to the main powerhouse cavern)
Transformer cavern general dimensions (LxWxH) (m)	88 x 14 x 20
Downstream Surge Shaft	
Type	Concrete lined circular surge shaft
Internal diameter (m)	3
Surge shaft height (m)	244
Surge shaft bottom elevation (masl)	1055.0
Tailrace	
Type	Circular tunnel with transition to an archway section at the final length and Outlet portal
Tunnel section	Circular concrete lined (8.0 m diameter)
Length up to the final transition section (m)	1515
Tunnel slope up to the final transition section (%)	0.23% (ascending slope)
Tunnel final section	Archway concrete lined section (8.0 W x 8.0 H)
Length from transition to outlet (m)	50
Tunnel slope up to the outlet portal (%)	15% (ascending slope)
Power and Energy	
Gross Head (m)	229.0
Design Net Head (m)	217.6
Installed plant capacity (MW)	300 (at the generator)
Mean annual energy (GWh)	1143 (average of 55 years)
Project Access Facilities	
Access road to dam and related structures (length)	550 m (Off taking from National Highway N-15 at the left side of Kunhar River, near Paras village)
Access road to by-pass tunnel (length)	440 m

Figure 2.1: Project Location in Pakistan

Figure 2.2: Project Location in District Mansehra

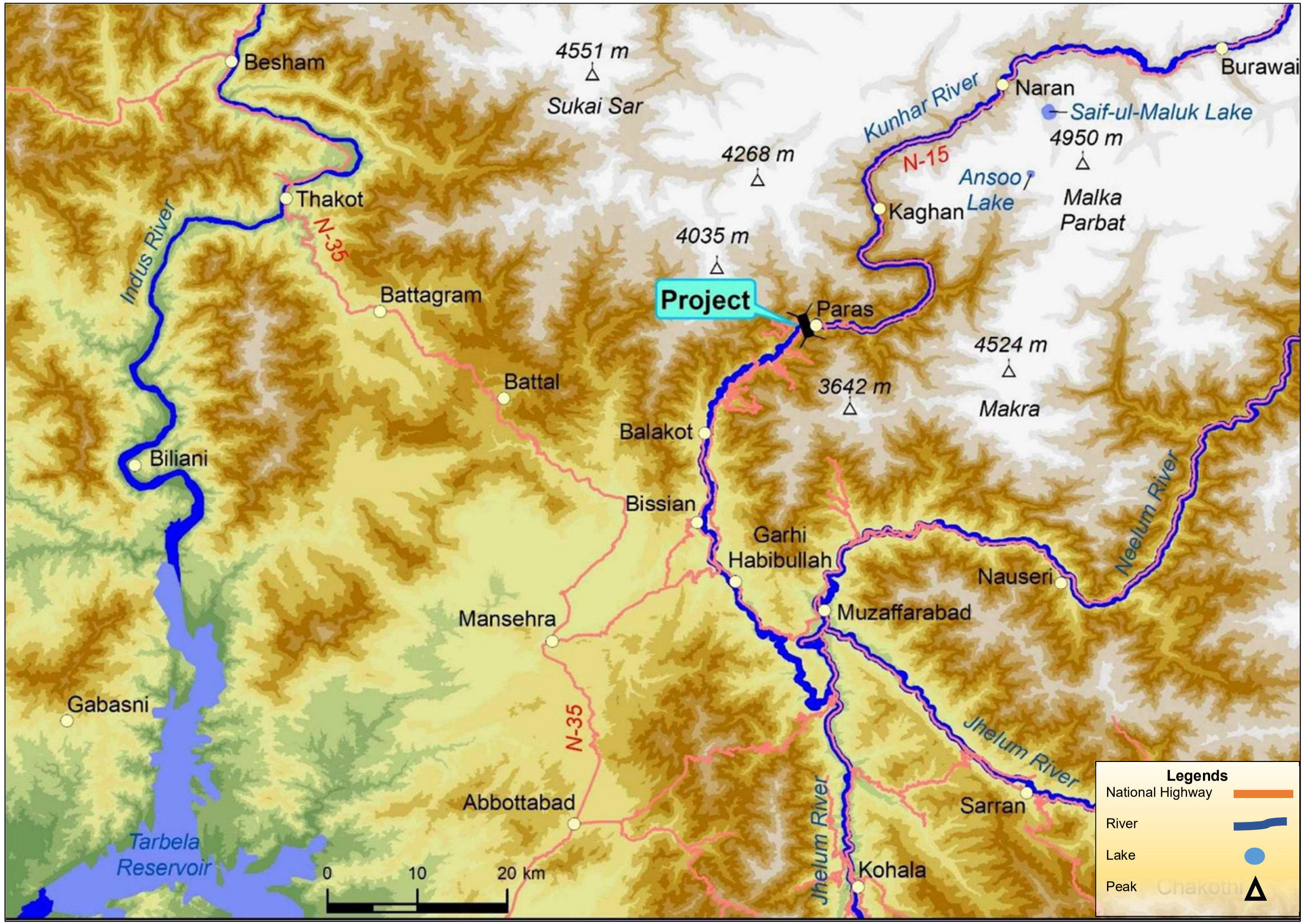


Figure 2.3: Project Layout Map

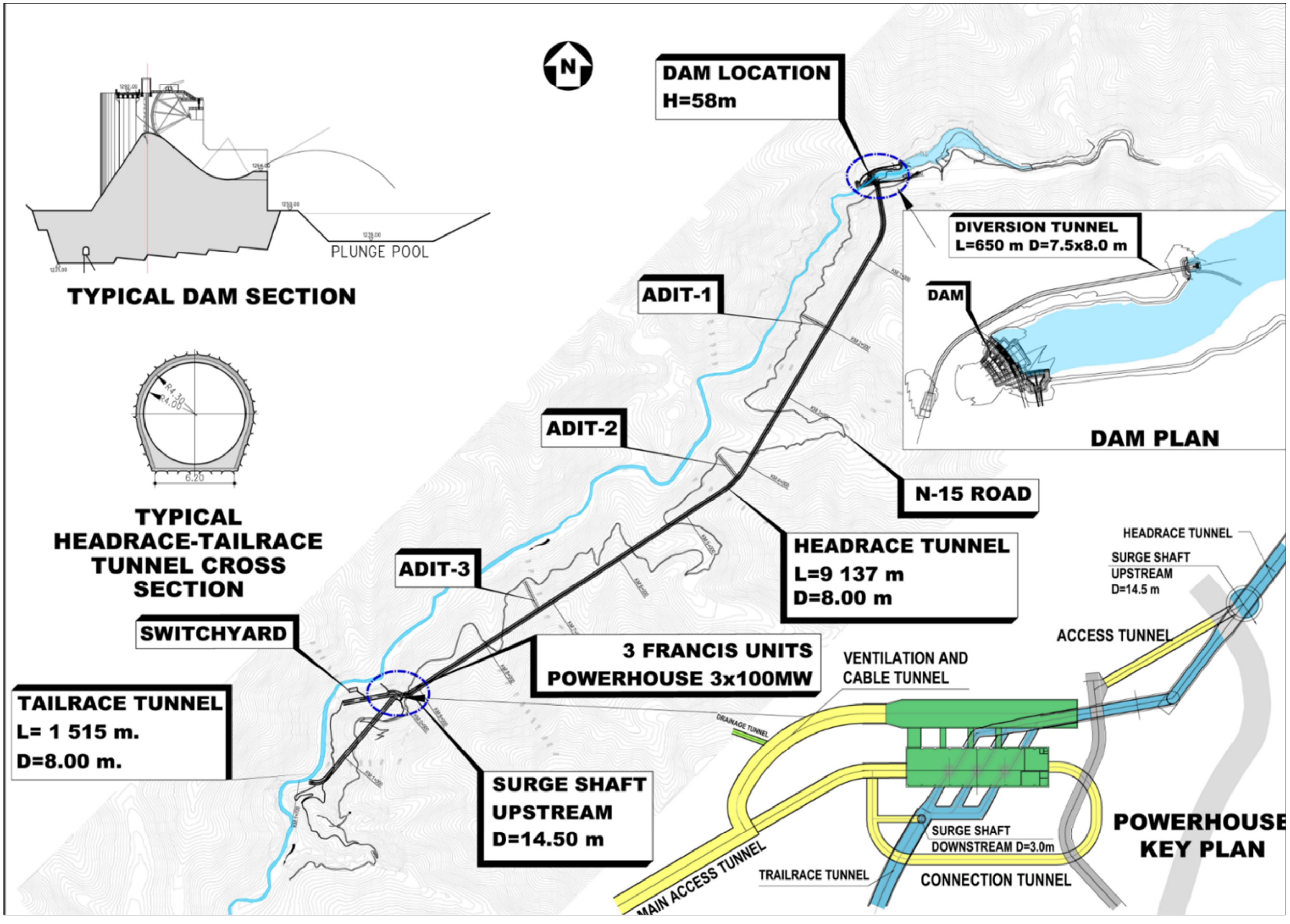


Figure 2.4: Project Setting-Dam site

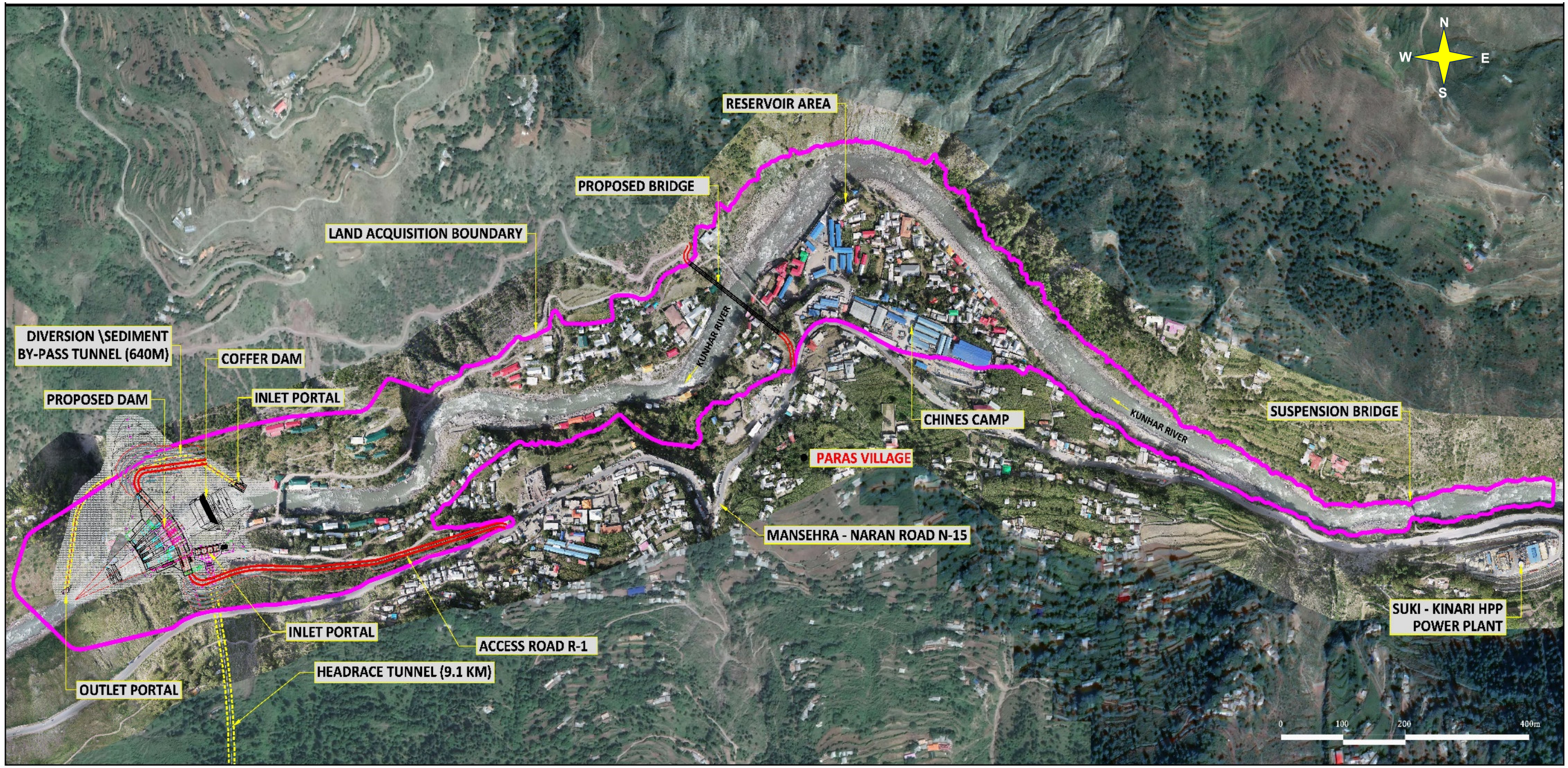
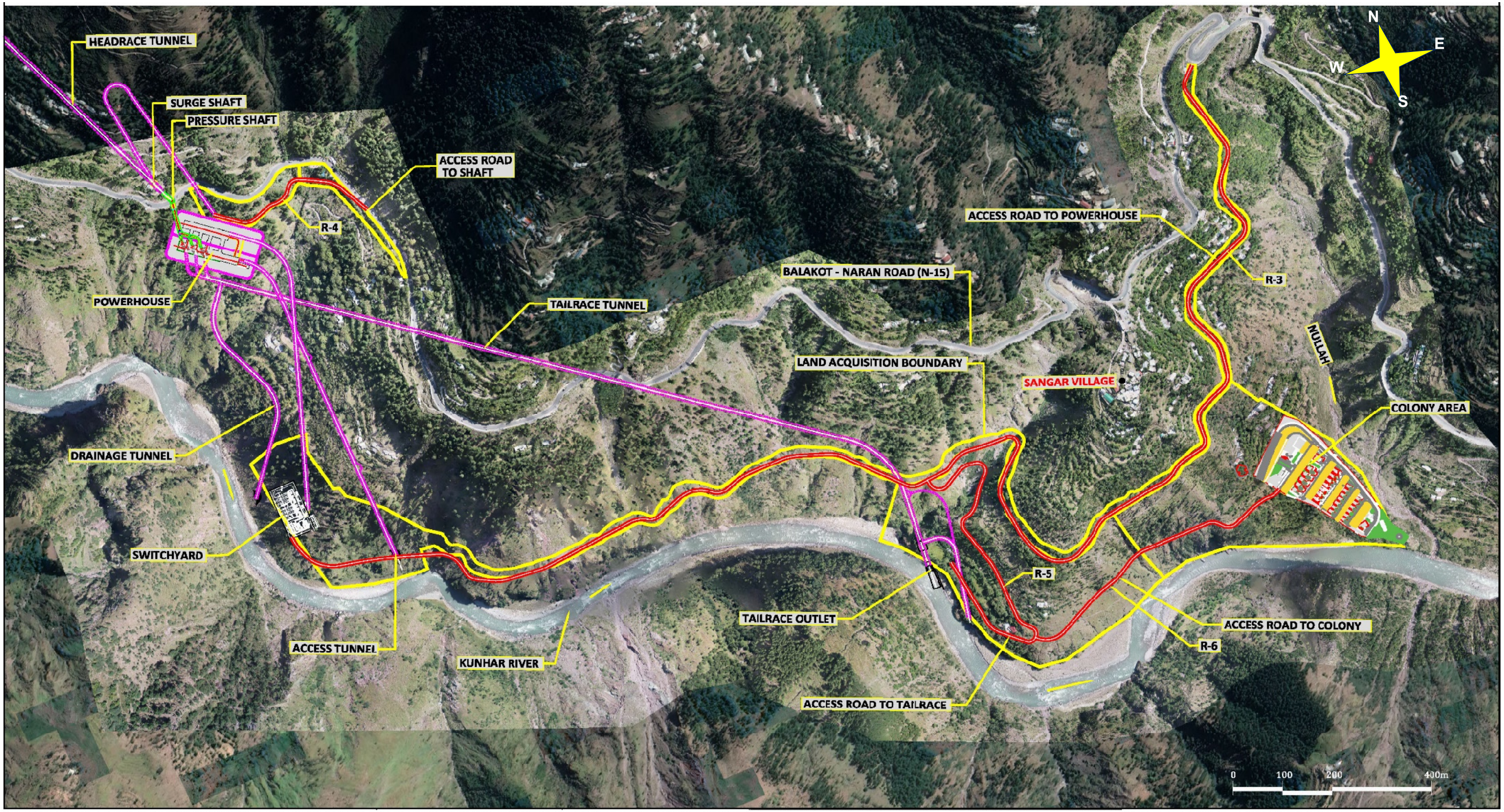


Figure 2.5: Project Setting-Powerhouse and Colony sites



2.2 Project Contracts and Management

2.2.1 Project Implementation Arrangement

15. Balakot Hydropower Project (300 MW) is being implemented through the arrangement as elucidated in the table below.

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 Consultants	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

16. For the Project development, the Government of Khyber Pakhtunkhwa signed a loan agreement with the Asian Development Bank (ADB) on May 21, 2021 which became effective on July 7, 2021.

17. As Asian Infrastructure Investment Bank (AIIB) is the co-financier of the Project, therefore, loan agreement was also signed with the AIIB which is effective since October 25, 2021.

Consultancy Services Contract Award (2020)

Construction Contract Award (2021)

18. Brief details of the Project Implementation Unit, the Project Management Consultant (PMC) and the EPC Contractor are given as hereunder.

A. Project Implementation Unit (PIU)

19. The Project Implementation Unit (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).

20. **Figure 2.5** shows the proposed organogram of the PIU wherein, as exhibited in **Table 2.3,** the Project Director, Deputy Directors and Assistant Directors along with some of the support staff are already onboard while procurement of the remaining personnel will be initiated when need arise.

Figure 2.2: PIU Organogram

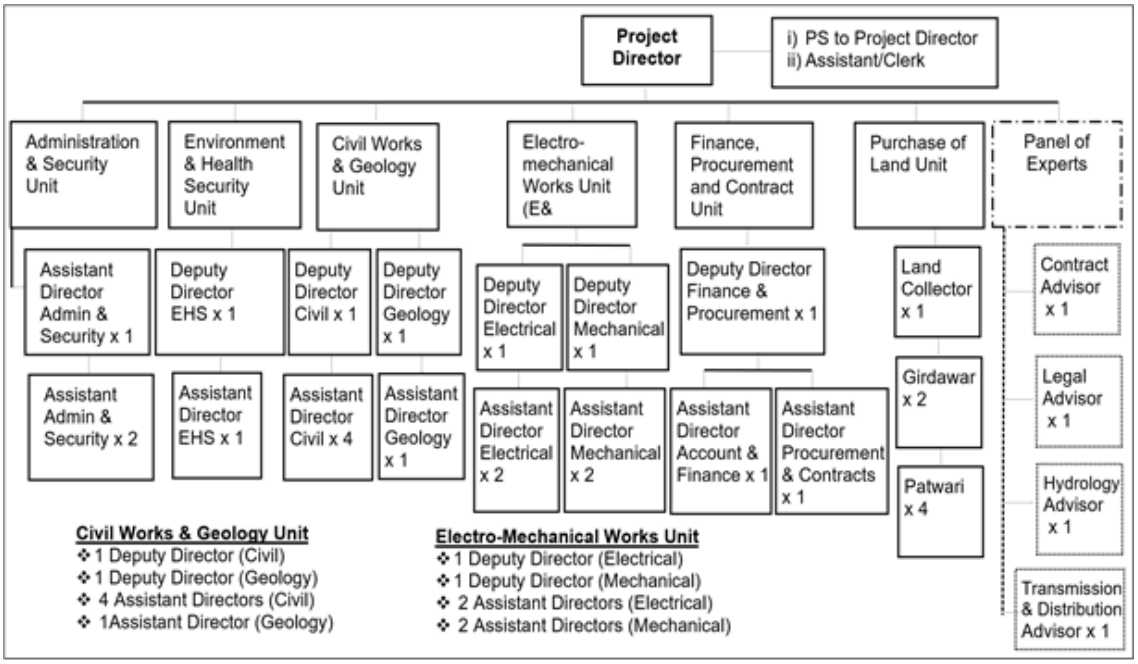


Table 2.3: PIU Staff Deployed During the Reporting Period

Staff Designation	Male/Female	No
Project Director	M	1
Deputy Director (Civil)	M	2
Deputy Director (Social & Resettlement)	M	1
Deputy Director (Environment Health, Safety & Gender)	F	1
Deputy Director (Finance)	M	1
Deputy Director (Geology)	M	1
Assistant Director (Finance)	M	1
Assistant Director (Civil)	M	1
Assistant Director (Electrical)	M	3
Account Assistant	M	1
Land Patwari	M	1
Assistant Director (Social & Resettlement)	F	1

21. As evident from the table above, PIU is headed by the Project Director with whom the overall responsibility of environmental management and environmental monitoring rests. He is assisted by the Environment & Health Security Unit, in matters pertaining to the environmental, health and security aspect of the Project. In this regard, Ms. Ibtesaam Zaima, the Deputy Director Health, Safety & Environment (HSE) and Gender, is onboard since March 2022, with full time inputs and can be reached via:

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

22. The Deputy Director Health, Safety & Environment (HSE) and Gender of the PIU, will be assisted by an Assistant Director (Social) who joined PIU in the last week of December 2022.

23. Under the provisions of the EPC Contract, the PIU project office has been established at Site at the address given below, and is 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

B. Project Management Consultant (PMC)

24. On September 03, 2020, PEDO entered into Management Consultancy Service Agreement for Balakot Hydropower Project (300 MW) with a 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).

25. Consultancy services are effective for the duration of 84 months since Commencement of Services on September 11, 2020. During this period, the JV will provide services specified in the consultancy contract as Project Management Consultant (PMC) and will act on behalf of PEDO as the “Project Manager/Engineer”.

26. Table below shows chronological order of the procurement of consultancy services.

Table 2.4: PMC Procurement Milestones

S/No	Description	Date
1	Expression of Interest (EOI)	July 29, 2019
2	Technical & Financial Proposals	November 29, 2019
3	Opening of Financial Proposals	May 19, 2020
4	Contract Negotiation Meetings	August 06 and 07, 2020
5	ADB Comments on / Concurrence to Negotiated Contract	August 25, 2020
6	Signing of Contract for Consultancy Services	September 03, 2020
7	Commencement of Services	September 11, 2020

27. Following table exhibits details of the PMC’s personnel deployed to the Balakot Hydropower Project (300 MW), during the reporting period.

Table 2.5: PMC's Personnel Deployed to the Project

S/No	Designation	Input
Expatriate Key Staff		
1	Project Manager - Team Leader	Intermittent
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
Local Experts		
1	Deputy Team Leader	Ful Time
2	Chief Engineer (Dams & Surface Works)	Ful Time
3	Electricity Tariff and PPA Expert	Intermittent
4	Quality Assurance Engineer (Dam and Surface Works)	Ful Time
5	Transmission Line Engineer	Intermittent
6	Contract Specialist	Intermittent
7	Health and Safety Monitor	Full Time
8	Resettlement Expert	Intermittent
9	Gender / Community Mobilization Expert	Intermittent
10	Environmental Expert	Intermittent
11	Document Controller (Monitoring)	Ful Time
12	Geologist A	Intermittent
13	Geologist B	Intermittent
14	Structural Engineer	Intermittent

28. Engineer Assad Ali Khan, the PMC Environmental Expert (EE) for Balakot Hydropower Project (300 MW), is onboard with intermittent inputs since commencement of the services. The EE can be approached through:

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

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

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

30. The PMC office, established at Site at the address given below, is operational since June 2022.

PMC Balakot HPP (300 MW) Site Office
Four Seasons Hotel, Near PTCL Exchange
Kaghan Road Balakot
District Mansehra
Khyber Pakhtunkhwa, Pakistan
Phone No: +92-997-360155

C. EPC Contractor

31. The construction contract of Balakot Hydropower Project (300 MW) was awarded to a Joint Venture of China Gezhouba Group Company (CGGC), China & Ghulam Rasool and Company Pvt. Ltd (GRC), Pakistan on Mach 09, 2021.

32. Consequent upon fulfillment of the requisite conditions of the EPC Contract, the Implementing Agency (IA) notified September 27, 2021 as an Effective Date for the EPC Contract.

33. Various milestones achieved during procurement process of the EPC Contractor are tabulated below.

Table 2.6: EPC Contractor 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	Bids Submission	June 15, 2020
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

34. 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 Document.

35. Under the provisions of the conditions of contract, preparation of the Site Specific Environmental Management Plan (SSEMP) is one of the EPC Contractor's contractual obligations. Although, SSEMP will primarily be based on the essence of the approved EIA report and Site requirements however, due preference will also be given to the SPS 2009 guidelines and conditions contained in the "Environmental Approval" granted by the Khyber Pakhtunkhwa Environmental Protection Agency on July 06, 2021.

36. During all three phases of the Project i.e. pre-construction, construction and Defect Liability Period, the EPC Contractor will take care of the HSE portfolio through implementation of measures proposed in the SSEMP, good practices and through compliance of instructions issued or gaps identified in the monitoring report(s) during currency of the contract.

37. **Figure 2.6** exhibits the EPC Contractor's HSE organogram followed by table showing details of the HSE team onboard so far.

Figure 2.3: EPC Contractor' HSE Team Organogram

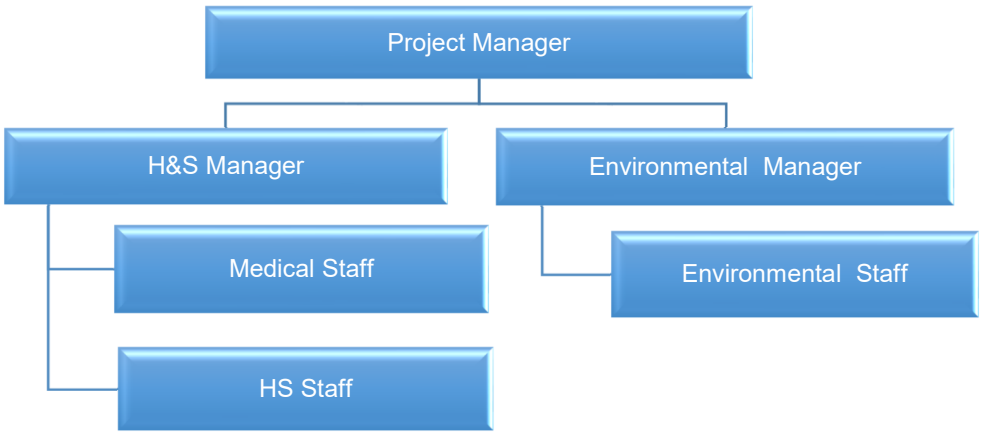


Table 2.7: EPC Contractor's HSE Team

S/No	Name	Designation	Contact Number
1	Qi Xiu Feng	H & S Manager	+92-3471149921
2	Irshad Saeed	Environmental Manager	+92-3059028481
3	Syed Baber Ali Shah	H & S Officer	+92-3449661669
4	Azeem	H & S Officer	+92-3196045598
5	Zaighum Shah	HSE Supervisor	+92-3249191434

2.2.2 Project HSE Safeguard Team

38. From the details given under Sub-heads A,B, and C above, the Balakot HPP (300 MW) HSE personnel responsible for the HSE safeguards are detailed in the table given below.

Table 2.8: Details of Balakot HPP (300 MW) HSE Personnel

Organization Name	Job Title	Name	Contact Details
Asian Development Bank (ADB)	Environmental Specialist - Country Environment Focal Person	Syed Asim Ali Sabzwari	asabzwari@adb.org
	Environmental Specialist - RETA Consultant	Abdul Basit Khan	abkhan.consultant@adb.org
Project Implementation Unit (PIU) of Balakot HPP (300 MW)	Deputy Director Health, Safety & Environment (HSE) and Gender	Ibtesaam Zaima	ibtesaamz@gmail.com
Project Management Consultant (PMC)	Environmental Expert	Assad Ali Khan	dtlbalakothpp@yahoo.com
	Health and Safety Monitor	Fawad Ali Shah	
EPC Contractor	H & S Manager	Qi Xiu Feng	453680735@qq.com
	Environmental Manager	Irshad Saeed	cggcbjstbalakot@126.com
	H & S Officer	Syed Baber Ali Shah	
	H & S Officer	Syed Zahir Shah	

2.3 Project Activities During Current Reporting Period

39. Consequent upon grant of possession of colony site (Ghanool) and dam site (Paras) on December 28, 2022 and March 31, 2023 respectively, the EPC Contractor initiated construction of permanent works as exhibited in the tables below. However, due to some social issues pertain to land acquisition, construction activities could not be initiated at dam site.

40. **Table 2.9** shows the EPC Contractor's overall works progress achieved till reporting period against the planned targets.

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

Description	Planned Start	Planned Finish	Planned %age	Achieved % Progress
Preparatory works	28-Aug-21	27-Feb-23	100%	47.0% / 53.0%
Basic Design	21-Sep-21	27-Sep-22	100%	93.0% / 7.0%
Detail Design	29-May-22	26 Dec-27	19%	3.0% / 97.0%
Procurement & Production & Test & transportation	29-Jul-22	30-May-26	23%	0.0% / 100.0%
River Diversion	1-Oct-22	27-Nov-23	62%	0.0% / 100.0%
Concrete Dam	19-Jun-23	27-Jan-27	0%	0.0% / 100.0%
Power Intake Works	28-Jan-23	28-Jul-24	26%	0.0% / 100.0%
Headrace Tunnel	13-Oct-22	27-Jun-26	19%	3.0% / 97.0%
Upstream Surge Tank, Pressure Shaft & Penstocks	23-Apr-23	28-Jul-25	0%	0.0% / 100.0%
Main Access Tunnel & Ventilation and Cable Tunnel	16-Nov-22	18-Oct-26	15%	0.0% / 100.0%
Powerhouse Works	4-Jun-23	20-Dec-25	2%	0.0% / 100.0%
Tailrace Tunnel Downstream Surge Shaft	29-Jul-23	27-Feb-26	0%	0.0% / 100.0%
Switchyard	16-Apr-23	15-Jan-24	24%	0.0% / 100.0%
Transmission Line Works	28-Sep-22	27-Aug-25	25%	0.0% / 100.0%
Main transformers and other equipment installation	1-Mar-25	30-Nov-26	0%	0.0% / 100.0%
Roads and Bridge	1-Oct-22	3-Oct-26	18%	33.0% / 67.0%
Permanent Staff Residential Colony	28-Jun-23	28-Dec-25	0%	5.0% / 95.0%
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%

Key:
Achieved:
Remaining:

41. The manpower and machinery deployed at Site during the reporting period are exhibited in **Table 2.10, & 2.11,** while staff deployment trend has been shown in **Figure 2.7** followed by **Figure 2.8** showing status of the local employment in the Project.

Table 2.10: Manpower deployed to Project during the Reporting Period

S/No	Designation of Staff	January	February	March	April	May	June
1	Project Manager	1	1	1	1	1	1
2	CFO (DPM)	1	1	1	1	1	1
3	Planning, Engineering &Technical Director(DPM)	1	1	1	1	1	1
4	QHSE Director (DPM)	1	1	1	1	1	1
5	Equipment and Material Director (DPM)	1	1	1	1	1	1

S/No	Designation of Staff	January	February	March	April	May	June
6	Administrative Director (DPM)	1	1	1	1	1	1
7	Commercial Director (DPM)	1	1	1	1	1	1
8	Environmental Manager	1	1	1	1	1	1
9	Deputy Director of Technical &Planning	1	1	1	1	1	1
10	Commercial Management Department	5	5	5	5	5	5
11	Planning, Engineering, &Technical Management Department	8	8	8	10	15	15
12	QHSE Management Department	6	7	7	7	7	7
13	Equipment and Materials Department	9	10	10	10	10	10
14	Financial Management Department	3	3	3	3	3	3
15	Administration &Human Resource Department	30	30	30	30	30	30
16	Mechanical Repair Team	10	18	18	28	33	33
17	Surveyor	5	5	5	5	5	5
18	Laboratory	2	2	2	4	4	4
19	General Team A2&A3	18	20	20	30	30	30
20	A3 Camp ,Retaining wall Skilled &unskilled Labors	0	0	0	0	83	83
21	Adit#2 Skilled &unskilled Labors	75	75	45	43	51	51
22	Batching plant Team	0	0	0	8	8	8
23	Adit#3 Skilled &unskilled Labors	40	40	40	83	15	15
24	Design & Geologist Management	7	7	7	7	7	7
25	Magazine Store	15	15	15	0	0	0
26	A2 Temporary Camp	22	22	22	0	0	0
26	Site Manager	1	1	1	1	1	1
27	Planning Engineer	3	3	3	3	3	3
28	Construction Manager	2	2	2	2	2	2
29	Admin Manager	1	1	1	1	1	1
30	Quantity Surveyor	1	1	1	1	1	1
31	Site Engineer	2	2	2	2	2	2
32	Site Engineer	3	3	3	3	3	3
33	Chief Surveyor	1	1	1	1	2	2
34	Land Surveyor	4	5	5	5	5	5
35	Assistant Surveyor	1	1	1	1	1	1
36	Material Engineer	1	1	1	1	1	1
37	Senior Engineer Technical	1	1	1	1	1	1
38	Structure Engineer	1	1	1	1	1	1
39	Senior Planning Engineer	3	4	4	3	3	3
40	Senior Accountant	1	1	1	1	1	1
41	Lab technician	1	1	1	1	1	1
42	Electrical Engineer	1	1	1	1	1	1
43	Store Keepers	2	2	2	2	2	2
44	Health Safety Inspector	0	1	1	1	1	1
45	HSE Incharge	1	1	1	1	1	1
45	Geologist	0	0	0	1	1	1
46	Skilled Labor	35	42	43	53	53	59

S/No	Designation of Staff	January	February	March	April	May	June
47	Unskilled Labor	47	49	49	75	75	77
Total(No)		**377**	**401**	**372**	**444**	**478**	**486**
Out of Total, Local Employed Workforce (No)		**198**	**222**	**207**	**257**	**282**	**255**

Figure 2.7: Staff Deployment Trend during the Reporting Period

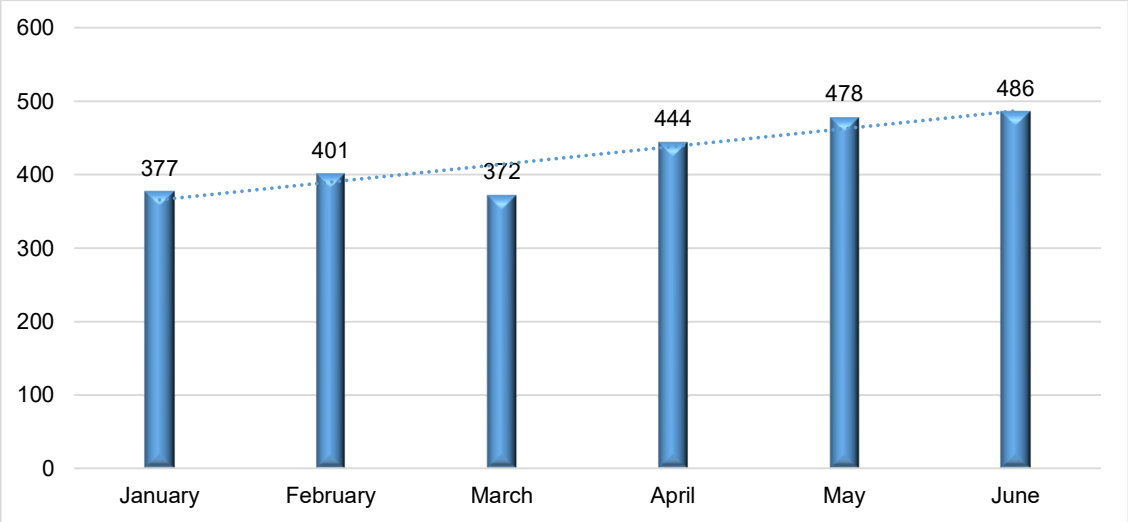
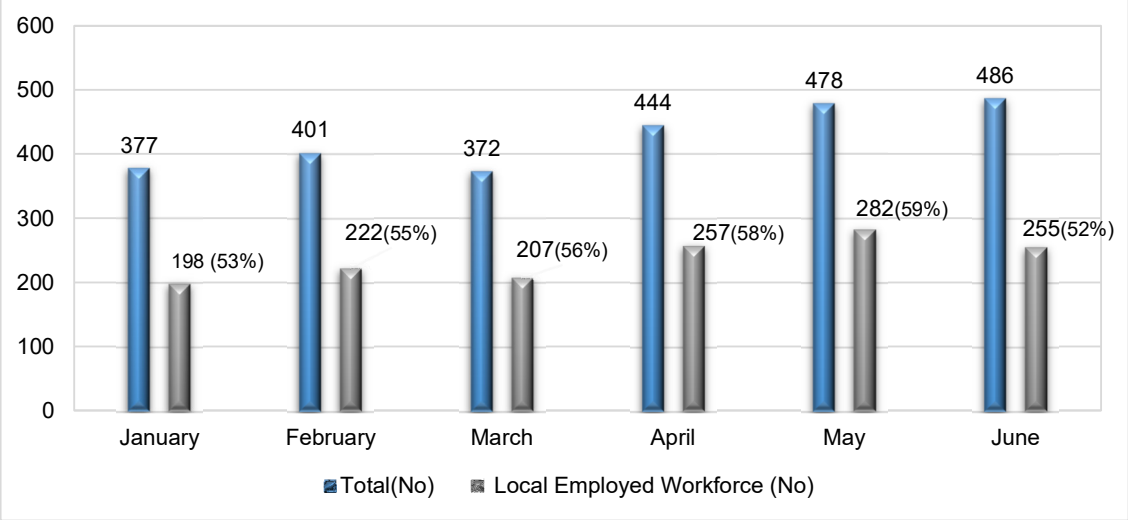


Figure 2.8: Local Employment Statistics



42. As exhibited in the graph above, there is gradual increase in the EPC Contractor's workforce since award of possession of sites except slight decrease in the month of March which is mainly due to the onset of Ramzan. With the progress of work, further increase in workforce deployment is anticipated.

Table 2.11: Machinery deployed to Project during the Reporting Period

S/No	Description	Model	Total No. Deployed	Deployment Month					
				Jan	Feb	Mar	Apr	May	Jun
1	Excavator	HITACHI 200	6	1	1	1	6	6	6
2	Excavator	Doosan 210,	4	1	4	4	4	4	4
3	Crawl Excavator	CDM 6225	1	0	1	1	1	1	1
4	Excavator	Hyundai	2	0	1	2	2	2	2
5	Excavator	Volvo 145	4	1	1	1	5	4	4
6	Excavator	HITACHI	3	0	4	3	3	3	3
7	Excavator		2	0	2	2	0	0	0
8	Excavator	Doosan	4	1	1	4	4	4	4
9	Excavator	CAT, Hyundai	4	0	0	3	4	4	4
10	Crawl Excavator	Hitachi 200	4	0	0	3	4	4	4
11	Loader		1	1	1	1	1	1	1
12	Tractor Trolley	385	1	1	1	1	1	1	1
13	Dump Truck	FAW 280	5	2	4	4	4	5	5
14	Roller		1	1	1	1	1	1	1
15	Generator	200, 200, 65 KV 15 KV	5	5	5	5	5	5	5
16	Batching plant		1	1	1	1	1	1	1
17	Double Cabin	Revo, Tiger 2002	2	2	2	2	2	2	3
18	Car Corolla	Toyota	1	1	1	1	1	1	1
19	Transit Mixer	Nissan, Hino	2	2	2	2	2	2	2
20	Compressor /12Bar		2	2	2	2	2	2	2
21	Jeep		2	2	2	2	2	2	2
22	Trolley Crane		1	1	1	1	1	1	1
23	Drilling Equipment		14	14	14	14	14	14	14
24	Shotcrete Pump		1	1	1	1	1	1	1
25	Air Winder		1	0	0	0	0	0	1
26	Dump truck		3	0	0	0	0	0	3
27	Generator 250		1	0	0	0	0	0	1
28	Water Bowser		1	0	0	0		1	1
29	Power Generator	375KVA	1	0	1	1	1	1	1
30	Power Generator	100 KVA	1	0	1	1	0	0	0
31	Ventilation Fan		1	1	1	1	1	1	1
32	Jeep		1	0	0	0	0	0	1
33	Doble Cabin		1	0	0	0	0	0	1
34	Toyota	Fortuner	1	0	0	1	1	1	1
35	Peter Engine	25HP	1	2	2	2	2	2	2
36	Bulldozer		1	0	0	0	0	2	2
37	Excavator	Mobile Sunny/SAY155UU	1	0	0	0	0	1	1
38	Crawl Excavators	PC200-8	1	1	1	1	1	1	1
39	Dump Trucks	SX3255DR384R	7	4	4	3	5	7	7
40	Excavator	Hitachi 200, Hitachi 220	2	2	2	2	2	2	2
41	Excavator	CATN320D,Hyundai 210	2	2	2	2	2	2	2
42	Excavator	Komatsu 200,Komatsu 100	2	2	2	2	2	2	2

S/No	Description	Model	Total No. Deployed	Deployment Month					
				Jan	Feb	Mar	Apr	May	Jun
43	Loader	LW500	1	1	1	1	1	1	1
44	Crawler bulldozer	SD22	1	1	1	1	2	2	2
45	Side dump loader	WA380-6	1	1	1	1	1	1	1
46	Jeep		1	0	0	0	0	1	1
47	Mini Dumper	Mercedes	1	1	1	1	1	1	1
48	Loader	LW500FN, LW300FN	3	2	2	2	3	3	3
49	Diesel generators	V550C2,HDG22	2	2	2	2	2	2	2
50	Diesel generators	Perkins 121hp,1106A-70TG1	2	2	2	2	2	2	2
51	Water tank	SCS5160GSS	2	2	2	2	2	2	2
52	Concrete Mixture Machine		2	2	2	2	2	2	2
53	Diesel tank	Foton Daimler,M600	1	1	1	1	1	1	1
54	Water truck	DLQ5161GSSZ4	1	1	1	1	1	1	1
55	Flatbed truck	FG1JKPB	1	1	1	1	1	1	1
56	Concrete Mixture Machine		3	3	3	3	3	3	3
57	GPS-RTK Survey System Brand	Nan fang S82	4	4	4	4	4	4	4
58	Total station Brand	GPT-4002LN	1	1	1	1	1	1	1
59	Digital Leveling Instruments	Trimble DINI03	1	1	1	1	1	1	1
60	Pickup	4X4	3	3	3	3	3	3	3
61	Prado		3	3	3	3	3	3	3
62	Car	MJ	1	1	1	1	1	1	1
63	Road Roller	XS183JPD	1	1	1	1	1	1	1
64	Air Compressors		2	2	2	2	2	2	2
65	Crawler Drilling machine	T35	1	1	1	1	1	1	1
66	Diesel Air Compressor	XRHS666CD,XAHS750	2	2	2	2	2	2	2
67	Mobile truck crane 25ton	QY25K5-I	1	1	1	1	1	1	1
68	Concrete Pump	HBT80.13.112RSD, HBT60.16.110SU	2	2	2	2	2	2	2
69	Power Transformer	500,800KV,100,1200KV&1250	5	5	5	5	5	5	5
70	Single Arm Rock Drilling Rig	D7	1	1	1	1	1	1	1
71	Binding Machine		1	1	1	1	1	1	1
72	Shaper	BC6063	1	1	1	1	1	1	1
73	jib crane	BZD-2	1	1	1	1	1	1	1
74	jib crane	BZD-2	1	1	1	1	1	1	1
75	Digital Underground Scale	SCS-60	1	1	1	1	1	1	1
76	low voltage switch box	380V 1600A	1	1	1	1	1	1	1
77	low voltage switch box	380V 2000A	1	1	1	1	1	1	1
78	low voltage switch box	UAN111-354-111	1	1	1	1	1	1	1
79	Ordinary lathe	C6160C	1	1	1	1	1	1	1
80	Vertical lifting table milling machine	ZX7045	1	1	1	1	1	1	1
81	Shaper	BC6063	1	1	1	1	1	1	1
82	sewage pump	TS200-125-365	1	1	1	1	1	1	1

S/No	Description	Model	Total No. Deployed	Deployment Month					
				Jan	Feb	Mar	Apr	May	Jun
83	oil storage tank	5170 Gallon 19500L	1	1	1	1	1	1	1
84	lathe	CY6166B-3000	1	1	1	1	1	1	1
85	Shaper	B6065	1	1	1	1	1	1	1
86	Vertical lifting table milling machine	XQ6232W-B	1	1	1	1	1	1	1
87	Radial drilling machine	Z5140A	1	1	1	1	1	1	1
88	Single column press	YX41-100T	1	1	1	1	1	1	1
89	Other hydraulic presses (pipe crimping machines)	XM91-C1	1	1	1	1	1	1	1
90	lathe		1	1	1	1	1	1	1
91	Dump truck		1	0	0	0	1	1	1
92	Excavator	210,323&323	3	0	0	0	0	3	3
93	Jeep		1	0	0	0	0	0	1
94	Mazda		1	0	0	0	0	1	1
95	Pickup double cabin		1	0	0	0	0	0	1
96	Batching plant		1	0	0	0	0	0	1
97	Lifter		1	0	0	0	0	1	1

2.4 Material Resource Utilization

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

i. Coarse aggregate: Black Dimond and Ghuman

ii. Fine aggregate: Lawrencepur, Maira and Thakot

iii. Cement: Askari and Fauji

iv. Reinforced steel: Fazal and Ittifaq

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

45. Following tables show month-wise and cumulative details of the materials used in the Project construction activities.

Table 2.12: Month-wise and Cumulative Details of Construction Materials

S/No	Month	Steel (Ton)	Cement (Bag)	Sand (cft)	Aggregates (cft)
1	January	40	105	5058.13	0
2	February	35	140	3400	0
3	March	0	180	400	6000
4	April	0	0	5184	7000

S/No	Month	Steel (Ton)	Cement (Bag)	Sand (cft)	Aggregates (cft)
5	May	0	1131	1017	7941
6	June	218	500	2576	3488
Total for Reporting Period (Jan-June 2023)		**293**	**2056**	**17635.13**	**24429**
Cumulative for the Project		**293**	**2056**	**17635.13**	**24429**

Table 2.13: Month-wise and Cumulative Details of POL and Water used

S/No	Month	Diesel (Litre)	Petrol (Litre)	Water (Litre)
1	January	30000	797.89	565500
2	February	18250	456.45	601500
3	March	71160	385.16	558000
4	April	71160	385.16	51600
5	May	83455	817.84	639000
6	June	91000	910.7	631800
Total for Reporting Period (Jan-June 2023)		**365025**	**2842.5**	**3047400**
Cumulative for the Project		**365025**	**2842.5**	**3047400**

Works Progress in Pictures

Earthwork at Adit 1

Land leveling at Colony site

Support work at Adit 2

Portal area excavation

Retaining wall construction at Adit 3

Construction of A3 Camp

2.5 Description of any Changes to the Project Design

46. So far, changes in the intended function of the bypass tunnel, and placement of spillways in the dam body have been approved as given below.

i. The bypass tunnel, originally conceived for the Kunhar River diversion during construction phase, and sediment exclusion during operation phase of the Project, has now been proposed to be used as diversion tunnel only, whereas for sediment flushing, additional bottom out let will be provided in the dam body.

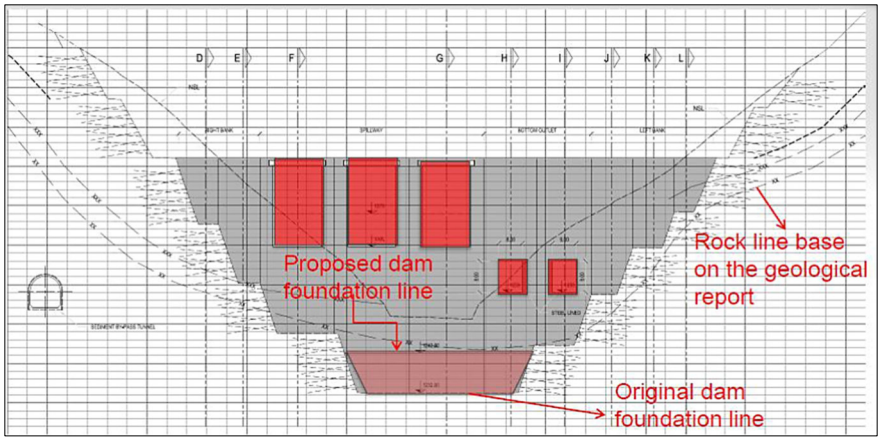
ii. A combination of three spillways, which in the tender document were placed at the left side of the dam body, have now been optimized to two spillways, placed at the left and right side of the dam body. Also, the number of bottom outlet systems increased from 2 to 3, and lowering the lower level by 5 m while shifting its location to the dam axis.

47. As evident from the design changes expounded under Item No. (i) above, the originally proposed sediment bypass tunnel will operate as diversion tunnel only with minor structural adjustments however, for the design changes mentioned at Item No. (ii), there will be structural changes in the dam body as exhibited in **Figure 2.9** below.

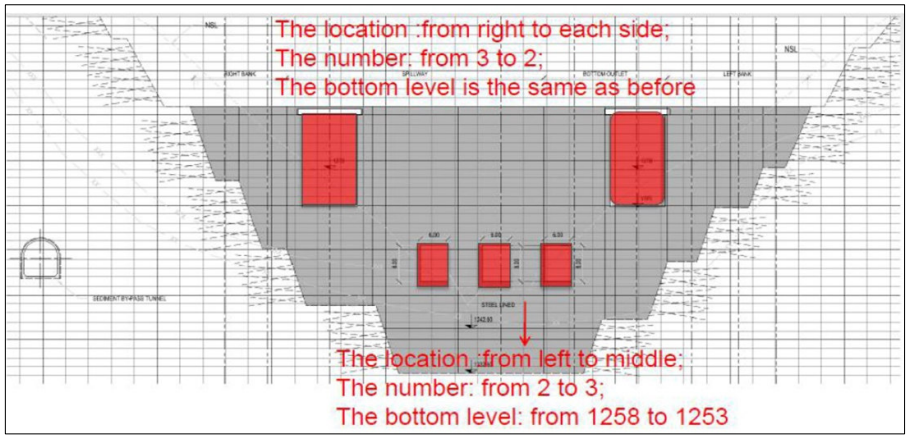
48. The PMC and PIU have principally been agreed with the above design change proposal and have granted approval to the EPC Contractor subject to fulfilment of the PMC comments on the proposal.

49. To reflect the above design changes, updation of the Project EIA report is currently in progress which is scheduled to be submitted to the relevant quarters at ADB by the end of July 2023, for necessary review and concurrence thereof.

Figure 2.9: Design Change Proposal for the Dam Spillways



Original Scheme of Spillway and Bottom Outlets



Revised Scheme of Spillway and Bottom Outlets

2.6 Description of any Changes to the Agreed Construction Methods

50. Since approval of the Basic Engineering Design on March 31, 2023, the EPC Contractor is regularly being submitting method statements for the PMC review and approval thereof. So far, method statements for Adit 1 & 2, have been approved while others are either under review or comments thereon have been sent to the EPC Contractor for incorporation in the revised submission(s).

51. Although, no changes have been proposed in the approved method statements so far, nevertheless, approved changes will be reported in the corresponding SAEMR.

3 ENVIRONMENTAL SAFEGUARD ACTIVITIES

3.1 General Description of Environmental Safeguard Activities

52. During the reporting period, the Project Basic and Detail Engineering Design, surveys, construction of: (i) access roads; (ii) Adit portals; (iii) EPC Contractor's camps/workshops; (iv) installation of batching plant; and identification/acquisition of muck disposal areas, were some of the major activities undertaken by the EPC Contractor at Site.

53. Health, safety and environmental aspects of the aforementioned activities were regularly being 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 Khyber Pakhtunkhwa Environmental Protection Agency (KPKEPA) approved laboratory at the pre-identified locations at Site.

54. Several tripartite (PIU, PMC and EPC Contractor) HSE progress review meetings were held wherein the HSE activities were prioritized, action plans were furnished and targets were set to implement the SSEMP provisions in true letter and spirit. The MOM copies of two such meetings are attached as **Annexure-03,** for reference and information.

55. Furthermore, two virtual meetings were held with the ADB and AIIB, whereby portfolio progress was presented while the financiers' safeguard team not only emphasized implementation of the BAP but also asked for submission of Action Plans in this regard.

56. Following is a brief description of the major safeguard activities.

3.1.1 HSE Progress Review Meetings

57. Consequent upon the PIU grant of sectional possession of site falling in Sangar and Ghanool Maozas i.e. Powerhouse and Residential colony sites, to the EPC Contractor on December 28, 2022, HSE progress review meeting was held with the EPC Contractor's Health, Safety and Environment (HSE) team on January 25, 2023, wherein an array of HSE related issues were discussed in detail. Minutes of Meeting (MoM), containing the identified/pending issues, the required action and time line thereto, were furnished on the spot, signed and issued on the very next day for the EPC Contractor's necessary action. The major non-compliances observed by the PMC's Health and Safety Monitor were also discussed in detail while time frame for rectification of the same was agreed upon by the EPC Contractor's team, as evident from the MoM attached as **Annexure-03**.

58. On March 21, 2023, HSE progress review meeting was held with the EPC Contractor's HSE team at the PMC Site office wherein various portfolio issues like appointment of the Environmental Manager, vocational trainings, approval of muck disposal sites etc. were discussed in detail. The meeting was also attended by the Deputy Director Health, Safety & Environment (HSE) of the PIU. The minutes of meeting issued, containing time frame for resolving the HSE related issues at Site, and submission of the EPC Contractor's plan for various pending activities is attached as **Annexure-03.**

HSE Progress Review Meeting held on January 25, 2023

HSE Progress Review Meeting held on March 21, 2023

59. In addition to the above progress review meetings, during the reporting period, the PMC Health and Safety Monitor regularly conducted weekly HSE meetings with the EPC Contractor staff to ensure implementation of the SSEMP provisions and compliance to the targeted activities.

3.1.2 Virtual Meetings with the Project Financiers on HSE Progress

60. On March 08, 2023, a virtual meeting was held among ADB, AIIB, PIU and PMC on the portfolio and Basin-wide BAP progress. The Deputy Director Health, Safety & Environment (HSE) and Gender, delivered a detailed presentation covering HSE activities and Basin-wide BAP progress. At the end of the meeting, the ADB safeguard team asked to:

i. provide work plan for implementation of the Basin-wide BAP;

ii. submit copy of SSEMP for the Bank review and concurrence; and

iii. update EIA report to reflect changes in the design, and in the project specific BAP implementation arrangement.

61. Action Plan for the Basin-wide BAP implementation and softy copy of the SSEMP were provided to the Bank while updation of the EIA initiated in the last week of the reporting period, i.e. upon approval of: (i) the design changes; and (ii) implementation arrangement of project specific BAP. Submission of the updated EIA report to the Bank is scheduled at the end of July, 2023.

62. On May 22,2023, the Environmental Expert (EE) of the Project Management Consultant (PMC) presented the Balakot HPP (300 MW) HSE portfolio progress to the Asian Development Bank Safeguard Review Mission through virtual media. Beside ADB Environmental Safeguard team, the presentation was also participated by the Project Director, and Deputy Director (DD) Environment, Health, Safety and Gender of the Project Management Unit (PIU) of Balakot HPP (300MW). Submission of a comprehensive Action Plan for Basin-wide BAP, and updated Environmental Impact Assessment (EIA) report to the quarter concerned at ADB were the two main targets set in the presentation. In this regard, detailed BAP Action plan was submitted to ADB on June 15, 2023, while submission of the updated EIA report is scheduled before end of July, 2023.

3.1.3 Instrumental Environmental Monitoring

63. The Khyber Pakhtunkhwa Environmental Protection Agency (KPKEPA) 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 SSEMP where baseline instrumental monitoring was done in December 2022. The first quarter instrumental monitoring was conducted in month of March 2023, while the second quarter monitoring was conducted in June 2023.

64. Details of instrumental environmental monitoring and the results obtained thereof have been given under Sub-head 5 of the current SAEMR while signed copies are attached as **Annexure -04.**

Air quality and Noise level Monitoring at A3 Camp (June 16, 2023)

3.2 Site Audit

65. Table below exhibits Site visits, jointly undertook by the PIU, PMC, and the EPC Contractor's environmental staff as part of the Site Audit. Since the PMC's Health and Safety Monitor visits the Site on almost daily basis hence, his routine inspection/supervision visits are not reflected herein.

66. During these visits, health, safety and environmental aspects of the construction activities pertain to permanent access roads, camp facilities, batching plants, adits, and temporary access roads were audited.

Table 3.1: Site Visits Conducted during the Monitoring Period

Visit Date	Auditor (Title and Name)		Purpose of Audit	Summary of Findings
	Title	Name		
January 26, 2023	**PMC:** Environmental Expert	Assad Ali Khan	HSE compliance audit of construction works at Adit 3, and camps at Adit 2 and 3.	i. At several reaches of the access road, sliding had occurred while happening of such events anticipated in case of further precipitation. Therefore, EPC Contractor was asked to take necessary measures to avert such incidents. ii. The stream flowing in the valley precipitate in the material dumped and leveled at the site, identified for the future batching/aggregate plant ,was causing obstruction to the flow triggering erosion. iii. The workshop at Adit 3 Camp (A3 Camp) site, appeared to be prone to the land sliding, was accordingly instructed for necessary protection. iv. There was no provision of latrine facilities at the under construction camp site at Adit 3. v. The muck disposal site at Adit 3 appeared to accommodate much lower quantity than the EPC Contractor's earlier anticipation.
	EPC Contractor: i. Incharge QHSE ii. QAQC iii. Environmental Manager	i. Wang He ii. Ali Husnain iii. Ashfaq Nazir		
March 07, 2023	**PIU:** Deputy Director HSE and Gender	Ibtesaam Zaima	HSE compliance audit of the construction activities at Site.	i. Storage containers were mostly without MSDS ii. Damaged electric wires were observed. iii. Food items were observed in equipment store iv. Latrines were not properly cleaned at camp v. Minor housekeeping issues were observed.
	PMC: Health and Safety Monitor	Fawad Ali Shah		
	EPC Contractor: i. HSE Officer ii. HSE Officer	i. Sayyed Zaigham Shah ii. Syed Zahir Shah		
May 25, 2023	**PIU:** i. Deputy Director HSE and Gender	i. Ibtesaam Zaima ii. Dr. Naveed Afsar		

Visit Date	Auditor (Title and Name)		Purpose of Audit	Summary of Findings
	Title	Name		
	ii. Deputy Director Social and Resettlement			
	PMC: i. Environmental Expert ii. Health and Safety Monitor	i. Assad Ali Khan ii. Fawad Ali Shah	EEM familiarization of the Project setting in connection with the preparation of the EEM Inception Report	EEM visited main facilities the Project like dam, colony, powerhouse and access roads sites whereby the PMC Environmental Expert explained Project setting through maps.
	EEM:	Dr.Abdul Qayyum		
June 24, 2023	**Forest Department** DFO, Kunhar River Watershed Division	Abid Mumtaz	Assessment of the damaged trees at R 3	i. The damages caused by R3 road excavation was assessed and shape file was prepared however, the matter is yet to be sort out as to clarify whether the affected trees have been accounted for payment at the time of tree assessment or not. ii. Further meetings and site visits will be conducted to settle the matter.
	PIU: Patwari	Waqar Ahmad		
	EPC Contractor: Manager GRC	Muhammad Arif		

Recording non-compliances at Adit-3 site (January 26, 2023)

PMC and PIU joint visit to the EPC Contractor's Store at Adit 1 (March 07, 2023)

Environmental Expert of PMC explaining Project Setting to EEM (May 25,2023)

3.3 Issues Tracking (Based on Non. Conformance Notices)

67. As stated above, construction of permanent works initiated during the current reporting period whereby a vivid number of non-compliance events- mostly of minor nature- were recorded at Site however, as result of persistent follow-up, holding of regular meetings with the EPC Contractor's HSE staff , induction trainings, regular toolbox talks and other capacity

building trainings imparted to the Contractor's workforce, the intensity of non-compliance events has now significantly been reduced at Site.

68. The minor non-compliances observed include, no or casual usage of PPE; poor housekeeping; issues in storage of materials; deficiencies in solid waste management; safe disposal of effluent from adit tunnels; lack of signage at Site; low intensity oil spillage, generation of dust due to the Project vehicles movement on unpaved access roads and the EPC Contractor's failure in timely submission of periodic reports.

69. During the reporting period, particularly in the early phases of construction activities, out of 47 minor non-compliances observed, 39 have been rectified while rectification of the remaining is in progress. The issues under observation for rectification or where improvement is needed include arrangement for kitchen effluent disposal; provision of well-equipped spillage kits; improvement in housekeeping; establishment of fully equipped dispensary (although, dispensary has been established however, deficient of essential medicine); regular water sprinkling and improvement in record keeping.

70. It shall however be noted that no major non-compliance occurred at Site during the reporting period.

71. **Table 3.2**, exhibit synopsis of the non-conformance activities recorded; their rectification status, and those which remained open during the current reporting period.

Table 3.2: Summary of Issues Tracking Activity for Current Reporting Period[1]

Description	Status
Total Number of issues for the Project	47
Number of open issues	8
Number of closed issues	39
Percentage of issues closed	83%

3.4 Trends

72. As expounded above, permanent works activities initiated during the reporting period of the current SAEMR whereby a vivid number of non-compliances were observed however, due to persistent efforts, around 83% of the issues have now been closed while swift rectification of the remaining opened issues is in progress.

73. Generally, a positive encouraging trend was observed in implementation of safeguard activities and rectification of gaps identified during supervision of such activities.

3.5 Unanticipated Environmental Impacts or Risks

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

[1] Since construction activities started during this reporting period hence, number of issues for the Project are same to the number of issues for the reporting period.

4 STATUS OF COMPLIANCE WITH COVENANTS

75. **Table 4.1** below, exhibit compliance status of the environmental related safeguard covenants contained in the Loan Agreement signed on May 21, 2020, between the Asian Development Bank, and the Khyber Pakhtunkhwa Province and Pakhtunkhwa Energy Development Organization (PEDO).

Table 4.1: Compliance Status with Covenants[2]

Covenant	Reference in Loan Agreement	Compliance Status
Procurement PEDO shall not, award any Works contracts which involves environmental impacts until: a) Khyber Pakhtunkhwa Environmental Protection Agency 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 No. 8	**Complied** a. The Khyber Pakhtunkhwa Environmental Protection Agency (KPKEPA) has granted "Environmental Approval" to the project EIA report on July 06, 2021. b. The environment, health and safety safeguard 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 Construction 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 No. 9	**Compliance to the covenant in progress** a. The Khyber Pakhtunkhwa Environmental Protection Agency (KPKEPA) has granted "Environmental Approval" to the project EIA report on July 06, 2021. Requisite NOCs, from Forest, Fisheries, Wildlife and Mining & Mineral departments of the government of Khyber Pakhtunkhwa, have been obtained. b. SSEMP, based on the EMP, site data and the project requirement, has been approved by the Employer on December 30, 2022. c. ADB has granted concurrence to the proposed changes in the implementation of the project specific BAP while Action Plan for Basin-wide BAP has been submitted to the Bank. PIU has initiated consultation with the Fisheries and Wildlife departments of the government of KPK to finalize office establishments, human resources, mode of payment and contract signing etc. under the project specific BAP.
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 No. 10	**Complied** • The requisite human and financial resources are available with the PIU, PMC and the EPC Contractor. • For BAP implementation, budgetary provision exists in the Project PC-1 whereas for the EMP implementation, the EPC Contractor has allocated lump

[2] **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 Loan Agreement	Compliance Status
		sum amount in his bid which is also reflected in the EPC Contract.
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 No. 10	**Compliance in progress** The environment, health and safety safeguard 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 Construction Contract. a) Implementation of SSEMP provisions is in progress at Site for the protection of environment, and 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 which may be identified Safeguards Monitoring Reports. c) So far, no unanticipated risk(s) have been identified, nevertheless, provisions of the covenant, SSEMP, and conditions of contract will be taken care of, and will strictly be followed if any unforeseen risk identified. d) Construction activities were mostly be undertaken within the permanent acquired land. In pursuance of 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 initiation of permanent work at Site. e) The temporary land, acquired by the EPC Contractor for his facilities, will be reinstated under the conditions of 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,	Para. 11 Page No. 10&11	**Compliance in progress.** a) This is the fourth SAEMR in compliance with the mentioned loan covenant. Previous three reports have been disclosed on the ADB website. b) Till reporting period, no unanticipated environmental risks have been identified so far. c) External environmental monitor is onboard since September 2022 who has also submitted Inception Report to the PIU for review and approval thereof.

Covenant	Reference in Loan Agreement	Compliance Status
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 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, as specified in the PAM, are onboard in compliance with the covenant provisions. e) No breach to the 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 SPS.	Para. 12 Page No. 11	**Complied**. Loan proceed are solely being under use for the development of the Balakot HPP (300 MW).
Grievance Redress Mechanism (12) 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. (14) The safeguards grievance redress mechanism referred	Para. 13 & 14 Page No. 11	(12) **Complied:** PEDO has notified 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 Commencement of Works. (14) **Complied:** The notified GRM is effectively performing the intended functions.

Covenant	Reference in Loan Agreement	Compliance Status
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.		
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 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.	Para. 15 Page No. 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.

76. Consequent upon securing NOCs/permissions from the relevant departments under the directions of the KPKEPA and holding of Public Hearing event, the Director General

KPKEPA issued “Environmental Approval” on July 06, 2021 in respect of the EIA report submitted to the Agency by PEDO in November, 2019.

77. Following are some of the major conditions contained in the “Environmental Approval” to the EIA report.

- LARP implementation before initiation of construction.
- Treatment for tunnel effluent.
- E-Flow of 6.1 cumecs shall be maintained.
- Sharing of muck disposal locations with the KPKEPA.
- Implementation of BAP.
- Pre- construction Environmental Monitoring through KPKEPA certified lab.
- Separate approval for crush plant, asphalt plant etc. shall be obtained from the KPKEPA.
- Implementation of tree plantation plan.
- Clearance from Mine and Mineral department of the government of KPK.
- Regular submission of compliance reports (Quarterly) to KPKEPA.

78. In response to the PIU request, as briefly expounded in the previous SAEMRs, the KPKEPA has waived- off part of condition (hh) of the “Environmental Approval” pertain to the construction of Fish ladder. Also, as construction of Fish Hatchery was not part of the EPC Contract hence, PEDO, with the consent of the Fisheries department, has to construct such hatchery either through amendment in the current EPC Contract or through a separate contract to offset the Project execution impacts on the Kunhar River fish fauna. Rest of the conditions contained in the “Environmental Approval” have either been complied, or made part of the SSEMP, or compliance is in progress or will be complied at appropriate time.

5 RESULTS OF ENVIRONMENTAL MONITORING

5.1 Overview of Monitoring Conducted during Current Period

79. The prime objectives of environmental monitoring are to:

i monitor project impacts on physical, biological and socio-economic indicators, and to assess adequacy of the EMP/SSEMP in identifying and mitigating the project adverse impacts;

ii recommend mitigation measures for any unforeseen impact or where the impact level exceeds from those anticipated in EMP/SSEMP; and

iii ensure legal compliance including safety of workforce and community.

80. During the project execution, two types of monitoring will be 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 and soil etc.

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

5.2 Instrumental Environmental Monitoring

82. As highlighted under Sub-head 3.1.3, quarterly instrumental environmental monitoring under the Balakot HPP (300 MW) was carried out by the Khyber Pakhtunkhwa Environmental Protection Agency (KPKEPA) certified laboratory, namely Integrated Environment Laboratory (IEL) at the locations pinned in the SSEMP. The first quarter monitoring was conducted during the month of March, 2023, while the second quarter monitoring was undertaken during June, 2023.

83. The instrumental environmental monitoring points and the monitoring plan are exhibited under **Figure 5.1** and **Table 5.1** respectively.

Figure 5.1: Instrumental Monitoring Points

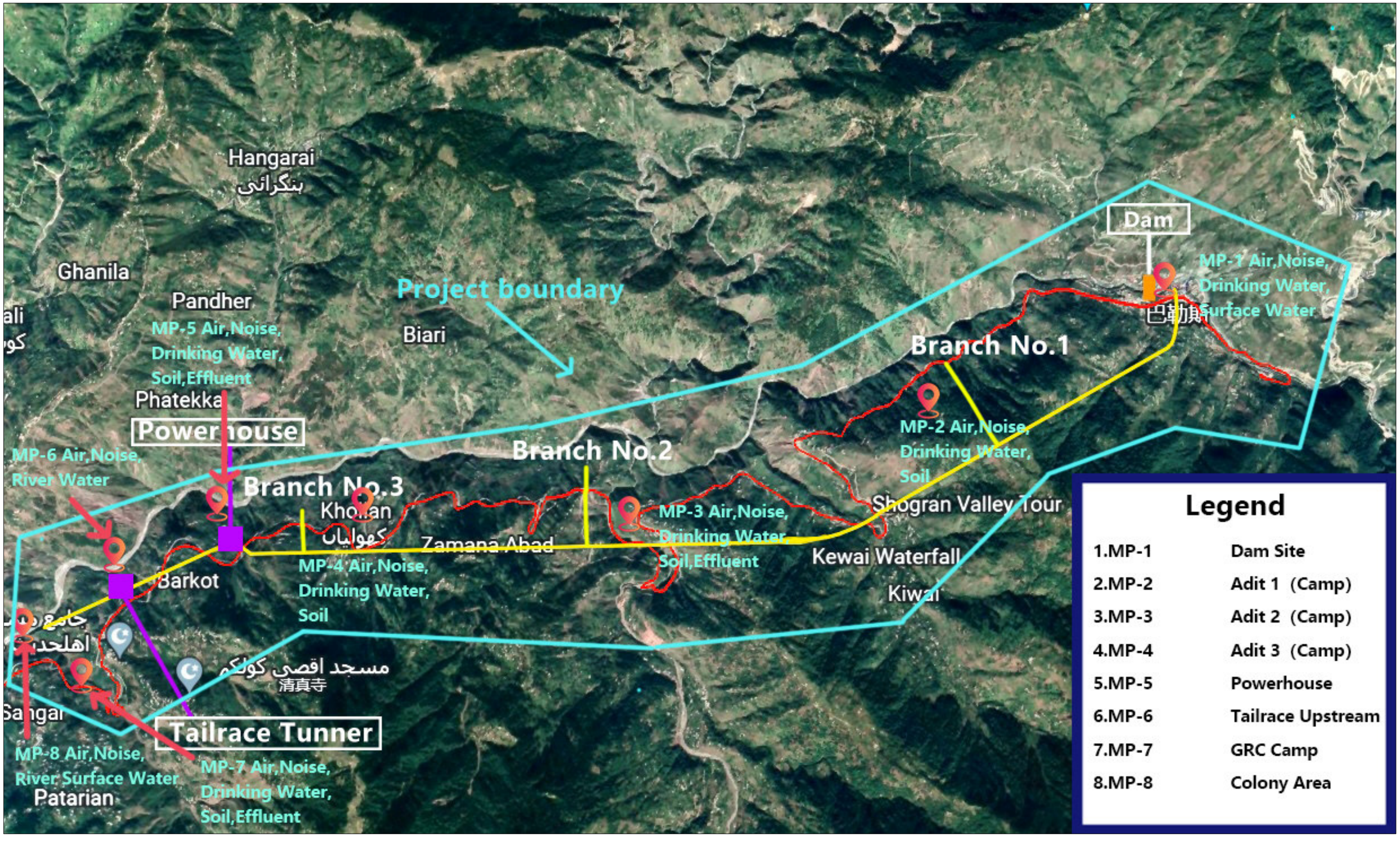


Table 5.1: Instrumental Environmental Monitoring Plan

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	Same as given for construction phase	Same as given for construction phase	Same as shown on map	Once	EPC Contractor	PIU & 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 map	Quarterly (24 Hours Duration)	EPC Contractor	PIU & PMC
Dust	Dust control	Air quality standards by NEQS, WHO		Quarterly (24 Hours Duration)	EPC Contractor	PIU & PMC
Noise Level	dB(A)	Noise pollution Control NEQS, WHO,		Quarterly (24 Hours Duration)	EPC Contractor	PIU & 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 & PMC
	Ground Water: 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*, *Faecal coliform* and *E. Coli*	Water quality standard by NEQS, WHO		Quarterly	EPC Contractor	PIU & PMC
Soil Pollution	Soil texture, pH, EC, Available Phosphorus and SAR.	NEQS, Government of Pakistan		Twice a year	EPC Contractor	PIU & PMC

84. Comparison of the two quarters instrumental environmental monitoring results with the baseline results, and with the NEQS, WHO, IFC and USEPA standard values (where applicable) are briefly given hereunder while signed copies of the results are attached to the report as **Annexure-04**.

5.3 Monitoring of Air, Noise, Water and Soil analysis

5.3.1 Ambient Air Monitoring

a. Particulate Matter Monitoring

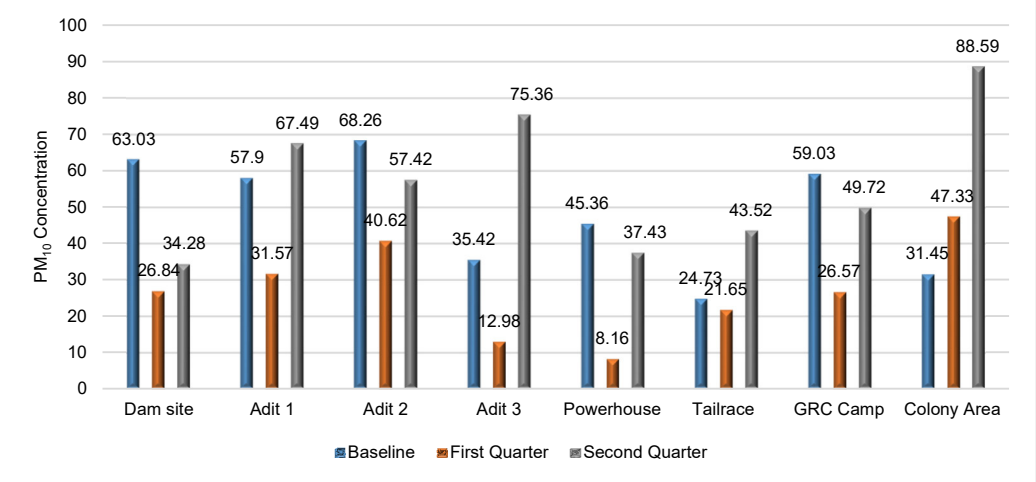
i. Methodology and Instrument Used

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

ii. Comparison of Results and Discussion

86. Ambient particulate matters ($PM_{10\ \&\ 2.5}$) were monitored for twenty-four (24) hours at the pre-identified locations as given in **Figure 5.1** above. The graph given below exhibit the intended comparison as expounded above.

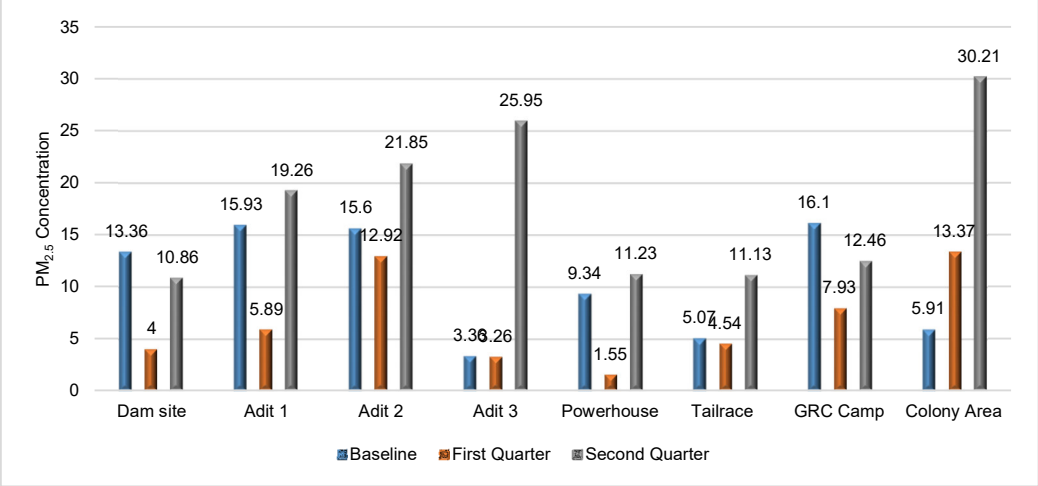
Figure 5.2: Comparison for the Particulate Matter (PM_{10}) µg/m³



NEQS:150 µg/m³
WHO: 45 µg/m³

87. As evident from the results exhibited above, the PM_{10} concentration at most of the sampling points is in excess to the WHO guiding values but fall well below the NEQS. Same scenario was recorded at the time of the baseline line monitoring however, in the second quarter, there is sharp increase in the PM_{10} concentration at Adit 3 site which happened primarily due to propagation of earth work activities. To subsidize the particulate matter concentration, sprinkling frequency was increased during the workhours.

Figure 5.3: Comparison for the Particulate Matter ($PM_{2.5}$) µg/m³



NEQS:35 µg/m³
WHO: 15 µg/m³

88. The baseline results obtained for $PM_{2.5}$ shows compliance with the NEQS however, are in excess to the WHO guideline values at some locations. As evident from the graph, even baseline results recorded at some locations are in exceedance to the WHO guidelines values.

89. Due to excavation for access roads and land leveling at colony site, the result obtained shows sharp increase in the $PM_{2.5}$ concentration. Also, high concentration at Adit 3 is due to the vehicular movement on katcha track leading to Adit 3. Although, sprinkling of water was regularly being undertaken at these sites however, no special mitigation measures- other than those specified in SSEMP- were adopted as the concentration was for a short period and below the permissible NEQS guiding values. The monitoring period has also some impact on the high $PM_{2.5}$ concentration as evident from the results obtained during the first quarter monitoring which was undertaken in the month of March 2023.

b. Gases Monitoring

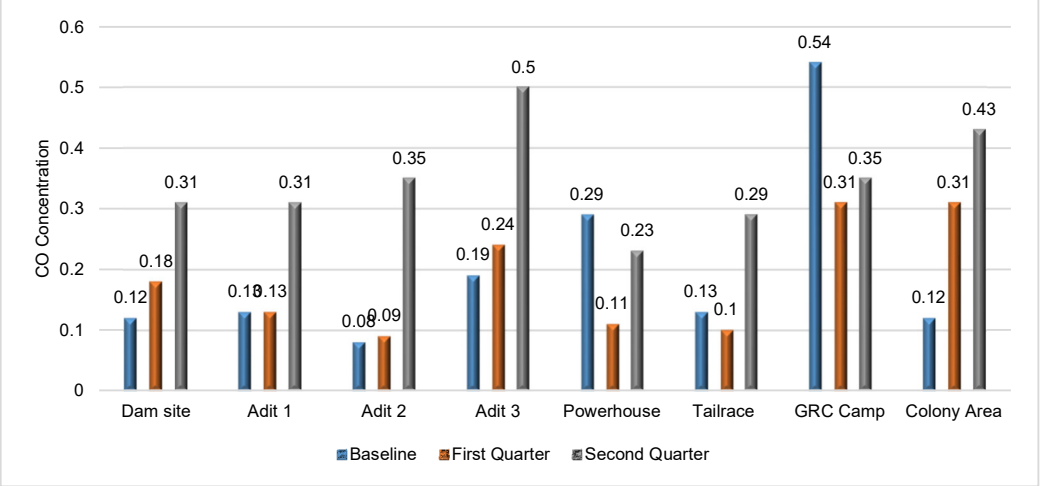
i. Methodology and Instrument Used

90. The ambient gaseous monitoring was carried out for assessment of Carbon monoxide (CO), Sulphur dioxide (SO_2) and oxides of Nitrogen (NO_x) at the pre-determined locations. Air Quality Monitoring System (AQMS-65), employed for monitoring, is a fully integrated air monitoring station which delivers 'near reference levels' of performance parameters. With a size of large suitcase, it can measure up to 20 different gaseous, particulate pollutants and environmental parameters simultaneously.

ii. Comparison of Results and Discussion

91. The twenty-four (24) hours ambient gaseous monitoring for the foregoing gases was carried out during the first and second quarters of 2023, at the pre-identified locations in the Project area. Comparison of the results obtained is presented as hereunder.

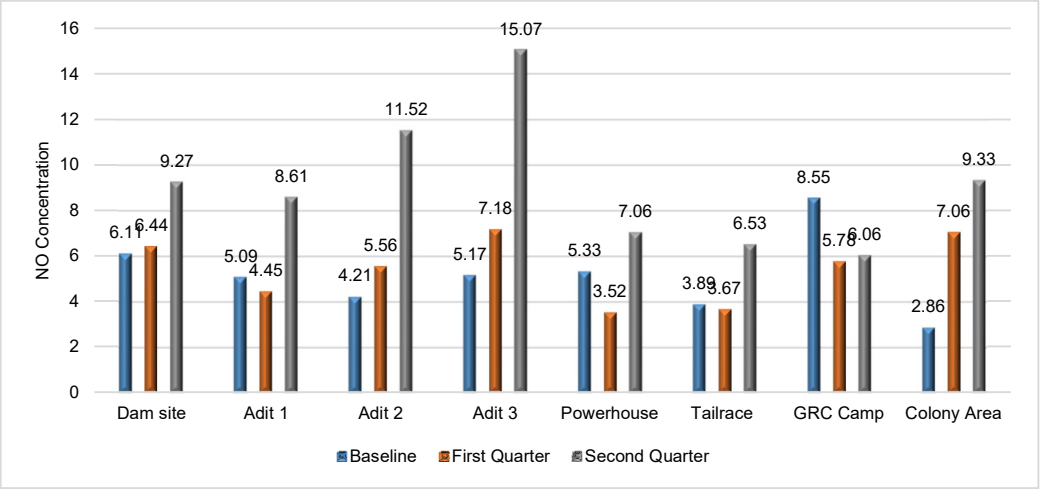
Figure 5.4: Comparison for Carbon Monoxide (CO) (mg/m^3)



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

92. The results recorded during the second quarter shows increase in the CO concentration which is mainly attributed to the increased vehicular traffic on the N-15 (Kaghan-Naran) road and initiation of construction works at Site. However, still, the results fall well below the NEQS and WHO guideline values.

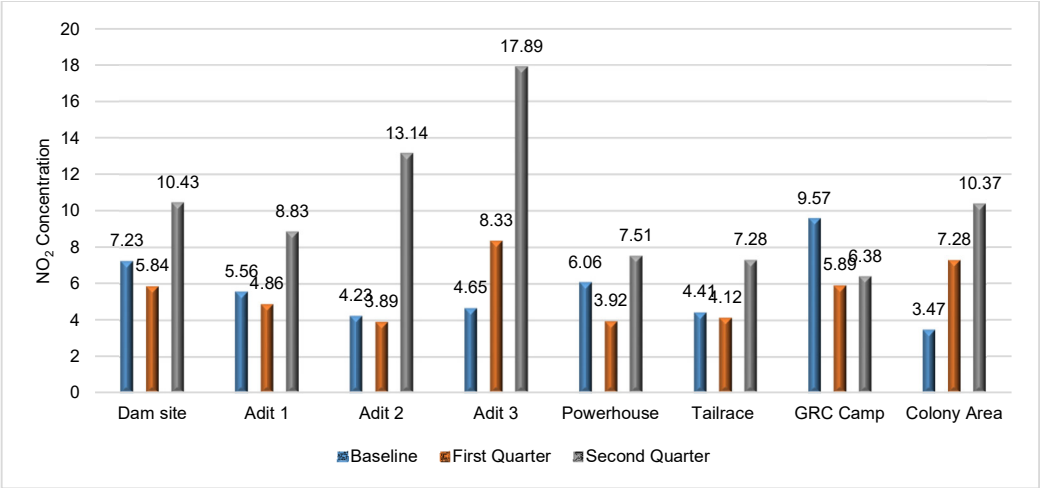
Figure 5.5: Comparison for Nitrogen Oxide (NO) (mg/m^3)



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

93. As shown in the graph above, the Nitrogen Oxide concentration is well below the NEQS and WHO permissible limits. Again, the high concentration is due to increase in vehicular movement on the N-15 during the month of June, as all the Project facilities are located along this route.

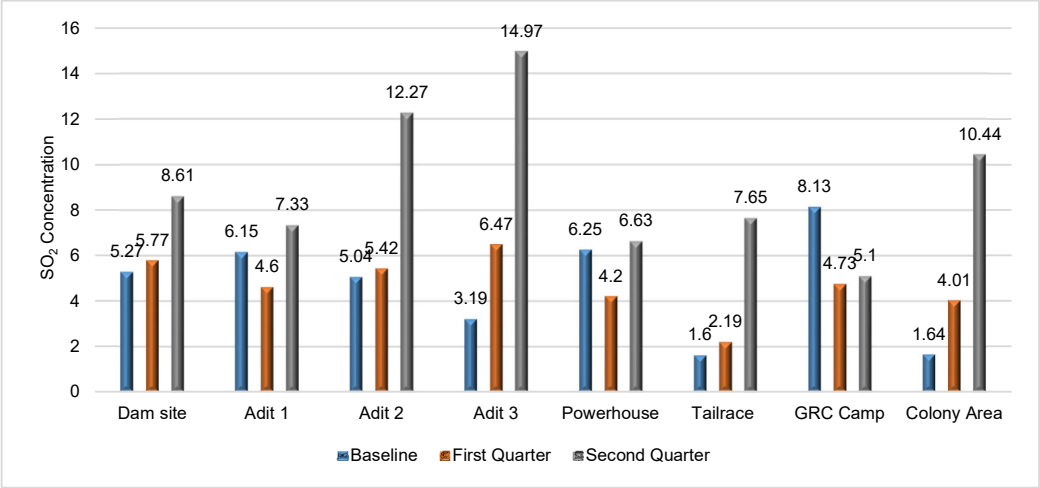
Figure 5.6: Comparison for Nitrogen Dioxide (NO_2) (µg/m^3)



NEQS: 80 µg/m^3
WHO: 25 µg/m^3

94. As shown in the figure above, the Nitrogen Dioxide concentration in all the quarters fall well below the guideline values of NEQS and WHO.

Figure 5.7: Comparison for Sulfur Dioxide (SO_2) (µg/m^3)



NEQS: 120 µg/m^3
WHO: 40 µg/m^3

95. As clear from the SO_2 emission presented above, the recorded results fall within the NEQS and WHO guideline values. Increase in concentration is mainly due to the reasons stated under other gaseous emissions.

5.3.2 Noise Monitoring

i. Methodology

96. The twenty-four (24) hours noise level monitoring was carried out at the pre-identified locations as shown under **Figure 5.1** above.

97. Digital Sound level meter with the following specifications was employed during the noise monitoring.

- HME® 9011 Sound Levels Meter

- IEC651 Type 2 & ANISI.4TYPE2 (Japan)

ii. Features of the Equipment

- 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

iii. Comparison of Results and Discussion

98. Following tables shows noise level monitoring results, obtained during the instrumental environmental monitoring carried out during the first and second quarter of the reporting period. The table also exhibits comparison of the two quarter monitoring with the baseline monitoring results.

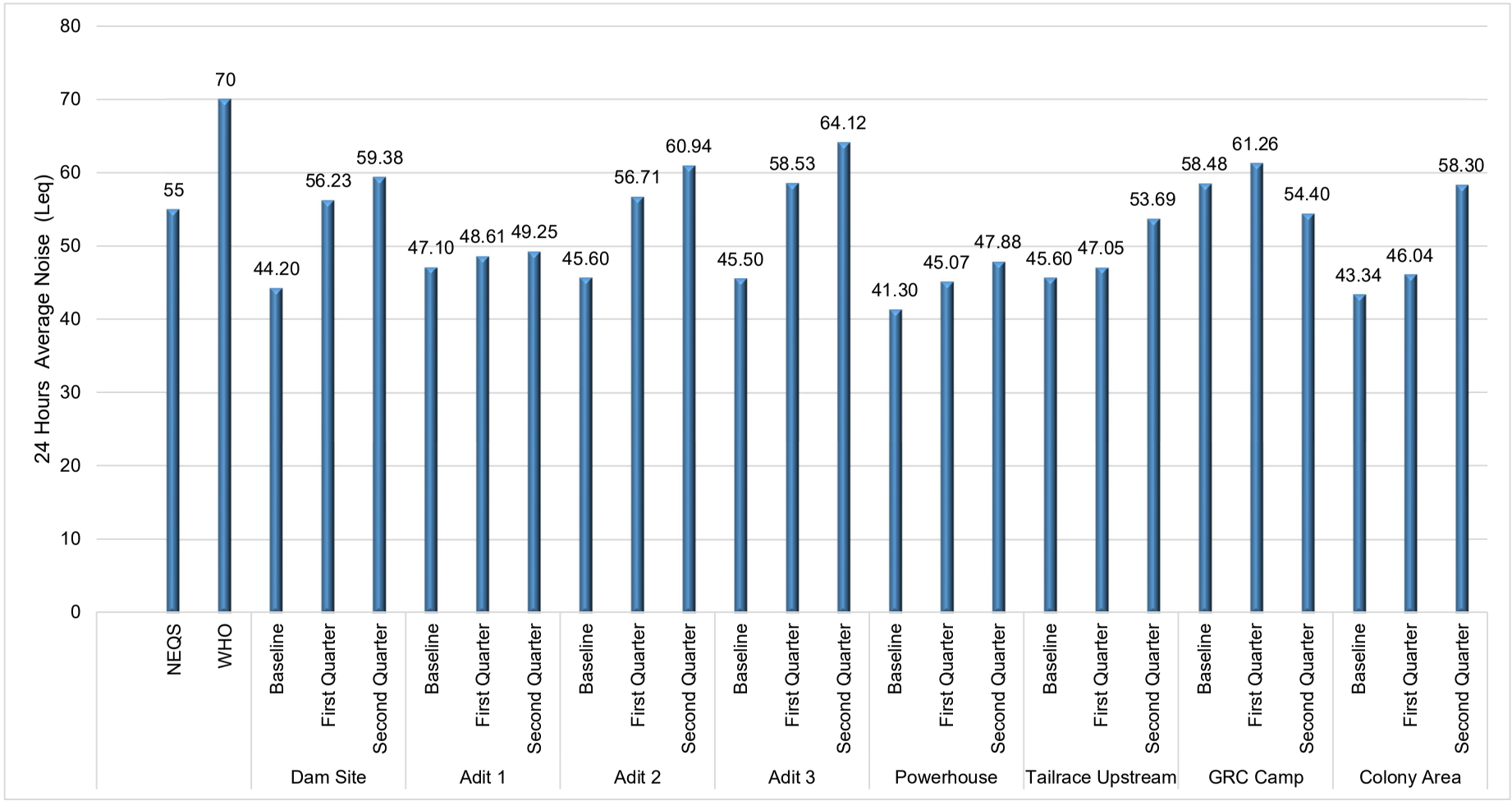
Table 5.2: Comparison of Ambient Noise Monitoring Results

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	First Quarter	Second Quarter	Baseline	First Quarter	Second Quarter	Baseline	First Quarter	Second Quarter	Baseline	First Quarter	Second Quarter	Baseline	First Quarter	Second Quarter	Baseline	First Quarter	Second Quarter	Baseline	First Quarter	Second Quarter	Baseline	First Quarter	Second Quarter
1.	9:00 AM	dB(A)	46.70	57.90	61.05	49.60	51.10	55.90	48.10	58.65	62.85	48.00	64.80	70.40	43.80	47.60	50.40	48.10	49.50	56.15	61.00	63.10	61.05	42.50	47.70	64.95
2.	10.00AM		46.50	57.70	60.85	49.40	50.90	55.65	47.90	58.40	62.60	47.80	64.60	70.15	43.60	47.35	50.15	47.90	49.30	55.95	60.80	62.85	60.80	43.60	47.50	64.70
3.	11.00 AM		46.30	57.50	60.65	49.20	50.70	55.40	47.70	58.10	62.35	47.60	64.30	69.90	43.40	47.10	49.90	47.70	49.10	55.75	60.50	62.60	60.55	40.90	47.30	64.45
4.	12.00AM		46.10	57.30	60.45	49.00	50.50	55.20	47.50	57.90	62.15	47.40	64.10	69.70	43.20	46.90	49.70	47.50	48.90	55.55	60.30	62.40	60.35	41.70	47.10	64.25
5.	1:00 PM		45.80	57.00	60.15	48.70	50.20	55.00	47.20	57.70	61.95	47.10	63.90	69.50	42.90	46.70	49.50	47.20	48.70	55.30	60.10	62.20	60.15	45.30	46.80	64.05
6.	2:00 PM		45.60	56.80	59.95	48.50	50.05	54.80	47.00	57.50	61.75	46.90	59.20	64.80	42.70	46.50	49.30	47.00	48.40	55.05	59.90	62.00	59.95	44.20	46.60	63.85
7.	3:00 PM		45.40	56.60	59.75	48.30	49.80	54.60	46.80	57.30	61.55	46.70	59.00	64.60	42.50	46.30	49.10	46.80	48.20	54.85	59.70	61.80	59.75	40.90	46.40	63.65
8.	4:00 PM		45.20	56.40	59.55	48.10	49.60	54.35	46.60	57.10	61.30	46.50	58.80	64.35	42.30	46.05	48.85	46.60	48.05	54.65	59.50	61.55	59.50	43.20	46.20	63.40
9.	5:00 PM		45.00	56.20	59.35	47.90	49.40	54.10	46.40	56.80	61.05	46.30	58.50	64.10	42.10	45.80	48.60	46.40	47.80	54.45	59.20	61.30	59.25	46.40	46.00	63.15
10.	6:00 PM		44.80	56.00	59.15	47.70	49.20	53.90	46.20	56.60	60.85	46.10	58.30	63.90	41.90	45.60	48.40	46.20	47.60	54.25	59.00	61.10	59.05	45.40	45.80	62.95
11.	7:00 PM		44.50	55.70	58.85	47.40	48.90	53.70	45.90	56.40	60.65	45.80	58.10	63.70	41.60	45.40	48.20	45.90	47.40	54.00	58.80	60.90	58.85	48.70	45.50	62.75
12.	8:00 PM		44.30	55.50	58.65	47.20	48.70	53.50	45.70	56.20	60.45	45.60	57.90	63.50	41.40	45.20	48.00	45.70	47.10	53.75	58.60	60.70	58.65	42.40	45.30	62.55
13.	9:00 PM		44.10	55.30	58.45	47.00	48.50	53.30	45.50	56.05	60.25	45.40	57.70	63.30	41.20	45.00	47.80	45.50	46.90	53.55	58.40	60.50	58.45	40.20	45.10	62.35
14.	10.00 PM		43.90	55.10	58.25	46.80	48.30	53.05	45.30	55.80	60.00	45.20	57.50	63.05	41.00	44.70	47.55	45.30	46.70	53.35	58.20	60.25	58.20	44.70	44.90	62.10
15.	11.00 PM		43.70	54.90	58.05	46.60	48.10	43.00	45.10	55.50	59.75	45.00	55.80	61.40	40.80	44.50	47.30	45.10	46.50	53.15	57.90	60.00	48.15	42.10	44.70	52.05
16.	12.00 PM		43.40	54.60	57.75	46.30	47.80	42.70	44.80	55.30	59.55	44.70	55.50	61.10	40.50	44.30	47.10	44.80	46.30	52.95	57.70	59.80	47.85	44.00	44.40	51.75
17.	1:00 AM		43.20	54.40	57.55	46.10	47.60	42.50	44.60	55.10	59.35	44.50	55.30	60.90	40.30	44.10	46.90	44.60	46.10	52.75	57.50	59.60	47.65	46.20	44.20	51.55
18.	2:00 AM		43.00	54.20	57.35	45.90	47.40	42.30	44.40	54.90	59.15	44.30	55.10	60.70	40.10	43.90	46.70	44.40	45.90	52.55	57.30	59.40	47.45	41.70	44.00	51.35
19.	3:00 AM		42.80	57.00	60.15	45.70	47.20	42.10	44.20	54.70	58.95	44.10	54.90	60.50	39.90	43.70	46.50	44.20	45.70	52.35	57.10	59.20	47.25	44.10	43.80	51.15
20.	4:00 AM		42.60	56.75	59.90	45.40	47.00	41.85	44.00	54.50	58.70	43.80	54.70	60.25	39.70	43.40	46.25	44.00	45.50	52.10	56.90	61.95	47.00	42.90	47.60	50.90
21.	5:00 AM		42.30	56.50	59.65	45.20	46.70	41.60	43.70	54.20	58.45	43.60	54.40	60.00	39.40	43.20	46.00	43.70	45.20	51.85	56.60	61.70	46.75	41.00	47.30	50.65
22.	6:00 AM		42.10	56.30	59.45	45.00	46.50	41.40	43.50	54.00	58.25	43.40	54.20	59.80	39.20	43.00	45.80	43.50	45.00	51.65	56.40	61.50	46.55	40.40	47.10	50.45
23.	7:00 AM		41.90	56.10	59.25	44.80	46.30	41.20	43.30	60.10	64.35	43.20	57.10	62.65	39.00	42.80	45.60	43.30	44.80	51.45	56.20	61.30	46.35	44.30	46.90	50.25
24.	8:00 AM		41.70	57.65	60.80	44.60	46.10	41.00	43.10	62.20	66.40	43.00	61.05	66.60	38.80	42.60	45.40	43.10	44.60	51.25	56.00	62.65	46.15	43.30	46.70	50.05
Average for 24 hrs			**44.20**	**56.23**	**59.38**	**47.10**	**48.61**	**49.25**	**45.60**	**56.71**	**60.94**	**45.50**	**58.53**	**64.12**	**41.30**	**45.07**	**47.88**	**45.60**	**47.05**	**53.69**	**58.48**	**61.26**	**54.40**	**43.34**	**46.04**	**58.30**
NEQS Guideline Values: 45-55 dB[3] WHO Guideline Value: 70 dB																										

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

[3] 45 dB for Night time and 55 dB for Day time. As there are no construction activities during the night time hence, only day time guiding value has been used for comparison purposes.

Figure 5.8: Comparison of 24 Hours (average) Ambient Noise Monitoring Results (dB)



99. The twenty-four (24) hours results for ambient noise level monitoring show that the recorded noise levels at GRC camp are in excess to the NEQS guideline value of 55 dB. As the camp is located adjacent to the N-15, hence, exceedance in noise levels is primarily attributed to the general vehicular traffic on N-15 because, apparently, there are no other stationary sources that may cause noise pollution. Also, there is no shuttling of construction machinery between camp and work sites as the camp is solely being used for offices and workforce residence hence, the Project activities are not causing any substantial noise pollution at the camp monitoring point.

100. In second quarter of the reporting period, the increase in noise levels at the residential colony site is mainly attributed to the operation of heavy earthwork machinery engaged in land leveling and construction of access road to the residential colony and powerhouse sites. Similarly, the exceedance in noise level at Adit 2 and Adit 3 is also due to operation of heavy earthwork machinery involved in construction of access roads.

101. Although, the noise levels recorded at almost all work sites, are in exceedance of NEQS guideline value of 55 dB, however, mostly fall within WHO permissible limit. As, with the completion of the slopes cutting activities for roads, the heavy earthwork machinery has been shifted from the off taking reaches of road sites hence, the monitoring points are now either exposed to baseline noise sources or sporadic movement of construction machinery.

102. It is worthwhile to mention here that almost the entire Project facilities are identified along the N-15 route where most of the settlements along this route in the valley are exposed to the noise pollution associated with the vehicular traffic. Due to this fact, and sharp increase in the vehicular traffic from April to September each year, exceedance in noise levels is anticipated.

5.3.3 Water Monitoring

A. Drinking Water

i. Methodology

103. During the reporting period, the drinking water quality tests were conducted at the sample points identified on the map given under **Figure 5.1** above.

104. APHA standard methods used for the sampling, and preservation of water whereas the following standards methods were used for analysis.

- American Water Works Association (AWWA) and
- American Public Health Association (**APHA**)

ii. Comparison of Drinking Water Results and Discussion

105. The two quarters drinking water monitoring results of the sample points (source), and their comparison with the baseline results are given under **Table 5.3** below.

Table 5.3: Comparison of Drinking Water Monitoring Results

S/No	Parameters	Standard Method	Units	WHO	NSDWQ	Sampling Points																	
						Dam Site			Adit 1			Adit 2			Adit 3			Powerhouse			GRC Camp		
						Results																	
						Baseline	First Quarter	Second Quarter	Baseline	First Quarter	Second Quarter	Baseline	First Quarter	Second Quarter	Baseline	First Quarter	Second Quarter	Baseline	First Quarter	Second Quarter	Baseline	First Quarter	Second Quarter
1.	pH	APHA-4500H+ B	--	6.5-8.5	6.5-8.5	7.4	7.6	7.5	7.7	7.4	7.54	7.3	7.3	7.4	7.7	7.62	7.4	7.5	7.46	7.6	7.7	7.67	7.61
2.	Temperature	---	°C	---	----	7	11	14	6	9	8	8	9	13	8	8	10	7	8	11	7	9	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	3	4	6	5	6	5	4	4	6	5	4	10	8	4	6	4	6
5.	Turbidity	APHA-2130 B	NTU	<5	<5	3	4.2	4	4	3.6	4.2	4	2.1	3	4	3	3	4	4	3	3	2	3
6.	Total Dissolved Solids (TDS)	APHA-2540 C	mg/l	< 1000	<1000	359	326	328	381	386	390	363	359	361	377	395	387	402	382	389	384	387	379
7.	Total Hardness as $CaCO_3$	APHA-2340 C	mg/l	-------	<500	294	268	264	217	239	245	261	256	259	258	267	261	316	327	318	347	342	338
8.	Nitrate (NO_3)	APHA-4500NO3 B	mg/l	50	≤50	2.2	0.9	1	1.9	2.1	2.3	1.03	1.01	0.94	1.06	1.1	1.05	1.2	1.08	1.06	1.46	1.24	1.21
9.	Nitrite (NO_2)	APHA-4500NO2 B	mg/l	3	≤3	0.04	0.006	0.004	0.06	0.004	0.007	0.07	0.05	0.07	0.08	0.11	0.16	0.37	0.31	0.34	0.58	0.52	0.55
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	0	N.D.	0.003	0	0.0012	0.005	0.002	0.001	0.008	0.006	0	0.009	0.01	0	0.006	0.003	0.0019
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	79	83	131	129	137	138	134	129	129	117	119	105	109	111	117	123	118
14.	Chlorine	APHA-4500 CL	mg/l		0.5-1.5	0.2	0.4	0.57	0.09	0.26	0.29	0.1	0.12	0.24	0.03	0.08	0.12	0.1	0.07	0.05	0.05	0.08	0.15
15.	Lead (Pb)	APHA-3500 Pb-B	mg/l	0.01	≤0.05	0.006	0.001	0.002	0.001	0.009	N.D.	0.004	0.001	0.003	0.005	0.003	0.004	0.003	0.002	0.004	N.D	N.D	N.D.
16.	Fluoride	APHA-4500F- C	mg/l	1.5	≤1.5	0.73	0.58	0.56	0.58	0.61	0.67	0.86	0.81	0.79	0.75	0.69	0.71	0.91	0.84	0.86	0.64	0.67	0.62
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	0.057	0.052	0.08	0.12	0.19	0.12	0.11	0.08	0.16	0.17	0.16	0.11	0.07	0.06	0.2	0.18	0.23

S/No	Parameters	Standard Method	Units	WHO	NSDWQ	Sampling Points																	
						Dam Site			Adit 1			Adit 2			Adit 3			Powerhouse			GRC Camp		
						Results																	
						Baseline	First Quarter	Second Quarter	Baseline	First Quarter	Second Quarter	Baseline	First Quarter	Second Quarter	Baseline	First Quarter	Second Quarter	Baseline	First Quarter	Second Quarter	Baseline	First Quarter	Second 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	0.05	0.02	0.07	0.06	0.072	0.04	0.03	0.027	N.D.	0.001	N.D.	0.06	0.02	N.D.	0.05	0.06	0.04
23.	Zinc (Zn)	APHA-3500 Zn B	mg/l	3	5	1.01	1.09	1.07	1.06	1.09	1.15	1.1	1.04	1.02	1.3	1.21	1.19	1.08	1.13	1.08	1.06	1.1	1.07
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

NSDWQ: National Standards for Drinking Water Quality
WHO: World Health Organization
ND: Not Detected

106. As evident from the results of the drinking water sources in the Project area, almost all the monitored parameters fall within the permissible limits of WHO and NSDWQ.

B. Comparison of Surface Water Results of the Kunhar River

107. For the Kunhar River water monitoring, samples were collected from three locations i.e. Dam site (upstream of 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 the undisturbed locations, baseline impact of the contributing streams on the river water quality, and the overall impact of the Project construction.

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

109. The results obtained from the instrumental environmental monitoring, carried out in the first and second quarter of the reporting period, are presented under **Table 5.4** below.

Table 5.4: Comparison of Surface Water Results of the Kunhar River

S/No	Parameters	Standard Method	Units	NEQS	Sampling Points								
					Dam Site			Tailrace			Colony Area		
					Results								
					Baseline	First Quarter	Second Quarter	Baseline	First Quarter	Second Quarter	Baseline	First Quarter	Second Quarter
1.	Temperature	-----	°C	40	5	7	11	6	7	13	4	7	8
2.	pH	APHA-4500H+ B	--	6.5-8.5	8.3	8.1	7.9	7.9	7.7	8.2	8.1	8.2	8.4
3.	Chemical Oxygen Demand (COD)	APHA-5220-D	mg/l	150	113	97	84	108	91.8	86	86	74.2	71
4.	Biological Oxygen Demand (BOD5) at 20 °C	APHA, 5210	mg/l	80	62.8	64.9	61.7	54.7	59.3	63.1	42	43.7	46.2
5.	Total Dissolved Solids (TDS)	APHA-2540 C	mg/l	3500	2637	2563	2176	2492	2281	2564	1864	1857	1895
6.	Total Suspended Solids (TSS)	APHA-2540 D	mg/l	200	129	124	96	108	93	106	117	126.4	119.7
7.	Total Hardness	APHA-2340 C	mg/l	--	164	159	142	157	143	151	161	151	146
8.	Oil & Grease	Separation Method	mg/l	10	2.8	2.4	1.3	2	2.07	1.69	1.3	1.28	1.23
9.	Chromium (Hexa & Trivalent)	APHA-3500Cr B	mg/l	1	0.61	0.59	0.53	0.55	0.51	0.59	0.41	0.46	0.37
10.	Total Iron	APHA-3500-Fe-B	mg/l	8	3.8	4.1	3.6	3.2	3.04	3.88	2.6	2.58	2.51
11.	Chloride	APHA-4500Cl- B	mg/l	1000	256	261	254	234	238	249	209	216	234
12.	Fluoride	APHA-4500F- C	mg/l	10	2.4	3.02	2.97	1.8	1.75	1.81	1.1	1.19	1.21
13.	Ammonia	ASTM-D1426-15	mg/l	40	4.9	5.2	5.8	3.7	3.6	3.2	2.9	3.2	3.4
14.	Cadmium	APHA-3500 Cd-B	mg/l	0.1	0.01	0.009	0	0.008	N.D	N.D	0.006	N.D	N.D
15.	Lead	APHA-3500-Pb B	mg/l	0.5	0.08	0.04	0.01	0.03	0.007	0.005	0.01	0.009	0.0079
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	0.21	0.18	N D	N D	N.D	N D	N D	N.D
18.	Barium	APHA-3500Ba B	mg/l	1.5	0.07	0.09	0.07	0.04	0.02	0.09	0.03	0.006	0.0071
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	0.34	0.28	0.31	0.28	0.26	0.24	0.22
22.	Zinc	APHA-3500-Zn B	mg/l	5	0.58	0.64	0.59	0.37	0.42	0.46	0.31	0.29	0.33
23.	Nickel	ASTM E3047-16	mg/l	1	0.15	0.12	0.13	0.11	0.08	0.09	0.08	0.05	0.03
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	0.32	0.29	0.31	0.28	0.37	0.29	0.24	0.16
27.	Sulphate (SO_4)	APHA-4500-SO_4 C	mg/l	600	429	425	406	354	349	356	349	342	356
28.	An Ionic Detergent (as MBAS)	----	mg/l	20	1.1	1.03	1.01	0.9	0.7	1.06	0.4	0.6	0.57
29.	Phenolic Compound (as Phenol)	APHA-5530-D	mg/l	0.1	0.06	0.04	0.06	0.02	0.01	0.04	0.01	0.01	0.013
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

NEQS: National Environmental Quality Standards
ND: Not Detected

5.3.4 Soil Analysis

110. During the course of quarterly instrumental environmental monitoring, the soil analysis of camps and workshop areas was also carried out with the purpose to record conditions of the soil at these sites, and track changes that may occur as consequent of the construction activities so as to obligate the EPC Contractor to restore the soil of the facilities to original conditions upon completion of the Project or handing over the site back to the owner(s).

111. Comparison of the soil analysis results obtained are exhibited in **Table 5.5** below.

Table 5.5: Comparison of the Soil Analysis Results

S/No	Parameters		Sampling Points and Results														
			Adit 1			Adit 2			Adit 3			GRC Camp			Powerhouse		
			Baseline	First Quarter	Second Quarter	Baseline	First Quarter	Second Quarter	Baseline	First Quarter	Second Quarter	Baseline	First Quarter	Second Quarter	Baseline	First Quarter	Second Quarter
1	Soil Texture	Sand %	14	13	19	8	10	13	17	21	19	16	15	17	12	14	16
		Silt%	57	54	49	58	53	49	49	56	53	43	46	45	61	59	57
		Clay %	29	33	32	34	37	38	34	23	28	41	39	38	37	27	27
		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	8.1	8.1	8.1	8.1	8.1	8.1	8.0	8.0	8.0	8.0	8.0	8.1	8.1	8.1
3	Electrical Conductivity EC (μSm^{-1})		238	238	238	238	238	238	238	231	231	231	231	231	229	229	229
4	Phosphorus ($mgkg^{-1}$)		2.01	2.01	2.01	2.01	2.01	2.01	2.01	3.2	3.2	3.2	3.2	3.2	2.9	2.9	2.9
5	Sodium Absorption Ratio		4.07	4.07	4.07	4.07	4.07	4.07	4.07	3.54	3.54	3.54	3.54	3.54	3.37	3.37	3.37

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

112. As evident from the results obtained at S/No. 3 to 5, there is no change in the monitored parameters exhibiting the fact that properties of the undisturbed soil at camps and workshops is still matching the baseline properties.

5.4 Trends

113. Due to propagation of construction activities, and deployment of heavy earthwork machinery at Site, a vivid increase in noise levels and particulate matters at some of the monitored points was recorded. As evident from **Table 5.2** (noise level) and **Figures 5.2 & 5.3** (particulate matters), the increase has mostly been occurred during the second quarter of the reporting period when the earthwork activities were in full swing. However, the increase in noise levels at the points identified near N-15 route may generally be attributed to the increase in vehicular traffic associated with the tourism period.

114. As the Project facilities are mostly identified either along or in the vicinity of N-15 route (a route that connect Kaghan, Naran tourist stations with rest of the country) hence, increase in noise levels and gaseous emissions in the tourism season i.e. from April to September, is anticipated.

Instrumental Environmental Monitoring Glimpses

Air and noise monitoring at Colony and GRC Camp sites (First Quarter, 2023)

Drinking water monitoring (First Quarter, 2023)

Kunhar River water monitoring (Second Quarter, 2023)

Soil Sampling at GRC Camp (Second Quarter, 2023)

Air and noise monitoring at Thobi camp (Second Quarter, 2023)

5.5 Summary of Monitoring Outcomes

115. The instrumental environmental monitoring results exhibit that weather and monitoring period have significant bearings on the air quality and noise levels of the Project area. As evident from the air monitoring, sharp increase in the primary air pollutants was recorded in the second quarter monitoring conducted during the month of June 2023, which is the time when tourism in the area reaches to its peak. Tourists rushing to Kaghan, Naran, Bata kundi

etc. use N-15 route which cause significant increase in the vehicular traffic on the road resulting increase in gaseous emissions all along the route. Same is the case of noise pollution.

116. No doubt, construction activities will affect the Project area air quality and noise levels however, the impact of tourism related increase in vehicular traffic cannot be ignored.

117. To suppress fugitive dust at Site, water sprinkling intensity has significantly been increased particularly at colony and Adit 3 site.

5.6 Waste Management

118. During the reporting period, the EPC Contractor approached to various relevant departments to secure No Objection Certificates (NOCs) for the safe disposal of hazardous and non-hazardous waste however, issuance of NOCs remained awaited till end of the reporting period. Copies of the correspondences are attached as **Annexure-02.** Although, KDA has supplied waste containers for collection of solid waste however, the requisite written NOC is yet to be issued in this regard.

119. The EPC Contractor has designated specific points within the camp for the collection of kitchen and domestic waste. These points are clearly marked and easily accessible to all camp residents and staff.

120. Moreover, the Contractor is committed to promote waste reduction and recycling practices within the camp through active engagement of camp residents to minimize waste generation by adopting sustainable practices such as composting food scraps and recycling materials whenever possible. By raising awareness and providing necessary infrastructure, we, as a team, strive to create a culture of environmental responsibility among all camp members

121. Following tables show month-wise and cumulative details of waste generated at camp and sites.

Table 5.6: Details of Solid and Lubricant Waste Generated

S/No	Type of Waste	Quantity		Disposal
		This Reporting Period	Cumulative	
1	Plastic Waste	22 kgs	22 kgs	Collected in the KDA supplied waste container and then transported to the approved waste disposal site.
2	Used Tyres	10 Nos	10 Nos	Stored in junk yard (to be auctioned)
3	Used Wooden sheets	0 kgs	0 kgs	Not produced yet
4	Used Engine oil	30 ltr	30 ltr	Stored in barrels.
5	Biodegradable waste (Vegetables, Food etc	50 kgs	50 kgs	Through KDA for further processing and composting.

Table 5.7: Details of Medical Waste and Sorbents Generated

S/No	Month	Medical Waste (kg)	Contaminated Sorbents (kg)
1	January	0	0
2	February	0	0
3	March	0	0
4	April	0.2	0
5	May	0.3	0
6	June	0.5	0
Total for Reporting Period (Jan-June 2023)		1.0	0
Cumulative for the Project		1.0	0

122. The medical waste generated will be disposed of at the incinerator facility available at the district/tehsil hospital. In this regard, the EPC Contractor has already submitted request to the relevant quarters at the district level.

123. For the primary treatment of the camp sewage, Contractor has constructed septic tank wherein sewage is being treated under anaerobic conditions. Also, provision exists in the shape of drain to discharge storm water from the camp.

124. No ground water contamination was observed as consequential effect of the Contractor's waste management aspect of the SSEMP.

5.7 Health and Safety

5.7.1 Community Health and Safety

125. During the reporting period, the EPC Contractor took a number of initiatives towards the community health and safety. Utmost efforts were made to construct temporary facilities like camp, batching plant, workshop etc. at locations isolated from the nearest community so as to minimize risks associated with such facilities. For example, Adit 2 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 Special Security Unit (SSU).

126. Before start of the construction activities, particularly at residential colony site, the EPC Contractor held consultations with the nearby community wherein the Project layout, nature of activities and machinery to be deployed were discussed in detail. Information dissemination regarding Project activities, associated risks and providence of safety arrangements thereto were the prime objectives of such consultations.

127. To maintain privacy of the houses near the construction sites, green shad net were provided to such houses on demand.

128. The unpaved access roads, used by the Contractor's vehicles, were regularly sprinkled to suppress dust and protect general commuters from the related impacts. The sections of katcha tracks, exposed to excess particulate matter concentration, were particularly sprinkled with increased frequency. For example, the access road (R 3) to colony and powerhouse, and

the access road to Adit 3, were regularly sprinkled to suppress dust emanating from the heavy machinery movement.

129. Similarly, to avoid noise disturbance at night, no construction activities were carried out at night time.

130. Throughout the construction sites, warning signs/messages in English and Urdu languages were displayed at appropriates locations. Also, Flag-men were deployed at the access roads off taking from N-15.

131. Camps, workshops, batching plants and work areas were cordoned off through installation of gates and fences to prohibit unauthorized entry to these facilities.

5.7.2 Workers Health and Safety

132. Personal Protective Equipment (PPE) were provided to all workers while Site supervisors ensured their proper usage.

133. For the construction workers, EPC Contractor has conducted trainings on safety issues with practical demonstration of response in case of any emergency.

134. Before start of the work, toolbox talks focusing on HSE related issues were regularly being held.

135. During the reporting period, availability of First Aid Box was ensured to provide first aid in case of emergency situation. First Aid Boxes are available at all work sites.

136. To cope with fire outbreak, Fire Extinguishers are available at camp, batching plant and lab/offices etc.

137. After repeated instructions and vigorous follow up, the EPC Contractor has ensured supply of clean drinking water to the workers, both at camp and at sites. As exhibited by the environmental monitoring results, drinking water qualities comply with the National Standards for Drinking Water Quality (NSDWQ).

138. The EPC Contractor's camps are equipped with all basic necessities like accommodation, dining halls, sanitation, games etc.

139. Under the provisions of the construction contract, medical dispensary has been provided at camp (although not fully equipped) where Contractor has ensured round the clock presence of the medical practitioner. Medical practitioner maintain stack and record registers containing record of medicine received and used, patient name and type of disease etc.

140. Table given below exhibit month-wise patient record and type of common diseases treated at the dispensary.

Table 5.8: Patients Record for the Current Reporting Period

S/No	Description	January	February	March	April	May	June
1	No. of patients treated at Camp Medical Facility	--	--	--	2	14	65
2	No of patients referred to DHQ Hospital, THQ Balakot.	--	--	--	1	0	0

S/No	Description	January	February	March	April	May	June
3	Types of illness	--	--	--	Hand injury	Low B.P	High fever/Headache
		--	--	--	Stomach pain	Stomach pain	Stomach/Back pain,
		--	--	--	Headache	Diarrhea	Vomiting, Food poisoning
		--	--	--	Headache	Stomach pain	Eye infection

141. As the dispensary at camp in current shape was established in April 2023, hence, no data available for the period from January to March. However, during these months, the EPC Contractor facilitated patients in availing medical treatment from private clinics in Balakot city while for headache, vomiting, or stomach pain etc., medicine from First Aid Box were administered.

142. As evident from the table above, subsequent to establishment of camp and shifting of workforce therein, more and more patients availed services of the dispensary with each passing month. Also, in April 2023, one patient was referred to Tehsil Head Quarter (THQ) Hospital at Balakot city for further evaluation and specialized treatment beyond the capability of the Camp Dispensary.

143. The types of illnesses reported by the patients included flu, fever, vomiting, , headache, low blood pressure, and stomach pain etc.

5.8 Implementation Status of Environmental Management Plan (EMP)

144. The table given below, shows implementation status of the pre-construction and construction phase mitigation measures contained in the disclosed EIA report of the Project while implementation status of corrective actions proposed in the previous monitoring period has been given separately under **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		Partial	EPC Contractor has identified springs in the vicinity of Adit 1,2, and 3 works sites while details will be submitted with the corresponding method statements.	Submission of method statements before initiation of works on Adits.
5	Use of local water resources for	Prepare a Water Sourcing and Abstraction Plan specifying the source, owner, total	Yes[4]			

[4] 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				
	construction activities may reduce the water availability for the local communities.	yield, current usage, allowable quantity and the duration for which water can be obtained.				
		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			
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	Dumping sites should have a flood prevention design for a 20- year flood		Partial	The EPC Contractor has identified sites for muck disposal however, the detail methodology showing	The EPC Contractor will submit the required methodologies on or before September 15,

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				
	sediment load entering river				protection works are yet to be submitted to the PMC for review and approval hence, the activity termed as partially complied.	2023 i.e. before initiation of permanent works on tunnel or any other facility involving excavation.
		Preparation of spoil management plan	Yes			
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				
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.		No	• LARP implementation is in progress.	

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 affected community and the district administration have not yet decided whether to shift the graves or not or when to shift the graves. Nevertheless, funds have been allocated for shifting of the graves.	
		If relocation of the graveyard cannot be avoided, it shall be managed through the local religious authorities.		No	Same as above.	Same as above
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			
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	Implement BAP		Partial	• The works related measures have been taken by the EPC Contractor while for the protection measures in the Area of Management, consultation with the Fisheries and Wildlife department, for establishment of offices, deployment of requisite human and logistic resources etc. is in progress.	Finalization of various modalities, i.e., offices, human resources, payment procedure etc. by October 15, 2023.

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				
	Degradation of the River Ecosystem Downstream of the Tailrace Terrestrial habitat loss caused by construction related activities.				• Delay in implementation was primarily caused by the departments reluctance to accept role of independent implementation organization as there exist no provision for such organization in the relevant laws. • Concurrence to the revision in the BAP implementation arrangement was intimated on May 22, 2023, and thereafter confirmed by the Bank on June 15, 2023.	
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[5]			
		Solid waste should only be disposed of at designated sites and a Waste Management Plan developed and implemented.	Yes			
		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	Yes			

[5] Annual HSE training is planned on July 25-26, 2023

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				
		encountered. Also see guidelines for the Environmental Training Plan in IR 5				
		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		Partial	• During the first quarter of the reporting period, no solid waste disposal points were identified hence, the aspect termed as partial compliance however, complied in the second quarter as the Kaghan Development Authority provided solid waste storage equipment and identified disposal locations.	As intimated by the officials at Kaghan Development Authority, the requisite NOC will be issued till July 20,2023.

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 aspect is however, still termed as partially complied as the requisite NOC is yet to be issued by the Kaghan Development Authority.	
		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[6]			

[6] Annual HSE training is planned on July 25-26, 2023

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				
		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			
		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	Yes[7]			

[7] Annual HSE training is planned on July 25-26, 2023

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				
		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				
		Equipment emitting excessive noise in comparison with other similar equipment will not be allowed to operate	Yes			
		Equipment under use will be regularly maintained, tuned, and provided with mufflers to minimize noise levels.	Yes			
		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	A brief tree plantation plan, embedded in the SSEMP, has been prepared; sites have been identified with the consent of the Forest department as exhibited in the SSEMP	Plantation at sites (other than muck disposal sites where plantation will be done upon completion of muck operation at that particular site) will be

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				
					however, detailed Tree Plantation Plan will be prepared once the muck disposal sites finalized and access roads constructed.	initiated in the first quarter of 2024.
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[8]			
		Prepare a site-specific environmental management plan (see **Section 9.5.3**) 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: ♦ 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.	Yes			

[8] 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				
		• 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 e.g. it converts the nitrogen oxides back into nitrogen and oxygen. • Appropriate maintenance of vehicles and machinery				
		Fugitive dust emissions from blasting	Yes[9]			

[9] Tunnel blasting operation has not yet been started however, the site-specific mitigation measures are included 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				
		• 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.				
		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[10]			
		Fugitive dust emissions from concrete batching plants	Yes			

[10] 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				
		• Suspend earthwork operation when wind speed exceeds 20 km/hr. in areas within 500 m of any settlement. • 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	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				
		• 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. • 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	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				
		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				
6	Vibration from blasting during the construction phase may disturb local communities.	Develop a Blasting and Explosives Management Plan and Vibration Monitoring Plan.	Yes[11]			
		♦ 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		Partial [12]	• The aspect termed as partial because blasting operation has not initiated yet, nevertheless, the houses/infrastructure falling within the ROW have already been accounted for compensation under LARP. • The potentially affected housed/infrastructure falling in the blasting impact zone and outside of the ROW will be surveyed after approval of method statement.	

[11] Vibration Management Plan is part of the approved SSEMP.
[12] Survey will be conducted for marking the potentially affected houses/infrastructure falling in blasting impact zone.

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				
		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. o 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. o A survey will be undertaken in both zones, to determine the pre-blasting conditions of the buildings. The survey 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.				

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				
		➢ 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.		No[13]		
		♦ Meaningful contact with the community shall be maintained and their grievance shall be attended to in a timely manner. In this regard: ○ A meaningful community engagement plan will be developed. The plan will cover identify the affected community; the key contact persons; frequency of engagement; the information to be shared; the responsibilities to manage the plan;	Yes			

[13] Not due for initiation.

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				
		and the notice period to be giving to the community for various blasting related generating activities. o The Grievance Redress Mechanism 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.				
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			

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				
		Ensure that the holes are correctly collared with respect to the back-break/inclination of the face and also that digging alongside the initiation face well controlled.	Yes			
		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 hole 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			

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				
		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.		Partial	Springs in the vicinity of Adits have been identified while springs on the headrace tunnel alignment are yet to be surveyed.	EPC Contractor will submit Springs Survey Report by August 15,2023.
		Monitor flow for located springs and maintain records.		Partial	Same as above	Same as above
		Support the community in development of alternate water supply schemes through local NGOs		Partial	Same as above	Same as above
		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			

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				
		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			
		Incorporate the above measures in the Construction Site Environmental Management Plan	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	There were some incidents of spillages which however, rectified after the PMC instructions.	
		Provide and use spill prevention trays at refueling locations.		No	EPC Contract has not provided Spill kits at all sites.	EPC Contractor will provide spill kits by July 31, 2023.
		The run off from maintenance workshops will be collected by impervious channels and be passed through oil water separators (OWS) before final disposal. The sludge and oil collected at the OWS will be disposed of properly.		No	Washing yard facility has not been constructed yet.	EPC Contractor will construct the facility by August 30, 2023.

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				
		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.		Partial	EPC Contractor has identified locations for construction of Stabilization Ponds however, construction has not initiated yet.	Although, EPC Contractor has not provided firm date for construction of stabilization ponds however, such ponds will be constructed before start of tunnel excavation activities.
		Keep all fuel storage tanks and lubricating oil drums in secondary containment impervious pits with impervious shed walls.	Yes			
		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.	Yes			
		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.		Partial	Spill control kits have not been provided at all sites.	EPC Contractor will provide spill kits by July 31, 2023.
		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			

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				
		Maintain record of remedial measures taken.	Yes			
		Use silt traps to prevent contamination of river and streams.		Partial	EPC Contractor has identified locations for construction of Stabilization Ponds however, construction has not initiated yet.	Stabilization ponds will be constructed before start of tunnel excavation activities.
		Incorporate the above measures in the Construction Site Environmental Management Plan	Yes			
11	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.	Develop a Noise and Vibration Control Plan	Yes[14]			
		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.	Yes[15]			

[14] Noise and Vibration plans are part of the approved SSEMP.
[15] 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				
		• 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 successfully implementation of the above mitigation measures. Specifically, inform communities 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;	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				
		• 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				
		Construction noise from on-site plant operations and equipment • All fixed plant 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. • Shift to a quieter construction process for example pile driving is very loud as 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 plant and equipment should be regularly maintained. • Move static plant and equipment as far as possible from sensitive boundaries, as work allows. A distance of four times		Partial	Non provision of earplugs to the work force at machinery operation sites.	EPC Contractor will provide earplugs to the work force at machinery sites before July 28, 2023.

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				
		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 plant 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. • Using vibratory piling instead of impact piling. • Conveyor belts and crushing/screening equipment can be housed to provide acoustic screening.	Yes[16]			

[16] 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				
		• 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[17]			
		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.				
		Install grease traps on the site, wherever needed, to prevent flow of oily water.		No	The grease trap is not available	Grease trap will be constructed as part of the

[17] 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				
						washing yard till August 30,2023.
		Spill cleaning kit (shovels, plastic bags and absorbent materials) will be available near fuel and oil storage areas.		Partial	Spill control kits have not been provided at all sites	EPC Contractor will provide spill kits by July 31, 2023.
		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[18]		
		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			

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

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				
		Salvage, store, and reuse all topsoil at all construction sites.	Yes[19]			
		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	Yes			

[19] 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 have indirectly been complied.

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 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.				
		Select local species for plantation to restore the biodiversity of the area in consultation with Forest Department after completion of respective activities.	Yes			
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[20]			
		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).	Yes[21]			

[20] All dumping sites will be rehabilitated under the terms of lease agreements while, where applicable, plantation will be undertaken on the dumping sites.
[21] Spoil disposal 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				
		• 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. • 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.				

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 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 seed 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. • 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.				

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				
		• Install erosion and sediment control measures, if possible before construction commences. · Identify drainage lines and install control measures to handle predicted storm-water 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 (two-year ARI with 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. • 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 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.				

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 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 tree plantation plan has not been started yet.	Implementation of tree plantation plan will be initiated in the first quarter of 2024.
16	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			
17	Increase in congestion, due to increased traffic volume will cause delays.	Develop and implement a Traffic Management Plan.	Yes			
		Make roundabouts for the congestion points.	Yes			
		Retain as much natural vegetation as possible to reduce the impact of smoke due to vehicles.	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 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 were observed without cover hence , the aspect termed as partial.	EPC Contractor has been instructed to immediately cover materials loaded on transportation vehicles.
		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.	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	Same as above.	
		Strictly implement speed limits and defensive driving policies.	Yes			
		Promptly and properly repair and maintain roads that are subject to damage by Project activities.	Yes			
19	Increased risk to community safety due to increased traffic volume during the construction phase near communities.	Develop and implement a Traffic Management Plan.	Yes			
		Identify suitable times to transport equipment.	Yes[22]			

[22] Only 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				
		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.				
		Maintain vehicles especially brakes.				
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.				
21	Direct, indirect and induced employment at the local levels, resulting in increased prosperity and wellbeing due to higher and stable incomes of people.	**Enhancement measures**: ♦ 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	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				
		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 is considered to be 'fair and transparent' in recruitment and in distribution of jobs between 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.		Partial	Vocational training institute has been identified however, trainings will commence from August, 2023.	August 01, 2023.
		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	Consultation with the Fisheries and Wildlife department, for establishment of offices, deployment of requisite human and logistic resources etc. is in progress.	Finalization of various modalities, i.e., offices, human resources, payment procedure etc. with these departments by October 15, 2023.
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			
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	Implement PEDO Stakeholder Engagement Plan including: ♦ maintaining regular communication with local communities and other	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				
	inhabitants and the in-migrants resulting in social unrest.	stakeholders 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.		No	The affected community and the district administration have not yet decided whether to shift the graves or not or when to shift the graves. Nevertheless, funds have been allocated for shifting of the graves.	
		If relocation of the graveyard cannot be avoided, it shall be managed through the local religious authorities.	Yes			

5.9 Trainings

145. No periodic trainings were scheduled during the reporting period. In fact, the annual Occupational Health and Safety (OHS) training is scheduled in the month of July, 2023, while the Vocational Training program will start from August 01, 2023.

146. The EPC Contractor's periodic HSE reports, submitted during the reporting period, were generally deficient of essential information and had also data consistency issues. In this regard, PMC has recommended capacity building training of the EPC Contractor's staff which will be held in the last week of July, 2023.

5.10 Complaints

147. The Divisional Forest Officer, Kunhar Watershed Division Mansehra complaint regarding damages to the trees at access road R3 was undertaken jointly by the PIU, PMC, and EPC Contractor whereby several meetings among stakeholder were held while DFO Kunhar Watershed Division conducted visit to the Site on June 24, 2023. Copy of the complaint is attached as **Annexure-05**,

148. As result of the above, Forest department prepared shape file of the area and made assessment of the damaged trees however, as the damaged trees are identified within the Right of Way (RoW) permanently acquired by the PEDO, hence, the matter is yet to be sort out whether the affected trees have been accounted for payment at the time of tree assessment or not. Outcome of the complaint will be reported in the upcoming SAEMR as till end of the reporting period, the matter remained in correspondences among stakeholders.

149. **Table 5.10**, exhibit details of the aforementioned complaint.

Table 5.10: Details of the Complaint(s) Received during the Reporting Period

Details of Complaint	Complainant*	Received			Actions (to be) taken with the target date	Resolution Status***
		Through*	By whom**	Date		
Damage to the Plantation Site: Damages to the trees falling in the Access Road R3, caused by the EPC Contractor's earthwork	Divisional Forest Officer, Kunhar Watershed Division, Mansehra.	Letter	PIU	January 18, 2023	As described under Para 100 and 101	Open

*Resident, NGO (non-governmental organization), etc.
**Verbally, letter, complaint box, email, etc.
***Contractor, supervision consultant or implementing/executing agency
****Open or Closed (If closed include date)

6 FUNCTIONING OF THE SSEMP

6.1 SSEMP Review

150. Generally, the Site-Specific Environmental Management Plan (SSEMP) prepared by the EPC Contractor of Balakot HPP (300 MW) and thereafter approved by the Employer, serve the intended purpose of mitigating/minimizing risks associated with the construction activities.

151. Various plans contained in the SSEMP like Erosion and Sediment Control Plan; Pollution Prevention Plan; Waste Management Plan; Instrumental Environmental Monitoring Plan; and Health and Safety Plan etc. were satisfactorily implemented by the EPC Contractor. Although, there were instances of minor non-compliances in start of the construction activities however, by and large, the EPC Contractor has shown compliance to the SSEMP provisions regarding health and safety aspect of the Project.

152. As stated under subhead 3.3, the minor non-compliances observed include, no or casual usage of PPE; poor housekeeping; issues in storage of materials; deficiencies in solid waste management; safe disposal of effluent from adit tunnels; lack of signage at Site; low intensity oil spillage, generation of dust due to the Project vehicles movement on unpaved access roads and the EPC Contractor's failure in timely submission of periodic reports. These minor non-compliances were largely rectified through persistent follow-up, holding of regular meetings with the EPC Contractor's HSE staff , induction trainings, regular toolbox talks and other capacity building trainings imparted to the Contractor's work force.

153. Although, no need felt for revision or amendment in the approved SSEMP however, if such need arises in future, same will be conveyed to the relevant quarters at ADB in timely manner while the SSEMP provisions will accordingly be reviewed, revised and updated to effectively eliminate/ mitigate works related HSE risks.

7 GOOD PRACTICE AND OPPORTUNITY FOR IMPROVEMENT

7.1 Good Practice

154. The EPC Contractor's consultation with the local area community, and provision of jobs for them has created a good working environment at Site. As exhibited under **Figure 2.8,** more than 55% of the Contractor's workforce belongs from the Project area. This is very essential for smooth execution of works at Site and elimination of unwarranted stoppages by the affected community.

155. To preserve the local norms and cultural values, the EPC Contractor has provided veils (green shad net) to the houses in the immediate vicinity of the work area. As evident from the picture below, along with the community, the EPC Contractor has also installed such veils along the access roads and at other appropriate locations. This initiative of the Contractor has created a sense of norms protection in the community resulting conducive relations.

Green Shade Net at R3

156. Furthermore, the EPC Contractor has made budgeted provisions to address the prioritized needs of the affected community. Provision of clean drinking water, construction of protection works and street pavement are some of the areas where the EPC Contractor will work with the affected community.

157. The EPC Contractor regularly hold monthly HSE champion events whereby prizes are distributed among labors (skilled/unskilled) who demonstrate proven adherence to the worksite safety protocols. 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 health and safety practices. By establishing Health Safety 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 mitigating risks. The Health Safety Champion Program fosters increased awareness, engagement, and accountability among the workforce, leading to a safer work environment, reduced incidents, and improved overall well-being.

158. Although, limited open spaces are available in the camps, still the EPC Contractor has made arrangements for sports and other recreational activities. For example, at Adit 2 camp, the Contractor has provided basketball facility where basketball matches are regularly being held at evening time. Such an activity is beneficial for a healthy life, and utilization of spare time.

7.2 Opportunities for Improvement

159. Although, the EPC Contractor has created good working relations with the community through provision of jobs and skilled development trainings, still there is room for improvement in cementing such relations. This can be achieved through regular communication, addressing community concerns, and implementation of social responsibility initiatives.

160. Due to language barrier, communication with the Chines safeguard team has been proven quite difficult for the PMC and PIU staff. Although, the EPC Contractor has hired local Environmental Manager and HSE field staff, still there is need of well-versed translator for effective communication with the Health and Safety Manager of CGGC and other quality control staff.

161. Although, the PMC staff has provided capacity building training to the EPC Contractor's HSE team, still concentrated efforts are needed to improve quality of the periodic reports.

8 SUMMARY AND RECOMMENDATIONS

8.1 Summary

162. Consequent upon grant of possession of colony and dam sites, the EPC Contractor initiated permanent works activities at Ganhool site (colony) while at dam site, construction activities are yet to be commenced. Construction of permanent and temporary access roads, earth works, installation of batching plants, and construction of camps were the major activities which remained in progress at Site.

163. At the start of construction activities, significant number of non- compliance events were recorded while instances of non-reporting of minor Site incidents were also observed. However, in the second quarter of the reporting period, there occurred significant reduction in the non-compliances' events mainly due to consistent follow up of the PIU and PMC HSE staff.

164. During the reporting period, no significant progress could be made in implementation of the project specific BAP which is primarily attributed to the extra time consumed in development of consensus among stakeholders on the changes in the BAP institutional arrangement, proposed by the Fisheries and Wildlife departments of the government of Khyber Pakhtunkhwa. However, as ADB has now granted concurrence to the proposed changes hence, a vivid progress on implementation of the BAP activities in the Area of Management, is anticipated in the upcoming reporting period.

165. For Basin-wide BAP, an Action Plan has been submitted to the ADB whereby utmost efforts will be made to achieve the milestones set therein.

166. Subsequent to the PMC approval in the design changes at the dam site, and the ADB concurrence to the changes proposed in institutional arrangement of the project specific BAP, the PMC initiated necessary updation of the Project EIA report in the last week of the reporting period.

167. The EPC Contractor's periodic HSE reports, submitted during the reporting period, remained in correspondences with the Contractor as such reports were generally deficient of essential information and data consistency issues.

168. Instrumental environmental Monitoring was held at Site, at the points pinned in the SSEMP, where baseline monitoring was held in the month of December 2022. Except for few exceedances-which are mostly related with the monitoring period and to some extent with the earthwork activities- the results obtained generally exhibit consistency with the baseline results.

169. Following table exhibit status of the targets set in the previous SAEMR for the current reporting period.

Table 8.1: Status of Activities Planned for January-June 2023

S/No	Activity	Target Date	Status at the end of Reporting Period	Reason(s) of delay/non-achievement
1	Finalization of project specific BAP implementation arrangement	January 30, 2023	**Achieved:** On May 22,2023, ADB conveyed concurrence to	• Delay in providence response to the ADB comments by Fisheries and Wildlife

S/No	Activity	Target Date	Status at the end of Reporting Period	Reason(s) of delay/non-achievement
			the Project Implementation Unit (PIU) in respect of " Proposal for Revision in the Project Specific BAP"	departments which had direct bearing on finalization of the "Proposal for Revision in the Project Specific BAP".
2	Signing of BAP Contract with Fisheries and Wildlife departments	March 30, 2023	Pending	Delay in materialization of changes proposed in the institutional arrangement of the project specific BAP.

170. The Corrective Action Plan given below shows pending issues from the previous period and those identified during the current monitoring period.

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

S/No	Issue	Required Action	Responsibility	Timing (Target Dates)
Pending Issues from the Previous Report(s)				
1	Signing of BAP Contract with Fisheries and Wildlife departments	Finalization of various modalities, i.e. offices, human resources, payment modalities etc. in consultation with the Fisheries and Wildlife Departments of the government of KPK.	PIU- Balakot HPP (300 MW)	October 15, 2023
Issues Identified during the Current Monitoring Period				
1	Providence record of springs identified in the headrace tunnel alignment or which may potentially be affected by the underground excavation work.	Identification of springs/underground water sources along the headrace tunnel/underground works.	EPC Contractor	August 15, 2023
2	Approval of muck disposal sites	Submission of method statements for review and approval containing muck disposal sites details	EPC Contractor	September 15, 2023
3	Obtaining No Objection Certificates (NOCs) for solid waste disposal including medical waste	Follow up of the applications submitted for NOCs.	EPC Contractor	July 20,2023.
4	Tree Plantation Plan	Submission of Tree Plantation Plan with the consent of	EPC Contractor	October 30,2023.

S/No	Issue	Required Action	Responsibility	Timing (Target Dates)
		relevant quarters at the Forest Department		
5	Non-availability of Spill Kits	Providence of Spill Kits	EPC Contractor	July 31, 2023
6	Non provision of earplugs to the work force at machinery operation sites.	Providence of earplugs and other essential equipment	EPC Contractor	July 28, 2023
7	Non-availability of grease trap	Providence of grease traps where needed as part of the washing yard.	EPC Contractor	August 30, 2023

8.2 Recommendations

171. Following are some of the recommendations framed in light of the monitoring and supervision HSE activities at Site.

172. Consequent upon finalization of the project specific BAP institutional arrangement for the Area of Management, active engagement of Fisheries and Wildlife departments of the government of Khyber Pakhtunkhwa need to be ensured whereby joint meeting of the stakeholders including the Project financiers is recommended to finalize various modalities contained in the Action Plan shared with the ADB on the occasion of presentation held on May 22, 2023.

173. PEDO/PIU should make all-out efforts to implement the Basin-wide BAP Action Plan in true letter and spirt.

174. To overcome persistent deficiencies in the EPC Contractor’s periodic HSE reports, a capacity building training of the Contractor’s HSE and Planning team is recommended.

ANNEXURES

Annexure-01: Sectional Possession of Dam Site (Paras and Bela Sacha Mozas)

P E D O

PAKHTUNKHWA ENERGY DEVELOPMENT ORGANIZATION

Government of Khyber Pakhtunkhwa Peshawar

Energy & Power Department

No. 1716-21/PEDO/PD Balakot HPP
Dated: 27th March 2023

Mr. Wang Yanwei,
Authorized Representative,
CGGC-GRC JV.

Project: **Design, Supply and Installation, Testing and Commissioning of Balakot Hydropower Project (300 MW), Including the Related Civil Works for River Diversion.**

SUBJECT: **RIGHT OF ACCESS TO PROJECT SITE AT MOUZA PARAS AND BELA SACHA VILLAGES.**

This is notice to the Contractor pursuant to Sub-Clause 10.2 of the General Conditions of Contract by the Employer for acquiring and providing legal and physical possession of the Site and access thereto, related to the Project Sites of "Dam Reservoir", "Dam Access Right Side Abutment and Diversion Tunnel", and "Dam Access Leftt Side Abutment and Access Road to Dam" within the villages of Mouza Paras & Bela Sacha. Related Land Acquisition Layout Plan is attached herewith.

Please note that the Contractor submitted its General Works Schedule (Schedule) vide letter ref. No. CGGC/PAK/2022/BalacotHPP/PMC/No. 152 dated April 17 2022, under Sub-Clause 18.2 of the General Conditions of Contract, which was accepted by PMC under letter ref. No. 1018/319 dated 19th April 2022. However, the Contractor failed to comply with this Schedule and its first and second milestone of 'Basic Design Approval', & 'Preparatory Works Completion', due on 27th September 2022 & 27th February 2023 respectvely could not be achieved till date. This delay significantly impacted the subsequent activities/ milestones.

27/03/2023
Project Director
Balakot HPP, PEDO.

CC:

1. The Chief Executive Officer, PEDO, Peshawar.
2. The Chief Engineer (Dev.), PEDO, Peshawar.
3. PS to Secretary Energy and Power, government of KPK.
4. The Team Leader, PMC, Balakot HPP.
5. The Deputy Team Leader, PMC, Balakot HPP.

Project Director
Balakot HPP, PEDO.

Annexure-02: EPC Contractor's Correspondences for NOCs

Application for NOC for Solid Waste Disposal

中国葛洲坝集团股份有限公司
CHINA GEZHOUBA GROUP COMPANY LIMITED

Ref. No: KDA-2023-001

Date: 28th March 2023

KAGHAN DEVELOPMENT AUTHORITY * MANSEHRA * Diary # 809 Date 30/3/23

To: Director General
Kaghan Development Authority (KDA)
Mansehra Khyber Pakhtunkhwa

PROJECT: **DESIGN SUPPLY AND INSTALLATION, TESTING AND COMMISSIONING OF BALAKOT HYDRO POWER PROJECT INCLUDING THE RELATED CIVIL WORKS FOR RIVER DIVERSION**

SUBJECT: **NEED OF NOC FOR WASTE MANAGEMENT AND TRANSPORTATION**

Dear Sir,

Reference to the subject captioned above and meeting held at your office dated 27/3/2023. CGGC-GRC-JV want KDA to manage the waste of Balakot hydropower project BHPP. We have been asked to provide the official letter and other details of staffs and camps. We invite your concern team to visit our sites as well as camps for further evaluation, and after that we will move toward contract and NOC, your early response will be highly appreciated.

With Profound Regards!

Mr. WANG YANWEI
Authorized representative of CGGC-GRC JV

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Application for NOC for Medical Waste Disposal

中国葛洲坝集团股份有限公司
CHINA GEZHOUBA GROUP COMPANY LIMITED

Ref. No: DHO-2023-001

Date: 28th March 2023

To: District Health Officer
Mansehra Khyber Pakhtunkhwa;

PROJECT: **DESIGN SUPPLY AND INSTALLATION, TESTING AND COMMISSIONING OF BALAKOT HYDRO POWER PROJECT INCLUDING THE RELATED CIVIL WORKS FOR RIVER DIVERSION**

SUBJECT: **APPLICATION FOR MEDICAL WASTE MANAGEMENT**

Dear Sir,

Reference to the subject captioned above CGGC-GRC-JV wants to used incinerator presents in Government hospital to dump our medical waste, so for that purpose we requesting you to allow us and gave us an NOC for our documentational requirement, please let us know the criteria of issuing NOC as well as waste management, we are looking forward to your prompt response, your early response will be highly appreciated.

With Profound Regards!

Mr. WANG YANWEI
Authorized representative of CGGC-GRC JV

30/3/23

巴基斯坦伊斯兰堡 F6/1 区 30 街 2 号
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Annexure-03: Minutes of HSE Progress Review Meetings

Minuts of HSE Progress Review Meeting held on January 25, 2023

Balakot Hydropower Project (300 MW)
District Mansehra
Minutes of Meeting:

Dated: January 25, 2023

S/No	Agenda Item/ Point of Discussion	Action	Responsibility	Time Frame
1	Information asked vide letter No. 1018/743 Dated November 30, 2022 in context of construction and installation of Temporary Works.	The request information will be provided for the review of PMC.	EPC Contractor	January 31, 2023
2	Providence of Method Statement for spoil disposal area(s) as asked vide letter No.1018/852 Dated January 18, 2023.	No spoil disposal operation will be undertaken unless the method statement is reviewed and approved by the PMC.	EPC Contractor	EPC Contractor will submit detailed Method Statement covering all information asked in the referred and other letters/SSEMP by not later than February 02, 2023.
3	Establishment of Dispensary and province of First Aid Boxes at Site	i. EPC Contractor will establish Dispensary at the sub-camp located at Sangar village. ii. Dispensary at Main Camp will be established upon its completion which is scheduled to be completed till March, 2023.	EPC Contractor	i. Fully equipped dispensary will be established at the Sangar sub-camp by February 28, 2023. ii. Dispensary at Main Camp will be established in the First week of March, 2023. iii. First Aid Box will be provided at all site by January 31, 2023.
4	Identification of eligible candidates for vocational training	With the recommendations of the affected community, EPC Contractor will identify eligible candidates for vocation training(s) at the institutes mentioned in the SSEMP.	EPC Contractor	EPC Contractor will identify the eligible candidates for training and will intimate to PMC till February 15, 2023.
5	Damage to Plantation sites	The EPC Contractor will take up the issue with the concerned DFO as per the site conditions, no forest tree fall in the impact corridor of the temporarily leased land.	EPC Contractor	The EPC Contractor will resolve the issue with the DFO by February 06, 2023.

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S/No	Agenda Item/ Point of Discussion	Action	Responsibility	Time Frame
6	Non-Compliances observed by the H&S Monitor of the PMC	The EPC Contractor will rectify the observed non-compliances on priority basis	EPC Contractor	EPC Contractor will provide Compliance report to PMC on or before, February 10, 2023. The H&S Monitor will visit the site on February 13, 2023 to check the compliances.
7	EPC Contractor's internal GRM	EPC Contractor will notify internal GRM and GRC and will submit the notification to the PMC for record.	EPC Contractor	i. EPC Contractor will submit GRM notification by January 30, 2023. ii. EPC Contractor will provide complaint registers at each camp once established however, such register will be provided at sub-camp at Sangar by January 30, 2023.

Wang He

2/3

Attendance Sheet

BALAKOT HPP CONSULTANTS

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

LIST OF PARTICIPANTS

MEETING WITH THE EPC CONTRACTOR'S HSE TEAM AT PMC OFFICE BALAKOT HYDROPOWER PROJECT ON 25TH JANUARY 2023

Sr.#	Name of Participants	PMC/EPC Contractor	Designation	Signature
1.	Qixiufang	CGGC	DPM	
2.	Ashfaq Nazir	CGGC	Envi. Manager	
3.	Ali Husnain Khan	CGGC	QA/QC	
4.	Wang He	CGGC	S/HSE	
5.	Assad Ali Khan	PMC	E.E	
6.	Syed Ali Fawad Shah	PMC	HSE Monitor	
7.				
8.				
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22.				
23.				
24.				

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

Page 1 of 1

3/3

Minuts of HSE Progress Review Meeting held on March 21, 2023

Balakot Hydropower Project (300 MW)

District Mansehra

Minutes of HSE Progress Review Meeting

Dated March 21, 2023

S/No	Agenda Item	Action	Responsibility	Time Frame
1	The EPC Contractor's delay in rectification of non-compliances, and discussion on major non-compliances observed/recorded at Site	i. Ensure regular sprinkling ii. Seeking approval of muck disposal on priority basis iii. Providence of quality PPE to the workforce iv. Protection measures to prevent falling of material in the water body. v. Failure to rectify the non-compliances, will be dealt under the provision of the EPC Contract. vi. EPC Contractor will provide design parameters for septic tank.	EPC Contractor	i. All non-compliances will be rectified till April 10, 2023.
2	Status of vocational, and HSE trainings	i. The annual HSE training will be arranged, once the possession of Paras area granted to the EPC Contractor, enabling maximum number of staff to attend the training. ii. The vocational training will be initiated either in May 2023, or as per the institute schedule. iii. PIU Social team will assist EPC Contractor in identifying the suitable candidates for vocational training.	EPC Contractor with the assistance of PIU/PMC social team	i. HSE annual training is tentatively planned at the end of April, 2023. ii. EPC Contractor will intimate names of the potentential candidates to PIU/PMC by April 05, 2023.
3	EPC Contractor's periodic HSE reporting	EPC Contractor will start HSE periodic report submission from: i. First Quarterly report for the quarter of January-March, 2023. ii. Monthly HSE report from April, 2023.	EPC Contractor	i. Quarterly HSE report submission on or before 10 April, 2023. ii. Monthly submission on or before 10 of each month.

Wang Yile

Guo Ze Lin

PMC. EE 21/03/2023

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S/No	Agenda Item	Action	Responsibility	Time Frame
4	Quarterly Instrumental Environmental Monitoring at Site	EPC Contractor will conduct Quarterly monitoring in the last week of March, 2023 at all points identified in the SSEMP.	EPC Contractor	EPC Contractor will submit Instrumental Monitoring Report to PMC for review on or before April 10, 2023.
5	Status of Environmental Manager appointment	EPC Contractor will submit CV of the potential candidate to PMC for review and further process	EPC Contractor	EPC Contractor will submit CV of the candidate by April 10, 2023.
6	Progress on No Objection Certificates /permits for waste disposal (hazardous/non-hazardous), and approval of muck disposal sites	i. EPC Contractor will approach TMA/KDA Balakot/Kaghan for domestic/camp waste disposal (non-hazardous) ii. For medical waste, Tehsil Headquarter hospital will be approached for NOC. iii. For Hazardous waste disposal (lubricants/chemicals etc.) EPC Contractor will identify the government approved contractor/vendor. iv. EPC Contractor will submit application/method statement for muck disposal sites prepared in light of the PMC comments.	EPC Contractor	i. Submission of feedback/copy of NOC issued by the quarter concerned by April 05, 2023. ii. Updated application/method statement for muck disposal sites will be submitted by April 10, 2023
7	Progress on various preformat given to the EPC Contractor in the last review meeting	The filled formats will be provided in the quarterly HSE progress reports	EPC Contractor	By April 10, 2023
8	HSE milestones for payment	EPC Contractor will submit detailed break up of lump sum items of the Environmental Mitigation cost	EPC Contractor	By April 10, 2023
9	Any other item/issue			

2/2

Wang He

Guo Ze-lin.

PMC 21/03/2023

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Attendance Sheet

Balakot Hydropower Project (300 MW)

District Mansehra

HSE Progress Review Meeting held at PMC office Balakot

List of Participants

Date: March 21, 2023

S/No	Name of Participant	Organization	Designation	Signature
1	Assad Ali Lehori	PMC	Environmental Expert	
2	SYED ALI FAWAD	PMC	H&S EXPERT	
3	Wang He	CGGC	HSE	
4	Guo Ze Lin	CGGC	HSE	
5	Qi xiufeng	CGGC	DPM (QHSE)	
6	Syed Babar Ali	CGGC	HSE officer	
7	Ali Husnain khan	CGGC	Quality Engineer	
8	Azeem Ullah	GRC	HSE Incharge	
9	Ibtesaam Zaman	PEDO	DD EH&SG	
10				
11				

3/3

Annexure-04: Copies of Instrumental Environmental Monitoring

Ambient Air Monitoring Results (First Quarter, 2023)-Particulate Matters

Integrated Environment Laboratory

EPA Accredited

AMBIENT PARTICULATE MATTERS MONITORING REPORT

Reference Number	BHPP/ENV/49-2023	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Monitoring Location:**	Dam Site (Paras Valley)
Monitoring Date:	28-03-2023	**Reporting Date:**	12-04-2023
Source:	Ambient Air	**Monitoring Instrument:**	AQMS 65, Serial # 1310
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	7.86	34.75	4.00 ($\mu g/m^3$)	26.84 ($\mu g/m^3$)
2.	10:00 A.M	8.11	35.62		
3.	11:00 A.M	6.19	34.07		
4.	12:00 P.M	5.44	37.36		
5.	01:00 P.M	5.47	35.81		
6.	02:00 P.M	5.83	35.1		
7.	03:00 P.M	5.77	32.57		
8.	04:00 P.M	5.37	31.35		
9.	05:00 P.M	4.27	28.13		
10.	06:00 P.M	3.04	26.61		
11.	07:00 P.M	2.27	24.88		
12.	08:00 P.M	2.67	26.36		
13.	09:00 P M	3.17	23.64		
14.	10:00 P M	3.54	22.91		
15.	11:00 P M	1.28	22.39		
16.	12:00 A M	3.16	19.66		
17.	01:00 A M	2.3	19.13		
18.	02:00 A M	3.87	20.42		
19.	03:00 A M	3.17	20.85		
20.	04:00 A M	2.75	19.16		
21.	05:00 A M	2.34	20.01		
22.	06:00 A M	1.47	22.29		
23.	07:00 A M	3.15	23.2		
24.	08:00 A M	3.67	27.19		
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*

Integrated Environment Laboratory

FOR ENVIRONMENTAL MONITORING, ANALYSIS & SURVEYS

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Environmental Protection Agency (EPA-KPK) Certified

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AMBIENT PARTICULATE MATTERS MONITORING REPORT

Reference Number	BHPP/ENV/49-2023	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Monitoring Location:**	Adit-1 (Thobi)
Monitoring Date:	29-03-2023	**Reporting Date:**	12-04-2023
Source: **GPS Coordinates:**	Ambient Air 34.636125, 73.428597	**Monitoring Instrument:**	AQMS 65, Serial # 1310

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	10.19	44.6		
2.	10:00 A.M	9.86	45.47		
3.	11:00 A.M	10.15	43.92		
4.	12:00 P.M	9.4	47.21		
5.	01:00 P.M	9.43	45.66		
6.	02:00 P.M	9.79	44.95		
7.	03:00 P.M	9.73	42.42		
8.	04:00 P.M	9.33	41.2		
9.	05:00 P.M	8.23	37.98		
10.	06:00 P.M	3.94	28.33		
11.	07:00 P.M	3.17	26.6		
12.	08:00 P.M	3.57	28.08		
13.	09:00 P M	4.07	25.36	5.89 ($\mu g/m^3$)	31.57 ($\mu g/m^3$)
14.	10:00 P M	4.44	24.63		
15.	11:00 P M	2.18	24.11		
16.	12:00 A M	4.06	21.38		
17.	01:00 A M	3.2	20.85		
18.	02:00 A M	4.77	22.14		
19.	03:00 A M	4.07	22.57		
20.	04:00 A M	3.65	20.88		
21.	05:00 A M	3.24	21.73		
22.	06:00 A M	2.37	24.01		
23.	07:00 A M	4.05	24.92		
24.	08:00 A M	4.57	28.91		
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***

Integrated Environment Laboratory

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Integrated Environment Laboratory

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AMBIENT PARTICULATE MATTERS MONITORING REPORT

Reference Number	BHPP/ENV/49-2023	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Monitoring Location:**	Adit-2 (Ghanool)
Monitoring Date:	30-03-2023	**Reporting Date:**	12-04-2023
Source:	Ambient Air	**Monitoring Instrument:**	AQMS 65, Serial # 1310
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	15.32	48.56		
2.	10:00 A.M	17.05	49.43		
3.	11:00 A.M	16.13	47.88		
4.	12:00 P.M	14.38	51.17		
5.	01:00 P.M	14.41	49.62		
6.	02:00 P.M	14.77	48.91		
7.	03:00 P.M	14.71	46.38		
8.	04:00 P.M	14.31	45.16		
9.	05:00 P.M	13.21	41.94		
10.	06:00 P.M	11.98	40.42		
11.	07:00 P.M	11.21	38.69		
12.	08:00 P.M	11.61	40.17		
13.	09:00 P M	12.11	37.45	12.92 ($\mu g/m^3$)	40.62 ($\mu g/m^3$)
14.	10:00 P M	12.48	36.72		
15.	11:00 P M	10.22	36.2		
16.	12:00 A M	12.1	33.47		
17.	01:00 A M	11.24	32.94		
18.	02:00 A M	12.81	34.23		
19.	03:00 A M	12.11	34.66		
20.	04:00 A M	11.69	32.97		
21.	05:00 A M	11.28	33.82		
22.	06:00 A M	10.41	36.1		
23.	07:00 A M	12.09	37.01		
24.	08:00 A M	12.61	41		
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/49-2023	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Monitoring Location:**	Adit-3 (Kholian)
Monitoring Date:	31-03-2023	**Reporting Date:**	12-04-2023
Source:	Ambient Air	**Monitoring Instrument:**	AQMS 65, Serial # 1310
GPS Coordinates:	34.610253,73.389367		

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	6.57	19.63	3.26 ($\mu g/m^3$)	12.98 ($\mu g/m^3$)
2.	10:00 A.M	7.24	19.86		
3.	11:00 A.M	5.48	20.29		
4.	12:00 P.M	4.73	19.83		
5.	01:00 P.M	4.76	18.47		
6.	02:00 P.M	5.12	17.6		
7.	03:00 P.M	5.06	19.52		
8.	04:00 P.M	4.66	18.3		
9.	05:00 P.M	3.56	15.08		
10.	06:00 P.M	2.33	13.56		
11.	07:00 P.M	1.56	11.83		
12.	08:00 P.M	1.96	13.31		
13.	09:00 P M	2.46	10.59		
14.	10:00 P M	2.83	9.86		
15.	11:00 P M	0.57	9.34		
16.	12:00 A M	2.45	6.61		
17.	01:00 A M	1.59	6.08		
18.	02:00 A M	3.16	7.37		
19.	03:00 A M	2.46	7.8		
20.	04:00 A M	2.04	6.11		
21.	05:00 A M	1.63	6.96		
22.	06:00 A M	0.76	9.24		
23.	07:00 A M	2.44	10.15		
24.	08:00 A M	2.96	14.14		
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/49-2023	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Monitoring Location:**	Powerhouse (Barkot)
Monitoring Date:	02-04-2023	**Reporting Date:**	12-04-2023
Source: **GPS Coordinates:**	Ambient Air 34.601812, 73.377145	**Monitoring Instrument:**	AQMS 65, Serial # 1310

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	1.98	11.91	1.55 ($\mu g/m^3$)	8.16 ($\mu g/m^3$)
2.	10:00 A.M	2.71	12.64		
3.	11:00 A.M	2.79	11.09		
4.	12:00 P.M	2.04	12.63		
5.	01:00 P.M	1.7	11.61		
6.	02:00 P.M	1.93	9.16		
7.	03:00 P.M	1.38	10.52		
8.	04:00 P.M	1.97	11.31		
9.	05:00 P.M	0.87	10.58		
10.	06:00 P.M	1.06	9.67		
11.	07:00 P.M	1.13	8.9		
12.	08:00 P.M	1.29	9.38		
13.	09:00 P M	1.58	7.66		
14.	10:00 P M	1.61	6.93		
15.	11:00 P M	2.13	6.41		
16.	12:00 A M	1.24	3.68		
17.	01:00 A M	1.19	3.15		
18.	02:00 A M	1.66	4.44		
19.	03:00 A M	0.97	4.87		
20.	04:00 A M	0.65	3.18		
21.	05:00 A M	1.03	4.03		
22.	06:00 A M	1.92	6.31		
23.	07:00 A M	1.24	7.22		
24.	08:00 A M	1.35	8.62		
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/49-2023	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Monitoring Location:**	Tailrace Upstream (Barkot)
Monitoring Date:	03-04-2023	**Reporting Date:**	12-04-2023
Source: **GPS Coordinates:**	Ambient Air 34.596088, 73.374512	**Monitoring Instrument:**	AQMS 65, Serial # 1310

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	7.94	29.59		
2.	10:00 A.M	8.67	30.46		
3.	11:00 A.M	6.75	28.91		
4.	12:00 P.M	6	32.2		
5.	01:00 P.M	6.03	30.65		
6.	02:00 P.M	6.39	29.94		
7.	03:00 P.M	6.33	27.41		
8.	04:00 P.M	5.93	26.19		
9.	05:00 P.M	4.83	22.97		
10.	06:00 P.M	3.6	21.45		
11.	07:00 P.M	2.83	19.72		
12.	08:00 P.M	3.23	21.2		
13.	09:00 P M	3.73	18.48	4.54 ($\mu g/m^3$)	21.65 ($\mu g/m^3$)
14.	10:00 P M	4.1	17.75		
15.	11:00 P M	1.84	17.23		
16.	12:00 A M	3.72	14.5		
17.	01:00 A M	2.86	13.97		
18.	02:00 A M	4.43	15.26		
19.	03:00 A M	3.73	15.69		
20.	04:00 A M	3.31	14		
21.	05:00 A M	2.9	14.85		
22.	06:00 A M	2.03	17.13		
23.	07:00 A M	3.71	18.04		
24.	08:00 A M	4.23	22.03		
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/49-2023	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Monitoring Location:**	GRC Camp Office (Sanghar)
Monitoring Date:	04-04-2023	**Reporting Date:**	12-04-2023
Source: **GPS Coordinates:**	Ambient Air 34.584562, 73.373878	**Monitoring Instrument:**	AQMS 65, Serial # 1310

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	10.49	34.51		
2.	10:00 A.M	9.25	35.38		
3.	11:00 A.M	10.3	33.83		
4.	12:00 P.M	9.55	37.12		
5.	01:00 P.M	9.58	35.57		
6.	02:00 P.M	9.94	34.86		
7.	03:00 P.M	9.88	32.33		
8.	04:00 P.M	9.48	31.11		
9.	05:00 P.M	8.38	27.89		
10.	06:00 P.M	7.15	26.37		
11.	07:00 P.M	6.38	24.64		
12.	08:00 P.M	6.78	26.12		
13.	09:00 P M	7.28	23.4	7.93 ($\mu g/m^3$)	26.57 ($\mu g/m^3$)
14.	10:00 P M	7.65	22.67		
15.	11:00 P M	5.39	22.15		
16.	12:00 A M	7.27	19.42		
17.	01:00 A M	6.41	18.89		
18.	02:00 A M	7.98	20.18		
19.	03:00 A M	7.28	20.61		
20.	04:00 A M	6.86	18.92		
21.	05:00 A M	6.45	19.77		
22.	06:00 A M	5.58	22.05		
23.	07:00 A M	7.26	22.96		
24.	08:00 A M	7.78	26.95		
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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- 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/49-2023	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Monitoring Location:**	Colony Area (Sanghar)
Monitoring Date:	05-04-2023	**Reporting Date:**	12-04-2023
Source: **GPS Coordinates:**	Ambient Air 34.587775, 73.366225	**Monitoring Instrument:**	AQMS 65, Serial # 1310

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	15.89	55.27		
2.	10:00 A.M	15.62	56.14		
3.	11:00 A.M	15.7	54.59		
4.	12:00 P.M	14.95	57.88		
5.	01:00 P.M	14.98	56.33		
6.	02:00 P.M	15.34	55.62		
7.	03:00 P.M	15.28	53.09		
8.	04:00 P.M	14.88	51.87		
9.	05:00 P.M	13.78	48.65		
10.	06:00 P.M	12.55	47.13		
11.	07:00 P.M	11.78	45.4		
12.	08:00 P.M	12.18	46.88		
13.	09:00 P M	12.68	44.16	13.37 ($\mu g/m^3$)	47.33 ($\mu g/m^3$)
14.	10:00 P M	13.05	43.43		
15.	11:00 P M	10.79	42.91		
16.	12:00 A M	12.67	40.18		
17.	01:00 A M	11.81	39.65		
18.	02:00 A M	13.38	40.94		
19.	03:00 A M	12.68	41.37		
20.	04:00 A M	12.26	39.68		
21.	05:00 A M	11.85	40.53		
22.	06:00 A M	10.98	42.81		
23.	07:00 A M	12.66	43.72		
24.	08:00 A M	13.18	47.71		
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.
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Signature of Analyst: ***Signature of Chief Chemist***

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Ambient Gaseous Monitoring Results (First Quarter, 2023)

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AMBIENT GASES MONITORING REPORT

Reference Number	BHPP/ENV/49-2023	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Monitoring Location:**	Dam Site (Paras Valley)
Monitoring Date:	28-03-2023	**Reporting Date:**	12-04-2023
Source:	Ambient Air Gases	**Monitoring Instrument:**	AQMS 65, Serial # 1310
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	0.25	5.64	6.37	6.45
2.	10:00 A.M	0.3	6.49	6.55	6.32
3.	11:00 A.M	0.22	6.56	6.82	5.59
4.	12:00 P.M	0.33	7.31	5.73	5.72
5.	01:00 P.M	0.36	6.71	5.6	5.87
6.	02:00 P.M	0.25	6.89	5.71	4.95
7.	03:00 P.M	0.23	7.43	6.07	5.57
8.	04:00 P.M	0.18	6.57	6.22	6.76
9.	05:00 P.M	0.14	5.73	5.74	4.59
10.	06:00 P.M	0.2	5.5	5.86	5.08
11.	07:00 P.M	0.06	6.28	6.44	6.51
12.	08:00 P.M	0.12	6.61	5.55	6.18
13.	09:00 P M	0.08	7.42	5.98	5.75
14.	10:00 P M	0.13	5.7	5.83	5.41
15.	11:00 P M	0.06	5.27	6.66	6.26
16.	12:00 A M	0.18	6.45	5.91	6.54
17.	01:00 A M	0.15	6.52	5.45	5.47
18.	02:00 A M	0.02	5.77	5.61	5.28
19.	03:00 A M	0.14	7.56	5.49	5.06
20.	04:00 A M	0.15	6.77	5.12	5.37
21.	05:00 A M	0.2	6.53	4.55	5.74
22.	06:00 A M	0.18	6.06	5.41	5.9
23.	07:00 A M	0.2	6.81	5.7	6.19
24.	08:00 A M	0.23	6.05	5.8	6.06
Average Concentration		**0.18**	**6.44**	**5.84**	**5.77**
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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AMBIENT GASES MONITORING REPORT

Reference Number	BHPP/ENV/49-2023	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Monitoring Location:**	Adit-1 (Thobi)
Monitoring Date:	29-03-2023	**Reporting Date:**	12-04-2023
Source:	Ambient Air Gases	**Monitoring Instrument:**	AQMS 65, Serial # 1310
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	0.19	3.65	5.39	5.28
2.	10:00 A.M	0.24	4.5	5.57	5.15
3.	11:00 A.M	0.16	4.57	5.84	4.42
4.	12:00 P.M	0.27	5.32	4.75	4.55
5.	01:00 P.M	0.23	4.72	4.62	4.7
6.	02:00 P.M	0.19	4.9	4.73	3.78
7.	03:00 P.M	0.17	5.44	5.09	4.4
8.	04:00 P.M	0.12	4.58	5.24	5.59
9.	05:00 P.M	0.08	3.74	4.76	3.42
10.	06:00 P.M	0.14	3.51	4.88	3.91
11.	07:00 P.M	0.11	4.29	5.46	5.34
12.	08:00 P.M	0.06	4.62	4.57	5.01
13.	09:00 P M	0.02	5.43	5.06	4.58
14.	10:00 P M	0.07	3.71	4.85	4.24
15.	11:00 P M	0.09	3.28	5.68	5.09
16.	12:00 A M	0.12	4.46	4.93	5.37
17.	01:00 A M	0.09	4.53	4.47	4.3
18.	02:00 A M	0.1	3.78	4.63	4.11
19.	03:00 A M	0.08	5.57	4.51	3.89
20.	04:00 A M	0.09	4.78	4.14	4.2
21.	05:00 A M	0.14	4.54	3.57	4.57
22.	06:00 A M	0.12	4.07	4.43	4.73
23.	07:00 A M	0.14	4.82	4.72	5.02
24.	08:00 A M	0.17	4.06	4.82	4.89
Average Concentration		**0.13**	**4.45**	**4.86**	**4.60**
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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AMBIENT GASES MONITORING REPORT

Reference Number	BHPP/ENV/49-2023	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Monitoring Location:**	Adit-2 (Ghanool)
Monitoring Date:	30-03-2023	**Reporting Date:**	12-04-2023
Source:	Ambient Air Gases	**Monitoring Instrument:**	AQMS 65, Serial # 1310
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	0.15	4.76	4.42	6.12
2.	10:00 A.M	0.17	5.61	4.6	5.99
3.	11:00 A.M	0.19	5.68	4.87	5.26
4.	12:00 P.M	0.16	6.43	3.78	5.39
5.	01:00 P.M	0.14	5.83	3.65	5.54
6.	02:00 P.M	0.13	6.01	3.76	4.62
7.	03:00 P.M	0.11	6.55	4.12	5.24
8.	04:00 P.M	0.06	5.69	4.27	6.43
9.	05:00 P.M	0.02	4.85	3.79	4.26
10.	06:00 P.M	0.08	4.62	3.91	4.75
11.	07:00 P.M	0.04	5.4	4.49	6.18
12.	08:00 P.M	0.06	5.73	3.6	5.85
13.	09:00 P M	0.06	6.54	4.03	5.42
14.	10:00 P M	0.08	4.82	3.88	5.08
15.	11:00 P M	0.04	4.39	4.71	5.93
16.	12:00 A M	0.06	5.57	3.96	6.21
17.	01:00 A M	0.03	5.64	3.5	5.14
18.	02:00 A M	0.03	4.89	3.66	4.95
19.	03:00 A M	0.02	6.68	3.54	4.73
20.	04:00 A M	0.03	5.89	3.17	5.04
21.	05:00 A M	0.08	5.65	2.6	5.41
22.	06:00 A M	0.06	5.18	3.46	5.57
23.	07:00 A M	0.08	5.93	3.75	5.86
24.	08:00 A M	0.11	5.17	3.85	5.73
Average Concentration		**0.09**	**5.56**	**3.89**	**5.42**
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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AMBIENT GASES MONITORING REPORT

Reference Number	BHPP/ENV/49-2023	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Monitoring Location:**	Adit-3 (Kholian)
Monitoring Date:	31-03-2023	**Reporting Date:**	12-04-2023
Source:	Ambient Air Gases	**Monitoring Instrument:**	AQMS 65, Serial # 1310
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	0.29	6.38	8.86	7.12
2.	10:00 A.M	0.34	7.23	9.04	6.99
3.	11:00 A.M	0.26	7.3	9.31	6.26
4.	12:00 P.M	0.37	8.05	8.22	6.39
5.	01:00 P.M	0.4	7.45	8.09	6.54
6.	02:00 P.M	0.29	7.63	8.2	5.62
7.	03:00 P.M	0.27	8.17	8.56	6.24
8.	04:00 P.M	0.22	7.31	8.71	7.43
9.	05:00 P.M	0.18	6.47	8.23	5.26
10.	06:00 P.M	0.24	6.24	8.35	5.75
11.	07:00 P.M	0.22	7.02	8.93	7.18
12.	08:00 P.M	0.2	7.35	8.04	6.85
13.	09:00 P M	0.21	8.16	8.47	6.42
14.	10:00 P M	0.19	6.44	8.32	6.08
15.	11:00 P M	0.2	6.01	9.15	6.93
16.	12:00 A M	0.22	7.19	8.4	7.21
17.	01:00 A M	0.19	7.26	7.94	6.14
18.	02:00 A M	0.18	6.51	8.1	5.95
19.	03:00 A M	0.18	8.3	7.98	5.73
20.	04:00 A M	0.19	7.51	7.61	6.04
21.	05:00 A M	0.24	7.27	7.04	6.41
22.	06:00 A M	0.22	6.8	7.9	6.57
23.	07:00 A M	0.24	7.55	8.19	6.86
24.	08:00 A M	0.27	6.79	8.29	6.73
Average Concentration		**0.24**	**7.18**	**8.33**	**6.47**
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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AMBIENT GASES MONITORING REPORT

Reference Number	BHPP/ENV/49-2023	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Monitoring Location:**	Powerhouse (Barkot)
Monitoring Date:	02-04-2023	**Reporting Date:**	12-04-2023
Source:	Ambient Air Gases	**Monitoring Instrument:**	AQMS 65, Serial # 1310
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	0.15	2.72	4.45	4.88
2.	10:00 A.M	0.2	3.57	4.63	4.75
3.	11:00 A.M	0.12	3.64	4.9	4.02
4.	12:00 P.M	0.23	4.39	3.81	4.15
5.	01:00 P.M	0.26	3.79	3.68	4.3
6.	02:00 P.M	0.15	3.97	3.79	3.38
7.	03:00 P.M	0.13	4.51	4.15	4
8.	04:00 P.M	0.08	3.65	4.3	5.19
9.	05:00 P.M	0.12	2.81	3.82	3.02
10.	06:00 P.M	0.1	2.58	3.94	3.51
11.	07:00 P.M	0.16	3.36	4.52	4.94
12.	08:00 P.M	0.13	3.69	3.63	4.61
13.	09:00 P M	0.09	4.5	4.06	4.18
14.	10:00 P M	0.12	2.78	3.91	3.84
15.	11:00 P M	0.06	2.35	4.74	4.69
16.	12:00 A M	0.08	3.53	3.99	4.97
17.	01:00 A M	0.05	3.6	3.53	3.9
18.	02:00 A M	0.07	2.85	3.69	3.71
19.	03:00 A M	0.04	4.64	3.57	3.49
20.	04:00 A M	0.05	3.85	3.2	3.8
21.	05:00 A M	0.1	3.61	2.63	4.17
22.	06:00 A M	0.08	3.14	3.49	4.33
23.	07:00 A M	0.1	3.89	3.78	4.62
24.	08:00 A M	0.13	3.13	3.88	4.49
Average Concentration		**0.11**	**3.52**	**3.92**	**4.20**
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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AMBIENT GASES MONITORING REPORT

Reference Number	BHPP/ENV/49-2023	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Monitoring Location:**	Tailrace Upstream (Barkot)
Monitoring Date:	03-04-2023	**Reporting Date:**	12-04-2023
Source: **GPS Coordinates:**	Ambient Air Gases 34.596088, 73.374512	**Monitoring Instrument:**	AQMS 65, Serial # 1310

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	0.11	3.29	4.89	3.68
2.	10:00 A.M	0.1	3.85	5.25	3.29
3.	11:00 A.M	0.12	4.25	5.9	2.64
4.	12:00 P.M	0.1	3.56	6.25	3.6
5.	01:00 P.M	0.09	5.04	6.73	1.66
6.	02:00 P.M	0.11	4.82	6.9	3.04
7.	03:00 P.M	0.13	4.58	5.7	1.44
8.	04:00 P.M	0.14	4.53	5.94	2.29
9.	05:00 P.M	0.1	4.05	3.23	2.34
10.	06:00 P.M	0.11	3.36	3.58	2.29
11.	07:00 P.M	0.12	3.17	4.25	2.37
12.	08:00 P.M	0.13	3.85	4.01	2.07
13.	09:00 P M	0.1	2.86	3	2.73
14.	10:00 P M	0.09	2.73	2.98	2.33
15.	11:00 P M	0.11	3.05	3.23	2.05
16.	12:00 A M	0.12	2.83	3.49	1.64
17.	01:00 A M	0.13	3.09	3.26	2.04
18.	02:00 A M	0.1	4.17	3.01	2.29
19.	03:00 A M	0.09	4.05	3.3	1.44
20.	04:00 A M	0.08	3.95	2.81	1.77
21.	05:00 A M	0.09	4.39	3.01	1.07
22.	06:00 A M	0.07	3.16	2.87	1.23
23.	07:00 A M	0.08	3.58	2.55	1.44
24.	08:00 A M	0.09	2.05	2.91	1.83
Average Concentration		**0.10**	**3.67**	**4.12**	**2.19**
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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AMBIENT GASES MONITORING REPORT

Reference Number	BHPP/ENV/49-2023	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Monitoring Location:**	GRC Camp Office (Sanghar)
Monitoring Date:	04-04-2023	**Reporting Date:**	12-04-2023
Source: **GPS Coordinates:**	Ambient Air Gases 34.584562, 73.373878	**Monitoring Instrument:**	AQMS 65, Serial # 1310

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	0.32	5.44	6.64	5.94
2.	10:00 A.M	0.34	5.98	7.07	5.83
3.	11:00 A.M	0.36	5.23	7.65	5.18
4.	12:00 P.M	0.31	5.71	7.93	6.14
5.	01:00 P.M	0.33	7.19	8.48	4.2
6.	02:00 P.M	0.32	6.97	8.65	5.58
7.	03:00 P.M	0.34	6.73	7.45	3.98
8.	04:00 P.M	0.35	6.68	7.69	4.83
9.	05:00 P.M	0.31	6.2	4.98	4.88
10.	06:00 P.M	0.32	5.51	5.33	4.83
11.	07:00 P.M	0.33	5.32	5.94	4.91
12.	08:00 P.M	0.34	5.67	5.76	4.61
13.	09:00 P M	0.31	5.43	4.75	5.27
14.	10:00 P M	0.3	4.88	4.73	4.87
15.	11:00 P M	0.32	5.01	4.98	4.59
16.	12:00 A M	0.33	4.98	5.24	4.18
17.	01:00 A M	0.34	5.24	5.01	4.58
18.	02:00 A M	0.31	6.32	4.76	4.83
19.	03:00 A M	0.3	6.27	5.05	3.98
20.	04:00 A M	0.29	6.09	4.56	4.31
21.	05:00 A M	0.3	6.54	4.76	3.61
22.	06:00 A M	0.28	5.31	4.62	3.77
23.	07:00 A M	0.29	5.73	4.3	3.98
24.	08:00 A M	0.3	4.29	4.66	4.72
Average Concentration		**0.31**	**5.78**	**5.89**	**4.73**
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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AMBIENT GASES MONITORING REPORT

Reference Number	BHPP/ENV/49-2023	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Monitoring Location:**	Colony Area (Snaghar)
Monitoring Date:	05-04-2023	**Reporting Date:**	12-04-2023
Source:	Ambient Air Gases	**Monitoring Instrument:**	AQMS 65, Serial # 1310
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	0.32	6.68	8.07	5.61
2.	10:00 A.M	0.34	7.24	8.43	5.09
3.	11:00 A.M	0.36	7.64	9.08	4.44
4.	12:00 P.M	0.31	6.95	9.43	5.4
5.	01:00 P.M	0.33	8.43	9.91	3.46
6.	02:00 P.M	0.32	8.21	9.62	4.84
7.	03:00 P.M	0.34	7.97	8.88	3.24
8.	04:00 P.M	0.35	7.92	9.12	4.09
9.	05:00 P.M	0.31	7.44	6.41	4.14
10.	06:00 P.M	0.32	6.75	6.76	4.09
11.	07:00 P.M	0.33	6.56	7.43	4.17
12.	08:00 P.M	0.34	7.24	7.19	3.87
13.	09:00 P M	0.31	6.25	6.18	4.53
14.	10:00 P M	0.3	6.12	6.16	4.13
15.	11:00 P M	0.32	6.44	6.41	3.85
16.	12:00 A M	0.33	6.22	6.67	3.44
17.	01:00 A M	0.34	6.48	6.44	3.84
18.	02:00 A M	0.31	7.56	6.19	4.09
19.	03:00 A M	0.3	7.44	6.48	3.24
20.	04:00 A M	0.29	7.34	5.99	3.57
21.	05:00 A M	0.3	7.78	6.19	2.87
22.	06:00 A M	0.28	6.55	6.05	3.03
23.	07:00 A M	0.29	6.97	5.73	3.24
24.	08:00 A M	0.3	5.44	6.09	3.98
Average Concentration		**0.31**	**7.06**	**7.28**	**4.01**
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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Ambient Noise Level Monitoring Results (First Quarter, 2023)

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AMBIENT NOISE MONITORING REPORT

Reference Number	BHPP/ENV/49-2023	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Monitoring Location:**	Dam Site (Paras Valley)
Monitoring Date:	28-03-2023	**Reporting Date:**	12-04-2023
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)	56.5	59.3	57.9
2.	10:00 A.M		56.3	59.1	57.7
3.	11:00 A.M		56.1	58.9	57.5
4.	12:00 P.M		55.9	58.7	57.3
5.	01:00 P.M		55.6	58.4	57
6.	02:00 P.M		55.4	58.2	56.8
7.	03:00 P.M		55.2	58	56.6
8.	04:00 P.M		55	57.8	56.4
9.	05:00 P.M		54.8	57.6	56.2
10.	06:00 P.M		54.6	57.4	56
11.	07:00 P.M		54.3	57.1	55.7
12.	08:00 P.M		54.1	56.9	55.5
13.	09:00 P M		53.9	56.7	55.3
14.	10:00 P M		53.7	56.5	55.1
15.	11:00 P M		53.5	56.3	54.9
16.	12:00 A M		53.2	56	54.6
17.	01:00 A M		53	55.8	54.4
18.	02:00 A M		52.8	55.6	54.2
19.	03:00 A M		55.6	58.4	57
20.	04:00 A M		55.4	58.1	56.75
21.	05:00 A M		55.1	57.9	56.5
22.	06:00 A M		54.9	57.7	56.3
23.	07:00 A M		54.7	57.5	56.1
24.	08:00 A M		56.2	59.1	57.65

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.
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Signature of Analyst:

Signature of Chief Chemist

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AMBIENT NOISE MONITORING REPORT

Reference Number	BHPP/ENV/49-2023	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Monitoring Location:**	Adit-1 (Thobi)
Monitoring Date:	29-03-2023	**Reporting Date:**	12-04-2023
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)	49.7	52.6	51.1
2.	10:00 A.M		49.5	52.4	50.9
3.	11:00 A.M		49.3	52.2	50.7
4.	12:00 P.M		49.1	52	50.5
5.	01:00 P.M		48.8	51.7	50.2
6.	02:00 P.M		48.6	51.5	50.05
7.	03:00 P.M		48.4	51.3	49.8
8.	04:00 P.M		48.2	51.1	49.6
9.	05:00 P.M		48	50.9	49.4
10.	06:00 P.M		47.8	50.7	49.2
11.	07:00 P.M		47.5	50.4	48.9
12.	08:00 P.M		47.3	50.2	48.7
13.	09:00 P M		47.1	50	48.5
14.	10:00 P M		46.9	49.8	48.3
15.	11:00 P M		46.7	49.6	48.1
16.	12:00 A M		46.4	49.3	47.8
17.	01:00 A M		46.2	49.1	47.6
18.	02:00 A M		46	48.9	47.4
19.	03:00 A M		45.8	48.7	47.2
20.	04:00 A M		45.6	48.4	47
21.	05:00 A M		45.3	48.2	46.7
22.	06:00 A M		45.1	48	46.5
23.	07:00 A M		44.9	47.8	46.3
24.	08:00 A M		44.7	47.6	46.1
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:

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

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AMBIENT NOISE MONITORING REPORT

Reference Number	BHPP/ENV/49-2023	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Monitoring Location:**	Adit-2 (Ghanool)
Monitoring Date:	30-03-2023	**Reporting Date:**	12-04-2023
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)	57.2	60.1	58.65
2.	10:00 A.M		57	59.8	58.4
3.	11:00 A.M		56.7	59.6	58.1
4.	12:00 P.M		56.5	59.4	57.9
5.	01:00 P.M		56.3	59.2	57.7
6.	02:00 P.M		56.1	59	57.5
7.	03:00 P.M		55.9	58.8	57.3
8.	04:00 P.M		55.7	58.5	57.1
9.	05:00 P.M		55.4	58.3	56.8
10.	06:00 P.M		55.2	58.1	56.6
11.	07:00 P.M		55	57.9	56.4
12.	08:00 P.M		54.8	57.7	56.2
13.	09:00 P M		54.6	57.5	56.05
14.	10:00 P M		54.4	57.2	55.8
15.	11:00 P M		54.1	57	55.5
16.	12:00 A M		53.9	56.8	55.3
17.	01:00 A M		53.7	56.6	55.1
18.	02:00 A M		53.5	56.4	54.9
19.	03:00 A M		53.3	56.2	54.7
20.	04:00 A M		53.1	55.9	54.5
21.	05:00 A M		52.8	55.7	54.2
22.	06:00 A M		52.6	55.5	54.0
23.	07:00 A M		58.7	61.6	60.1
24.	08:00 A M		60.5	63.9	62.2

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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Signature of Analyst: *Signature of Chief Chemist*

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AMBIENT NOISE MONITORING REPORT

Reference Number	BHPP/ENV/49-2023	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Monitoring Location:**	Adit-3 (Kholian)
Monitoring Date:	31-03-2023	**Reporting Date:**	12-04-2023
Source: **GPS Coordinates:**	Ambient Noise 34.610253,73.389367	**Monitoring Instrument:**	Noise Meter-IEC651-Type-2

Sr. No.	Monitoring Time	Unit	Minimum	Maximum	Leq
1.	09:00 A.M	dB(A)	63.4	66.3	64.8
2.	10:00 A.M		63.2	66	64.6
3.	11:00 A.M		62.9	65.8	64.3
4.	12:00 P.M		62.7	65.6	64.1
5.	01:00 P.M		62.5	65.4	63.9
6.	02:00 P.M		57.8	60.7	59.2
7.	03:00 P.M		57.6	60.5	59.0
8.	04:00 P.M		57.4	60.2	58.8
9.	05:00 P.M		57.1	60	58.5
10.	06:00 P.M		56.9	59.8	58.3
11.	07:00 P.M		56.7	59.6	58.1
12.	08:00 P.M		56.5	59.4	57.9
13.	09:00 P M		56.3	59.2	57.7
14.	10:00 P M		56.1	58.9	57.5
15.	11:00 P M		54.4	57.3	55.8
16.	12:00 A M		54.1	57	55.5
17.	01:00 A M		53.9	56.8	55.3
18.	02:00 A M		53.7	56.6	55.1
19.	03:00 A M		53.5	56.4	54.9
20.	04:00 A M		53.3	56.1	54.7
21.	05:00 A M		53	55.9	54.4
22.	06:00 A M		52.8	55.7	54.2
23.	07:00 A M		55.3	58.9	57.1
24.	08:00 A M		59.7	62.4	61.05

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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Signature of Analyst:

Signature of Chief Chemist

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AMBIENT NOISE MONITORING REPORT

Reference Number	BHPP/ENV/49-2023	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Monitoring Location:**	Powerhouse (Barkot)
Monitoring Date:	02-04-2023	**Reporting Date:**	12-04-2023
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)	46.3	48.9	47.6
2.	10:00 A.M		46.1	48.6	47.35
3.	11:00 A.M		45.8	48.4	47.1
4.	12:00 P.M		45.6	48.2	46.9
5.	01:00 P.M		45.4	48	46.7
6.	02:00 P.M		45.2	47.8	46.5
7.	03:00 P.M		45	47.6	46.3
8.	04:00 P.M		44.8	47.3	46.05
9.	05:00 P.M		44.5	47.1	45.8
10.	06:00 P.M		44.3	46.9	45.6
11.	07:00 P.M		44.1	46.7	45.4
12.	08:00 P.M		43.9	46.5	45.2
13.	09:00 P M		43.7	46.3	45
14.	10:00 P M		43.5	46	44.7
15.	11:00 P M		43.2	45.8	44.5
16.	12:00 A M		43	45.6	44.3
17.	01:00 A M		42.8	45.4	44.1
18.	02:00 A M		42.6	45.2	43.9
19.	03:00 A M		42.4	45	43.7
20.	04:00 A M		42.2	44.7	43.4
21.	05:00 A M		41.9	44.5	43.2
22.	06:00 A M		41.7	44.3	43
23.	07:00 A M		41.5	44.1	42.8
24.	08:00 A M		41.3	43.9	42.6
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/49-2023	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Monitoring Location:**	Tailrace Upstream (Barkot)
Monitoring Date:	03-04-2023	**Reporting Date:**	12-04-2023
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)	48.1	51	49.5
2.	10:00 A.M		47.9	50.8	49.3
3.	11:00 A.M		47.7	50.6	49.1
4.	12:00 P.M		47.5	50.4	48.9
5.	01:00 P.M		47.3	50.1	48.7
6.	02:00 P.M		47	49.9	48.4
7.	03:00 P.M		46.8	49.7	48.2
8.	04:00 P.M		46.6	49.5	48.05
9.	05:00 P.M		46.4	49.3	47.8
10.	06:00 P.M		46.2	49.1	47.6
11.	07:00 P.M		46	48.8	47.4
12.	08:00 P.M		45.7	48.6	47.1
13.	09:00 P M		45.5	48.4	46.9
14.	10:00 P M		45.3	48.2	46.7
15.	11:00 P M		45.1	48	46.5
16.	12:00 A M		44.9	47.8	46.3
17.	01:00 A M		44.7	47.6	46.1
18.	02:00 A M		44.5	47.4	45.9
19.	03:00 A M		44.3	47.2	45.7
20.	04:00 A M		44.1	46.9	45.5
21.	05:00 A M		43.8	46.7	45.2
22.	06:00 A M		43.6	46.5	45.0
23.	07:00 A M		43.4	46.3	44.8
24.	08:00 A M		43.2	46.1	44.6

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:

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AMBIENT NOISE MONITORING REPORT

Reference Number	BHPP/ENV/49-2023	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Monitoring Location:**	GRC Camp Office (Sanghar)
Monitoring Date:	04-04-2023	**Reporting Date:**	12-04-2023
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)	61.8	64.4	63.1
2.	10:00 A.M		61.6	64.1	62.85
3.	11:00 A.M		61.3	63.9	62.6
4.	12:00 P.M		61.1	63.7	62.4
5.	01:00 P.M		60.9	63.5	62.2
6.	02:00 P.M		60.7	63.3	62
7.	03:00 P.M		60.5	63.1	61.8
8.	04:00 P.M		60.3	62.8	61.55
9.	05:00 P.M		60	62.6	61.3
10.	06:00 P.M		59.8	62.4	61.1
11.	07:00 P.M		59.6	62.2	60.9
12.	08:00 P.M		59.4	62	60.7
13.	09:00 P M		59.2	61.8	60.5
14.	10:00 P M		59	61.5	60.25
15.	11:00 P M		58.7	61.3	60
16.	12:00 A M		58.5	61.1	59.8
17.	01:00 A M		58.3	60.9	59.6
18.	02:00 A M		58.1	60.7	59.4
19.	03:00 A M		57.9	60.5	59.2
20.	04:00 A M		60.7	63.2	61.95
21.	05:00 A M		60.4	63	61.7
22.	06:00 A M		60.2	62.8	61.5
23.	07:00 A M		60	62.6	61.3
24.	08:00 A M		61.8	63.5	62.65

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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AMBIENT NOISE MONITORING REPORT

Reference Number	BHPP/ENV/49-2023	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Monitoring Location:**	Colony Area (Sanghar)
Monitoring Date:	05-04-2023	**Reporting Date:**	12-04-2023
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)	46.3	49.2	47.7
2.	10:00 A.M		46.1	49	47.5
3.	11:00 A.M		45.9	48.8	47.3
4.	12:00 P.M		45.7	48.6	47.1
5.	01:00 P.M		45.4	48.3	46.8
6.	02:00 P.M		45.2	48.1	46.6
7.	03:00 P.M		45	47.9	46.4
8.	04:00 P.M		44.8	47.7	46.2
9.	05:00 P.M		44.6	47.5	46.0
10.	06:00 P.M		44.4	47.3	45.8
11.	07:00 P.M		44.1	47	45.5
12.	08:00 P.M		43.9	46.8	45.3
13.	09:00 P M		43.7	46.6	45.1
14.	10:00 P M		43.5	46.4	44.9
15.	11:00 P M		43.3	46.2	44.7
16.	12:00 A M		43	45.9	44.4
17.	01:00 A M		42.8	45.7	44.2
18.	02:00 A M		42.6	45.5	44.0
19.	03:00 A M		42.4	45.3	43.8
20.	04:00 A M		46.2	49	47.6
21.	05:00 A M		45.9	48.8	47.3
22.	06:00 A M		45.7	48.6	47.1
23.	07:00 A M		45.5	48.4	46.9
24.	08:00 A M		45.3	48.2	46.7
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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Drinking Water Monitoring Results (First Quarter, 2023)

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DRINKING WATER ANALYSIS REPORT

Reference Number	BHPP/ENV/49-2023	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Sampling Location:**	Dam Site (Paras Valley)
Sampling Date:	05-04-2023	**Reporting Date:**	12-04-2023
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	7.6
2.	Temperature	---	°C	---	----	11
3.	Taste & Odor	In-house	--	Non-Objectionable	Non Objectionable	Non Objectionable
4.	Color	APHA-2120 B/C	TCU	≤ 15	<15	3
5.	Turbidity	APHA-2130 B	NTU	<5	<5	4.2
6.	Total Dissolved Solids (TDS)	APHA-2540 C	mg/L	< 1000	<1000	326
7.	Total Hardness as $CaCO_3$	APHA-2340 C	mg/L	-------	<500	268
8.	Nitrate (NO_3)	APHA-4500NO3 B	mg/L	50	≤50	0.9
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	0
12.	Antimony (Sb)	APHA-3500Sb B	mg/L	0.005	<0.005	N.D.
13.	Chloride (Cl)	APHA-4500Cl- B	mg/L	250	<250	79
14.	Chlorine	APHA-4500 CL	mg/L		0.5-1.5	0.4
15.	Lead (Pb)	APHA-3500 Pb-B	mg/L	0.01	≤0.05	0.001
16.	Fluoride	APHA-4500F- C	mg/L	1.5	≤1.5	0.58
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	0.057
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	0.05
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/49-2023	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Sampling Location:**	Adit-1 (Thobi)
Sampling Date:	05-04-2023	**Reporting Date:**	12-04-2023
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	7.4
2.	Temperature	---	°C	---	----	9
3.	Taste & Odor	In-house	--	Non-Objectionable	Non Objectionable	Non Objectionable
4.	Color	APHA-2120 B/C	TCU	≤ 15	<15	5
5.	Turbidity	APHA-2130 B	NTU	<5	<5	3.6
6.	Total Dissolved Solids (TDS)	APHA-2540 C	mg/L	< 1000	<1000	386
7.	Total Hardness as $CaCO_3$	APHA-2340 C	mg/L	-------	<500	239
8.	Nitrate (NO_3)	APHA-4500NO3 B	mg/L	50	≤50	2.1
9.	Nitrite (NO_2)	APHA-4500NO2 B	mg/L	3	≤3	0.004
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
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	0.26
15.	Lead (Pb)	APHA-3500 Pb-B	mg/L	0.01	≤0.05	0.009
16.	Fluoride	APHA-4500F- C	mg/L	1.5	≤1.5	0.61
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	0.12
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	1.09
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/49-2023	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Sampling Location:**	Adit-2 (Ghanol)
Sampling Date:	05-04-2023	**Reporting Date:**	12-04-2023
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	---	----	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	2.1
6.	Total Dissolved Solids (TDS)	APHA-2540 C	mg/L	< 1000	<1000	359
7.	Total Hardness as $CaCO_3$	APHA-2340 C	mg/L	-------	<500	256
8.	Nitrate (NO_3)	APHA-4500NO3 B	mg/L	50	≤50	1.01
9.	Nitrite (NO_2)	APHA-4500NO2 B	mg/L	3	≤3	0.05
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	134
14.	Chlorine	APHA-4500 CL	mg/L		0.5-1.5	0.12
15.	Lead (Pb)	APHA-3500 Pb-B	mg/L	0.01	≤0.05	0.001
16.	Fluoride	APHA-4500F- C	mg/L	1.5	≤1.5	0.81
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	0.11
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	1.04
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/49-2023	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Sampling Location:**	Adit-3 (Kholian)
Sampling Date:	05-04-2023	**Reporting Date:**	12-04-2023
Source: **GPS Coordinates;**	Spring Water 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	7.62
2.	Temperature	---	°C	---	-----	8
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
6.	Total Dissolved Solids (TDS)	APHA-2540 C	mg/L	< 1000	<1000	395
7.	Total Hardness as $CaCO_3$	APHA-2340 C	mg/L	-------	<500	267
8.	Nitrate (NO_3)	APHA-4500NO3 B	mg/L	50	≤50	1.1
9.	Nitrite (NO_2)	APHA-4500NO2 B	mg/L	3	≤3	0.11
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	117
14.	Chlorine	APHA-4500 CL	mg/L		0.5-1.5	0.08
15.	Lead (Pb)	APHA-3500 Pb-B	mg/L	0.01	≤0.05	0.003
16.	Fluoride	APHA-4500F- C	mg/L	1.5	≤1.5	0.69
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	0.17
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	0.001
23.	Zinc (Zn)	APHA- 3500 Zn B	mg/L	3	5	1.21
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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DRINKING WATER ANALYSIS REPORT

Reference Number	BHPP/ENV/49-2023	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Sampling Location:**	Powerhouse (Barkot)
Sampling Date:	05-04-2023	**Reporting Date:**	12-04-2023
Source: **GPS Coordinates;**	Spring Water (Sanduri) 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	7.46
2.	Temperature	---	°C	---	-----	8
3.	Taste & Odor	In-house	--	Non-Objectionable	Non Objectionable	Non Objectionable
4.	Color	APHA-2120 B/C	TCU	≤ 15	<15	8
5.	Turbidity	APHA-2130 B	NTU	<5	<5	4
6.	Total Dissolved Solids (TDS)	APHA-2540 C	mg/L	< 1000	<1000	382
7.	Total Hardness as $CaCO_3$	APHA-2340 C	mg/L	-------	<500	327
8.	Nitrate (NO_3)	APHA-4500NO3 B	mg/L	50	≤50	1.08
9.	Nitrite (NO_2)	APHA-4500NO2 B	mg/L	3	≤3	0.31
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	0.01
12.	Antimony (Sb)	APHA-3500Sb B	mg/L	0.005	<0.005	N.D.
13.	Chloride (Cl)	APHA-4500Cl- B	mg/L	250	<250	109
14.	Chlorine	APHA-4500 CL	mg/L		0.5-1.5	0.07
15.	Lead (Pb)	APHA-3500 Pb-B	mg/L	0.01	≤0.05	0.002
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	0.07
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	0.02
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/49-2023	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Sampling Location:**	GRC Camp Office (Sanghar)
Sampling Date:	05-04-2023	**Reporting Date:**	12-04-2023
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	7.67
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
6.	Total Dissolved Solids (TDS)	APHA-2540 C	mg/L	< 1000	<1000	387
7.	Total Hardness as $CaCO_3$	APHA-2340 C	mg/L	-------	<500	342
8.	Nitrate (NO_3)	APHA-4500NO3 B	mg/L	50	≤50	1.24
9.	Nitrite (NO_2)	APHA-4500NO2 B	mg/L	3	≤3	0.52
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	123
14.	Chlorine	APHA-4500 CL	mg/L		0.5-1.5	0.08
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	0.67
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	0.06
23.	Zinc (Zn)	APHA- 3500 Zn B	mg/L	3	5	1.1
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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Surface Water Monitoring Results (First Quarter, 2023)

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SURFACE WATER ANALYSIS REPORT

Reference Number	BHPP/ENV/49-2023	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Sampling Location:**	Dam Site (Paras Valley)
Sampling Date:	05-04-2023	**Reporting Date:**	12-04-2023
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	7
2)	pH	APHA-4500H+ B	--	6-9	8.1
3)	Chemical Oxygen Demand (COD)	APHA-5220-D	mg/l	150	97
4)	Biological Oxygen Demand (BOD5) at 20 °C	APHA, 5210	mg/l	80	64.9
5)	Total Dissolved Solids (TDS)	APHA-2540 C	mg/l	3500	2563
6)	Total Suspended Solids (TSS)	APHA-2540 D	mg/l	200	124
7)	Total Hardness	APHA-2340 C	mg/l	--	159
8)	Oil & Grease	Separation Method	mg/l	10	2.4
9)	Chromium (Hexa & Trivalent)	APHA-3500Cr B	mg/l	1.0	0.59
10)	Total Iron	APHA-3500-Fe-B	mg/l	8.0	4.1
11)	Chloride	APHA-4500Cl- B	mg/l	1000	261
12)	Flouride	APHA-4500F- C	mg/l	10	3.02
13)	Ammonia	ASTM-D1426-15	mg/l	40	5.2
14)	Cadmium	APHA-3500 Cd-B	mg/l	0.1	0.009
15)	Lead	APHA-3500-Pb B	mg/l	0.5	0.04
16)	Arsenic	APHA-3500As B	mg/l	1.0	N D
17)	Copper	APHA-3500Cu B	mg/l	1.0	0.21
18)	Barium	APHA-3500Ba B	mg/l	1.5	0.09
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	0.64
23)	Nickel	ASTM E3047-16	mg/l	1.0	0.12
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	0.32
27)	Sulphate (SO_4)	APHA-4500-SO_4 C	mg/l	600	425
28)	An Ionic Detergent (as MBAS)	-----	mg/l	20	1.03
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
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/49-2023	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Sampling Location:**	Tailrace Upstream (Barkot)
Sampling Date:	05-04-2023	**Reporting Date:**	12-04-2023
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	7
2)	pH	APHA-4500H+ B	--	6-9	7.7
3)	Chemical Oxygen Demand (COD)	APHA-5220-D	mg/l	150	91.8
4)	Biological Oxygen Demand (BOD5) at 20 °C	APHA, 5210	mg/l	80	59.3
5)	Total Dissolved Solids (TDS)	APHA-2540 C	mg/l	3500	2281
6)	Total Suspended Solids (TSS)	APHA-2540 D	mg/l	200	93
7)	Total Hardness	APHA-2340 C	mg/l	--	143
8)	Oil & Grease	Separation Method	mg/l	10	2.07
9)	Chromium (Hexa & Trivalent)	APHA-3500Cr B	mg/l	1.0	0.51
10)	Total Iron	APHA-3500-Fe-B	mg/l	8.0	3.04
11)	Chloride	APHA-4500Cl- B	mg/l	1000	238
12)	Flouride	APHA-4500F- C	mg/l	10	1.75
13)	Ammonia	ASTM-D1426-15	mg/l	40	3.6
14)	Cadmium	APHA-3500 Cd-B	mg/l	0.1	N.D
15)	Lead	APHA-3500-Pb B	mg/l	0.5	0.007
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	0.02
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	0.42
23)	Nickel	ASTM E3047-16	mg/l	1.0	0.08
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	349
28)	An Ionic Detergent (as MBAS)	----	mg/l	20	0.7
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/49-2023	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Sampling Location:**	Colony Area (Sanghar)
Sampling Date:	05-04-2023	**Reporting Date:**	12-04-2023
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	7
2)	pH	APHA-4500H+ B	--	6-9	8.2
3)	Chemical Oxygen Demand (COD)	APHA-5220-D	mg/l	150	74.2
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	1857
6)	Total Suspended Solids (TSS)	APHA-2540 D	mg/l	200	126.4
7)	Total Hardness	APHA-2340 C	mg/l	--	151
8)	Oil & Grease	Separation Method	mg/l	10	1.28
9)	Chromium (Hexa & Trivalent)	APHA-3500Cr B	mg/l	1.0	0.46
10)	Total Iron	APHA-3500-Fe-B	mg/l	8.0	2.58
11)	Chloride	APHA-4500Cl- B	mg/l	1000	216
12)	Flouride	APHA-4500F- C	mg/l	10	1.19
13)	Ammonia	ASTM-D1426-15	mg/l	40	3.2
14)	Cadmium	APHA-3500 Cd-B	mg/l	0.1	N.D
15)	Lead	APHA-3500-Pb B	mg/l	0.5	0.009
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	0.24
22)	Zinc	APHA-3500-Zn B	mg/l	5.0	0.29
23)	Nickel	ASTM E3047-16	mg/l	1.0	0.05
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	0.24
27)	Sulphate (SO_4)	APHA-4500-SO_4 C	mg/l	600	342
28)	An Ionic Detergent (as MBAS)	----	mg/l	20	0.6
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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Soil Analysis Results (First Quarter, 2023)

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SOIL ANALYSIS REPORT

Reference Number	BHPP/ENV/49-2023	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Sampling Location :**	Adit-1 (Thobi)
Monitoring Date:	05-04-2023	**Reporting Date:**	12-04-2023
Source:	Soil Sample		

Sr. No.	Parameters		Results
1	Soil Texture	Sand %	13
		Silt%	54
		Clay %	33
		Texture Class	Silty Clay Loam
2	pH		8.1
3	Electrical Conductivity EC (μSm^{-1})		238
4	Phosphorus ($mgkg^{-1}$)		2.01
5	Sodium Absorption Ratio		4.07

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/49-2023	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Sampling Location :**	Adit-2 (Ghanol)
Monitoring Date:	05-04-2023	**Reporting Date:**	12-04-2023
Source:	Soil Sample		

Sr. No.	Parameters		Results
1	Soil Texture	Sand %	10
		Silt%	53
		Clay %	37
		Texture Class	Silty Clay Loam
2	pH		8.1
3	Electrical Conductivity EC (μSm^{-1})		238
4	Phosphorus ($mgkg^{-1}$)		2.01
5	Sodium Absorption Ratio		4.07

μSm^{-1}: micro siemens/meter

$mgkg^{-1}$: milligram per Kilogram

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SOIL ANALYSIS REPORT

Reference Number	BHPP/ENV/49-2023	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Sampling Location :**	Adit-3 (Kholian)
Monitoring Date:	05-04-2023	**Reporting Date:**	12-04-2023
Source:	Soil Sample		

Sr. No.	Parameters		Results
1	Soil Texture	Sand %	21
		Silt%	56
		Clay %	23
		Texture Class	Silty Clay Loam
2	pH		8.0
3	Electrical Conductivity EC (μSm^{-1})		231
4	Phosphorus ($mgkg^{-1}$)		3.2
5	Sodium Absorption Ratio		3.54

μSm^{-1}: micro siemens/meter

$mgkg^{-1}$: milligram per Kilogram

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SOIL ANALYSIS REPORT

Reference Number	BHPP/ENV/49-2023	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Sampling Location :**	Powerhouse (Barkot)
Monitoring Date:	05-04-2023	**Reporting Date:**	12-04-2023
Source:	Soil Sample		

Sr. No.	Parameters		Results
1	Soil Texture	Sand %	14
		Silt%	59
		Clay %	27
		Texture Class	Silty Clay Loam
2	pH		8.1
3	Electrical Conductivity EC (μSm^{-1})		229
4	Phosphorus ($mgkg^{-1}$)		2.9
5	Sodium Absorption Ratio		3.37

μSm^{-1}: micro siemens/meter

$mgkg^{-1}$: milligram per Kilogram

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SOIL ANALYSIS REPORT

Reference Number	BHPP/ENV/49-2023	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Sampling Location :**	GRC Camp Office (Sanghar)
Monitoring Date:	05-04-2023	**Reporting Date:**	12-04-2023
Source:	Soil Sample		

Sr. No.	Parameters		Results
1	Soil Texture	Sand %	15
		Silt%	46
		Clay %	39
		Texture Class	Silty Clay Loam
2	pH		8.0
3	Electrical Conductivity EC (μSm^{-1})		231
4	Phosphorus ($mgkg^{-1}$)		3.2
5	Sodium Absorption Ratio		3.54

μSm^{-1}: Micro siemens/meter

$mgkg^{-1}$: milligram per Kilogram

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Ambient Air Monitoring Results (Second Quarter, 2023)-Particulate Matters

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AMBIENT PARTICULATE MATTERS MONITORING REPORT

Reference Number	BHPP/ENV/49-2023	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Monitoring Location:**	Dam Site (Paras Valley)
Monitoring Date:	13-06-2023	**Reporting Date:**	26-06-2023
Source: **GPS Coordinates:**	Ambient Air 34.660470, 73.455497	**Monitoring Instrument:**	AQMS 65, Serial # 1310

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	15.68	42.34		
2.	10:00 A.M	14.93	43.21		
3.	11:00 A.M	13.01	41.66		
4.	12:00 P.M	12.26	44.95		
5.	01:00 P.M	12.29	43.4		
6.	02:00 P.M	12.65	42.69		
7.	03:00 P.M	12.59	40.16		
8.	04:00 P.M	12.19	38.94		
9.	05:00 P.M	11.09	35.72		
10.	06:00 P.M	9.86	34.2		
11.	07:00 P.M	9.09	32.47		
12.	08:00 P.M	9.49	33.95		
13.	09:00 P M	9.99	31.23	10.86 ($\mu g/m^3$)	34.28 ($\mu g/m^3$)
14.	10:00 P M	10.36	30.5		
15.	11:00 P M	8.1	29.98		
16.	12:00 A M	9.98	27.25		
17.	01:00 A M	9.12	26.72		
18.	02:00 A M	10.69	28.01		
19.	03:00 A M	9.99	28.44		
20.	04:00 A M	9.57	26.75		
21.	05:00 A M	9.16	27.6		
22.	06:00 A M	8.29	29.88		
23.	07:00 A M	9.97	30.79		
24.	08:00 A M	10.49	31.92		
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/51-2023	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Monitoring Location:**	Adit-1 (Thobi)
Monitoring Date:	18-06-2023	**Reporting Date:**	26-06-2023
Source: **GPS Coordinates:**	Ambient Air 34.636125, 73.428597	**Monitoring Instrument:**	AQMS 65, Serial # 1310

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	25.53	75.43	19.26 ($\mu g/m^3$)	67.49 ($\mu g/m^3$)
2.	10:00 A.M	23.26	76.3		
3.	11:00 A.M	21.34	74.75		
4.	12:00 P.M	20.59	78.04		
5.	01:00 P.M	20.62	76.49		
6.	02:00 P.M	20.98	75.78		
7.	03:00 P.M	20.92	73.25		
8.	04:00 P.M	20.52	72.03		
9.	05:00 P.M	19.42	68.81		
10.	06:00 P.M	18.19	67.29		
11.	07:00 P.M	17.42	65.56		
12.	08:00 P.M	17.82	67.04		
13.	09:00 P M	18.32	64.32		
14.	10:00 P M	18.69	63.59		
15.	11:00 P M	16.43	63.07		
16.	12:00 A M	18.31	60.34		
17.	01:00 A M	17.45	59.81		
18.	02:00 A M	19.02	61.1		
19.	03:00 A M	18.32	61.53		
20.	04:00 A M	17.9	59.84		
21.	05:00 A M	17.49	60.69		
22.	06:00 A M	16.62	62.97		
23.	07:00 A M	18.3	63.88		
24.	08:00 A M	18.82	67.87		
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/49-2023	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Monitoring Location:**	Adit-2 (Ghanool)
Monitoring Date:	14-06-2023	**Reporting Date:**	26-06-2023
Source:	Ambient Air	**Monitoring Instrument:**	AQMS 65, Serial # 1310
GPS Coordinates:	34.619787, 73.417525		

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	24.28	65.42	21.85 ($\mu g/m^3$)	57.42 ($\mu g/m^3$)
2.	10:00 A.M	26.01	66.29		
3.	11:00 A.M	25.09	64.74		
4.	12:00 P.M	23.34	68.03		
5.	01:00 P.M	23.37	66.48		
6.	02:00 P.M	23.73	65.77		
7.	03:00 P.M	23.67	63.24		
8.	04:00 P.M	23.27	62.02		
9.	05:00 P.M	22.17	58.8		
10.	06:00 P.M	20.94	57.28		
11.	07:00 P.M	20.17	55.55		
12.	08:00 P.M	20.57	57.03		
13.	09:00 P M	21.07	54.31		
14.	10:00 P M	21.44	53.58		
15.	11:00 P M	19.18	53.06		
16.	12:00 A M	21.06	50.33		
17.	01:00 A M	20.2	49.8		
18.	02:00 A M	21.77	51.09		
19.	03:00 A M	21.07	51.52		
20.	04:00 A M	20.65	49.83		
21.	05:00 A M	20.24	50.68		
22.	06:00 A M	19.37	52.96		
23.	07:00 A M	21.05	53.87		
24.	08:00 A M	20.86	56.42		
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/49-2023	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Monitoring Location:**	Adit-3 (Kholian)
Monitoring Date:	15-06-2023	**Reporting Date:**	26-06-2023
Source: **GPS Coordinates:**	Ambient Air 34.610253,73.389367	**Monitoring Instrument:**	AQMS 65, Serial # 1310

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	29.26	82.01		
2.	10:00 A.M	29.93	82.24		
3.	11:00 A.M	28.17	82.67		
4.	12:00 P.M	27.42	82.21		
5.	01:00 P.M	27.45	80.85		
6.	02:00 P.M	27.81	79.98		
7.	03:00 P.M	27.75	81.9		
8.	04:00 P.M	27.35	80.68		
9.	05:00 P.M	26.25	77.46		
10.	06:00 P.M	25.02	75.94		
11.	07:00 P.M	24.25	74.21		
12.	08:00 P.M	24.65	75.69		
13.	09:00 P.M	25.15	72.97	25.95 ($\mu g/m^3$)	75.36 ($\mu g/m^3$)
14.	10:00 P.M	25.52	72.24		
15.	11:00 P.M	23.26	71.72		
16.	12:00 A.M	25.14	68.99		
17.	01:00 A.M	24.28	68.46		
18.	02:00 A.M	25.85	69.75		
19.	03:00 A.M	25.15	70.18		
20.	04:00 A.M	24.73	68.49		
21.	05:00 A.M	24.32	69.34		
22.	06:00 A.M	23.45	71.62		
23.	07:00 A.M	25.13	72.53		
24.	08:00 A.M	25.65	76.52		
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/49-2023	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Monitoring Location:**	Powerhouse (Barkot)
Monitoring Date:	16-06-2023	**Reporting Date:**	26-06-2023
Source: **GPS Coordinates:**	Ambient Air 34.601812, 73.377145	**Monitoring Instrument:**	AQMS 65, Serial # 1310

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	11.66	41.58		
2.	10:00 A.M	12.39	42.31		
3.	11:00 A.M	12.47	40.76		
4.	12:00 P.M	11.72	42.3		
5.	01:00 P.M	11.38	41.28		
6.	02:00 P.M	11.61	38.83		
7.	03:00 P.M	11.06	40.19		
8.	04:00 P.M	11.65	40.98		
9.	05:00 P.M	10.55	40.25		
10.	06:00 P.M	10.74	39.34		
11.	07:00 P.M	10.81	38.57		
12.	08:00 P.M	10.97	39.05		
13.	09:00 P M	11.26	37.33	11.23 ($\mu g/m^3$)	37.83 ($\mu g/m^3$)
14.	10:00 P M	11.29	36.6		
15.	11:00 P M	11.81	36.08		
16.	12:00 A M	10.92	33.35		
17.	01:00 A M	10.87	32.82		
18.	02:00 A M	11.34	34.11		
19.	03:00 A M	10.65	34.54		
20.	04:00 A M	10.33	32.85		
21.	05:00 A M	10.71	33.7		
22.	06:00 A M	11.6	35.98		
23.	07:00 A M	10.92	36.89		
24.	08:00 A M	11.03	38.29		
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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AMBIENT PARTICULATE MATTERS MONITORING REPORT

Reference Number	BHPP/ENV/49-2023	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Monitoring Location:**	Tailrace Upstream (Barkot)
Monitoring Date:	17-06-2023	**Reporting Date:**	26-06-2023
Source:	Ambient Air	**Monitoring Instrument:**	AQMS 65, Serial # 1310
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	14.53	51.46		
2.	10:00 A.M	15.26	52.33		
3.	11:00 A.M	13.34	50.78		
4.	12:00 P.M	12.59	54.07		
5.	01:00 P.M	12.62	52.52		
6.	02:00 P.M	12.98	51.81		
7.	03:00 P.M	12.92	49.28		
8.	04:00 P.M	12.52	48.06		
9.	05:00 P.M	11.42	44.84		
10.	06:00 P.M	10.19	43.32		
11.	07:00 P.M	9.42	41.59		
12.	08:00 P.M	9.82	43.07		
13.	09:00 P M	10.32	40.35	11.13 ($\mu g/m^3$)	43.52 ($\mu g/m^3$)
14.	10:00 P M	10.69	39.62		
15.	11:00 P M	8.43	39.1		
16.	12:00 A M	10.31	36.37		
17.	01:00 A M	9.45	35.84		
18.	02:00 A M	11.02	37.13		
19.	03:00 A M	10.32	37.56		
20.	04:00 A M	9.9	35.87		
21.	05:00 A M	9.49	36.72		
22.	06:00 A M	8.62	39		
23.	07:00 A M	10.3	39.91		
24.	08:00 A M	10.82	43.9		
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.

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Signature of Analyst: *Signature of Chief Chemist*

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AMBIENT PARTICULATE MATTERS MONITORING REPORT

Reference Number	BHPP/ENV/51-2023	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Monitoring Location:**	GRC Camp Office (Sanghar)
Monitoring Date:	19-06-2023	**Reporting Date:**	26-06-2023
Source:	Ambient Air	**Monitoring Instrument:**	AQMS 65, Serial # 1310
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	18.73	57.66		
2.	10:00 A.M	16.46	58.53		
3.	11:00 A.M	14.54	56.98		
4.	12:00 P.M	13.79	60.27		
5.	01:00 P.M	13.82	58.72		
6.	02:00 P.M	14.18	58.01		
7.	03:00 P.M	14.12	55.48		
8.	04:00 P.M	13.72	54.26		
9.	05:00 P.M	12.62	51.04		
10.	06:00 P.M	11.39	49.52		
11.	07:00 P.M	10.62	47.79		
12.	08:00 P.M	11.02	49.27	12.46 ($\mu g/m^3$)	49.72 ($\mu g/m^3$)
13.	09:00 P M	11.52	46.55		
14.	10:00 P M	11.89	45.82		
15.	11:00 P M	9.63	45.3		
16.	12:00 A M	11.51	42.57		
17.	01:00 A M	10.65	42.04		
18.	02:00 A M	12.22	43.33		
19.	03:00 A M	11.52	43.76		
20.	04:00 A M	11.1	42.07		
21.	05:00 A M	10.69	42.92		
22.	06:00 A M	9.82	45.2		
23.	07:00 A M	11.5	46.11		
24.	08:00 A M	12.02	50.1		
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.
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Signature of Analyst: ***Signature of Chief Chemist***

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AMBIENT PARTICULATE MATTERS MONITORING REPORT

Reference Number	BHPP/ENV/51-2023	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Monitoring Location:**	Colony Area (Sanghar)
Monitoring Date:	20-06-2023	**Reporting Date:**	26-06-2023
Source:	Ambient Air	**Monitoring Instrument:**	AQMS 65, Serial # 1310
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	36.48	96.53		
2.	10:00 A.M	34.21	97.4		
3.	11:00 A.M	32.29	95.85		
4.	12:00 P.M	31.54	99.14		
5.	01:00 P.M	31.57	97.59		
6.	02:00 P.M	31.93	96.88		
7.	03:00 P.M	31.87	94.35		
8.	04:00 P.M	31.47	93.13		
9.	05:00 P.M	30.37	89.91		
10.	06:00 P.M	29.14	88.39		
11.	07:00 P.M	28.37	86.66		
12.	08:00 P.M	28.77	88.14		
13.	09:00 P M	29.27	85.42	30.21 ($\mu g/m^3$)	88.59 ($\mu g/m^3$)
14.	10:00 P M	29.64	84.69		
15.	11:00 P M	27.38	84.17		
15.	12:00 A M	29.26	81.44		
17.	01:00 A M	28.4	80.91		
18.	02:00 A M	29.97	82.2		
19.	03:00 A M	29.27	82.63		
20.	04:00 A M	28.85	80.94		
21.	05:00 A M	28.44	81.79		
22.	06:00 A M	27.57	84.07		
23.	07:00 A M	29.25	84.98		
24.	08:00 A M	29.77	88.97		
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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Ambient Gaseous Monitoring Results (Second Quarter, 2023)

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AMBIENT GASES MONITORING REPORT

Reference Number	BHPP/ENV/49-2023	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Monitoring Location:**	Dam Site (Paras Valley)
Monitoring Date:	13-06-2023	**Reporting Date:**	26-06-2023
Source:	Ambient Air Gases	**Monitoring Instrument:**	AQMS 05, Serial # 1310
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	0.38	8.47	10.96	9.29
2.	10:00 A.M	0.43	9.32	11.14	9.16
3.	11:00 A.M	0.35	9.39	11.41	8.43
4.	12:00 P.M	0.46	10.14	10.32	8.56
5.	01:00 P.M	0.49	9.54	10.19	8.71
6.	02:00 P.M	0.38	9.72	10.3	7.79
7.	03:00 P.M	0.36	10.26	10.66	8.41
8.	04:00 P.M	0.31	9.4	10.81	9.6
9.	05:00 P.M	0.27	8.56	10.33	7.43
10.	06:00 P.M	0.33	8.33	10.45	7.92
11.	07:00 P.M	0.19	9.11	11.03	9.35
12.	08:00 P.M	0.25	9.44	10.14	9.02
13.	09:00 P M	0.21	10.25	10.57	8.59
14.	10:00 P M	0.26	8.53	10.42	8.25
15.	11:00 P M	0.19	8.1	11.25	9.1
16.	12:00 A M	0.31	9.28	10.5	9.38
17.	01:00 A M	0.28	9.35	10.04	8.31
18.	02:00 A M	0.15	8.6	10.2	8.12
19.	03:00 A M	0.27	10.39	10.08	7.9
20.	04:00 A M	0.28	9.6	9.71	8.21
21.	05:00 A M	0.33	9.36	9.14	8.58
22.	06:00 A M	0.31	8.89	10	8.74
23.	07:00 A M	0.33	9.64	10.29	9.03
24.	08:00 A M	0.36	8.88	10.39	8.9
Average Concentration		**0.31**	**9.27**	**10.43**	**8.61**
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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AMBIENT GASES MONITORING REPORT

Reference Number	BHPP/ENV/51-2023	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Monitoring Location:**	Adit-1 (Thobi)
Monitoring Date:	18-06-2023	**Reporting Date:**	26-06-2023
Source: **GPS Coordinates:**	Ambient Air Gases 34.636125, 73.428597	**Monitoring Instrument:**	AQMS 65, Serial # 1310

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	0.43	7.81	9.36	8.01
2.	10:00 A.M	0.41	8.66	9.54	7.88
3.	11:00 A.M	0.33	8.73	9.81	7.15
4.	12:00 P.M	0.44	9.48	8.72	7.28
5.	01:00 P.M	0.47	8.88	8.59	7.43
6.	02:00 P.M	0.36	9.06	8.7	6.51
7.	03:00 P.M	0.34	9.6	9.06	7.13
8.	04:00 P.M	0.29	8.74	9.21	8.32
9.	05:00 P.M	0.25	7.9	8.73	6.15
10.	06:00 P.M	0.31	7.67	8.85	6.64
11.	07:00 P.M	0.29	8.45	9.43	8.07
12.	08:00 P.M	0.27	8.78	8.54	7.74
13.	09:00 P M	0.28	9.59	8.97	7.31
14.	10:00 P M	0.26	7.87	8.82	6.97
15.	11:00 P M	0.27	7.44	9.65	7.82
16.	12:00 A M	0.29	8.62	8.9	8.1
17.	01:00 A M	0.26	8.69	8.44	7.03
18.	02:00 A M	0.25	7.94	8.6	6.84
19.	03:00 A M	0.25	9.73	8.48	6.62
20.	04:00 A M	0.26	8.94	8.11	6.93
21.	05:00 A M	0.31	8.7	7.54	7.3
22.	06:00 A M	0.29	8.23	8.4	7.46
23.	07:00 A M	0.31	8.98	8.69	7.75
24.	08:00 A M	0.34	8.22	8.79	7.62
Average Concentration		**0.31**	**8.61**	**8.83**	**7.33**
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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AMBIENT GASES MONITORING REPORT

Reference Number	BHPP/ENV/49-2023	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Monitoring Location:**	Adit-2 (Ghanool)
Monitoring Date:	14-06-2023	**Reporting Date:**	26-06-2023
Source: **GPS Coordinates:**	Ambient Air Gases 34.619787, 73.417525	**Monitoring Instrument:**	AQMS 65, Serial # 1310

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	0.43	11.97	13.71	12.95
2.	10:00 A.M	0.45	11.52	13.89	12.82
3.	11:00 A.M	0.47	11.59	14.16	12.09
4.	12:00 P.M	0.44	12.34	13.07	12.22
5.	01:00 P.M	0.42	11.74	12.94	12.37
6.	02:00 P.M	0.41	11.92	13.05	11.45
7.	03:00 P.M	0.39	12.46	13.41	12.07
8.	04:00 P.M	0.34	11.6	13.56	13.26
9.	05:00 P.M	0.3	10.76	13.08	11.09
10.	06:00 P.M	0.36	10.53	13.2	11.58
11.	07:00 P.M	0.32	11.31	13.78	13.01
12.	08:00 P.M	0.34	11.64	12.89	12.68
13.	09:00 P M	0.31	12.45	13.32	12.25
14.	10:00 P M	0.33	10.73	13.17	11.91
15.	11:00 P M	0.32	10.3	14	12.76
16.	12:00 A M	0.34	11.48	13.25	13.04
17.	01:00 A M	0.31	11.55	12.79	11.97
18.	02:00 A M	0.29	10.8	12.95	11.78
19.	03:00 A M	0.3	12.59	12.83	11.56
20.	04:00 A M	0.31	11.8	12.46	11.87
21.	05:00 A M	0.34	11.56	11.89	12.24
22.	06:00 A M	0.37	11.09	12.29	12.4
23.	07:00 A M	0.33	11.84	12.61	12.69
24.	08:00 A M	0.29	11.08	13.14	12.56
Average Concentration		**0.35**	**11.52**	**13.14**	**12.27**
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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AMBIENT GASES MONITORING REPORT

Reference Number	BHPP/ENV/49-2023	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Monitoring Location:**	Adit-3 (Kholian)
Monitoring Date:	15-06-2023	**Reporting Date:**	26-06-2023
Source:	Ambient Air Gases	**Monitoring Instrument:**	AQMS 65, Serial # 1310
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	0.55	14.27	18.42	15.65
2.	10:00 A.M	0.6	15.12	18.6	15.52
3.	11:00 A.M	0.52	15.19	18.87	14.79
4.	12:00 P.M	0.63	15.94	17.78	14.92
5.	01:00 P.M	0.66	15.34	17.65	15.07
6.	02:00 P.M	0.55	15.52	17.76	14.15
7.	03:00 P.M	0.53	16.06	18.12	14.77
8.	04:00 P.M	0.48	15.2	18.27	15.96
9.	05:00 P.M	0.44	14.36	17.79	13.79
10.	06:00 P.M	0.5	14.13	17.91	14.28
11.	07:00 P.M	0.48	14.01	18.49	15.71
12.	08:00 P.M	0.46	15.24	17.6	15.38
13.	09:00 P M	0.47	16.05	18.03	14.95
14.	10:00 P M	0.45	14.33	17.88	14.61
15.	11:00 P M	0.46	13.9	18.71	15.46
16.	12:00 A M	0.48	15.08	17.96	15.74
17.	01:00 A M	0.45	15.15	17.5	14.67
18.	02:00 A M	0.44	14.4	17.66	14.48
19.	03:00 A M	0.44	16.19	17.54	14.26
20.	04:00 A M	0.45	15.4	17.17	14.57
21.	05:00 A M	0.5	15.16	16.6	14.94
22.	06:00 A M	0.48	14.69	17.46	15.1
23.	07:00 A M	0.5	15.44	17.75	15.39
24.	08:00 A M	0.53	14.68	17.85	15.26
Average Concentration		**0.50**	**15.07**	**17.89**	**14.97**
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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AMBIENT GASES MONITORING REPORT

Reference Number	BHPP/ENV/49-2023	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Monitoring Location:**	Powerhouse (Barkot)
Monitoring Date:	16-06-2023	**Reporting Date:**	26-06-2023
Source: **GPS Coordinates:**	Ambient Air Gases 34.601812, 73.377145	**Monitoring Instrument:**	AQMS 65, Serial # 1310

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	6.26	8.04	7.31
2.	10:00 A.M	0.32	7.11	8.22	7.18
3.	11:00 A.M	0.24	7.18	8.49	6.45
4.	12:00 P.M	0.35	7.93	7.4	6.58
5.	01:00 P.M	0.38	7.33	7.27	6.73
6.	02:00 P.M	0.27	7.51	7.38	5.81
7.	03:00 P.M	0.25	8.05	7.74	6.43
8.	04:00 P.M	0.2	7.19	7.89	7.62
9.	05:00 P.M	0.24	6.35	7.41	5.45
10.	06:00 P.M	0.22	6.12	7.53	5.94
11.	07:00 P.M	0.28	6.9	8.11	7.37
12.	08:00 P.M	0.25	7.23	7.22	7.04
13.	09:00 P M	0.21	8.04	7.65	6.61
14.	10:00 P M	0.24	6.32	7.5	6.27
15.	11:00 P M	0.18	5.89	8.33	7.12
16.	12:00 A M	0.2	7.07	7.58	7.4
17.	01:00 A M	0.17	7.14	7.12	6.33
18.	02:00 A M	0.19	6.39	7.28	6.14
19.	03:00 A M	0.16	8.18	7.16	5.92
20.	04:00 A M	0.17	7.39	6.79	6.23
21.	05:00 A M	0.22	7.15	6.22	6.6
22.	06:00 A M	0.2	6.68	7.08	6.76
23.	07:00 A M	0.22	7.43	7.37	7.05
24.	08:00 A M	0.25	6.67	7.47	6.92
Average Concentration		**0.23**	**7.06**	**7.51**	**6.63**
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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AMBIENT GASES MONITORING REPORT

Reference Number	BHPP/ENV/49-2023	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Monitoring Location:**	Tailrace Upstream (Barkot)
Monitoring Date:	17-06-2023	**Reporting Date:**	26-06-2023
Source: **GPS Coordinates:**	Ambient Air Gases 34.596088, 73.374512	**Monitoring Instrument:**	AQMS 65, Serial # 1310

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	0.3	6.15	8.05	9.14
2.	10:00 A.M	0.29	6.71	8.41	8.75
3.	11:00 A.M	0.31	7.11	9.06	8.1
4.	12:00 P.M	0.29	6.42	9.41	9.06
5.	01:00 P.M	0.28	7.9	9.89	7.12
6.	02:00 P.M	0.3	7.68	10.06	8.5
7.	03:00 P.M	0.32	7.44	8.86	6.9
8.	04:00 P.M	0.33	7.39	9.1	7.75
9.	05:00 P.M	0.29	6.91	6.39	7.8
10.	06:00 P.M	0.3	6.22	6.74	7.75
11.	07:00 P.M	0.31	6.03	7.41	7.83
12.	08:00 P.M	0.32	6.71	7.17	7.53
13.	09:00 P M	0.29	5.72	6.16	8.19
14.	10:00 P M	0.28	5.59	6.14	7.79
15.	11:00 P M	0.3	5.91	6.39	7.51
16.	12:00 A M	0.31	5.69	6.65	7.1
17.	01:00 A M	0.32	5.95	6.42	7.5
18.	02:00 A M	0.29	7.03	6.17	7.75
19.	03:00 A M	0.28	6.91	6.46	6.9
20.	04:00 A M	0.27	6.81	5.97	7.23
21.	05:00 A M	0.28	7.25	6.17	6.53
22.	06:00 A M	0.26	6.02	6.03	6.69
23.	07:00 A M	0.27	6.44	5.71	6.9
24.	08:00 A M	0.28	4.91	6.07	7.29
Average Concentration		**0.29**	**6.53**	**7.28**	**7.65**
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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AMBIENT GASES MONITORING REPORT

Reference Number	BHPP/ENV/51-2023	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Monitoring Location:**	GRC Camp Office (Sanghar)
Monitoring Date:	19-06-2023	**Reporting Date:**	26-06-2023
Source: **GPS Coordinates:**	Ambient Air Gases 34.584562, 73.373878	**Monitoring Instrument:**	AQMS 65, Serial # 1310

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	0.36	5.68	7.15	6.71
2.	10:00 A.M	0.38	6.24	7.51	6.18
3.	11:00 A.M	0.4	6.64	8.16	5.53
4.	12:00 P.M	0.35	5.95	8.51	6.49
5.	01:00 P.M	0.37	7.43	8.99	4.55
6.	02:00 P.M	0.36	7.21	9.16	5.93
7.	03:00 P.M	0.38	6.97	7.96	4.33
8.	04:00 P.M	0.39	6.92	8.2	5.18
9.	05:00 P.M	0.35	6.44	5.49	5.23
10.	06:00 P.M	0.36	5.75	5.84	5.18
11.	07:00 P.M	0.37	5.56	6.51	5.26
12.	08:00 P.M	0.38	6.24	6.27	4.96
13.	09:00 P M	0.35	5.25	5.26	5.62
14.	10:00 P M	0.34	5.12	5.24	5.22
15.	11:00 P M	0.36	5.44	5.49	4.94
16.	12:00 A M	0.37	5.22	5.75	4.53
17.	01:00 A M	0.38	5.48	5.52	4.93
18.	02:00 A M	0.35	6.56	5.27	5.18
19.	03:00 A M	0.34	6.44	5.56	4.33
20.	04:00 A M	0.33	6.34	5.07	4.66
21.	05:00 A M	0.34	6.78	5.27	3.96
22.	06:00 A M	0.32	5.55	5.13	4.12
23.	07:00 A M	0.33	5.97	4.81	4.33
24.	08:00 A M	0.34	4.44	5.17	5.07
Average Concentration		**0.35**	**6.06**	**6.38**	**5.10**
NEQSAA		**06**	**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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AMBIENT GASES MONITORING REPORT

Reference Number	BHPP/ENV/51-2023	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Monitoring Location:**	Colony Area (Snaghar)
Monitoring Date:	20-06-2023	**Reporting Date:**	26-06-2023
Source:	Ambient Air Gases	**Monitoring Instrument:**	AQMS 65, Serial # 1310
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	0.63	9.18	12.07	13.75
2.	10:00 A.M	0.68	10.03	12.25	13.62
3.	11:00 A.M	0.6	10.1	12.52	12.89
4.	12:00 P.M	0.71	10.85	11.43	13.02
5.	01:00 P.M	0.74	10.25	11.3	13.17
6.	02:00 P.M	0.63	10.43	11.41	12.25
7.	03:00 P.M	0.61	10.97	11.77	12.87
8.	04:00 P.M	0.56	10.11	11.92	14.06
9.	05:00 P.M	0.52	9.27	11.44	11.89
10.	06:00 P.M	0.58	9.04	11.56	12.38
11.	07:00 P.M	0.31	8.66	10.14	9.3
12.	08:00 P.M	0.29	8.99	9.25	8.97
13.	09:00 P M	0.3	9.8	9.68	8.54
14.	10:00 P M	0.28	8.08	9.53	8.2
15.	11:00 P M	0.29	7.65	10.36	9.05
16.	12:00 A M	0.31	8.83	9.61	9.33
17.	01:00 A M	0.28	8.9	9.15	8.26
18.	02:00 A M	0.27	8.15	9.31	8.07
19.	03:00 A M	0.27	9.94	9.19	7.85
20.	04:00 A M	0.28	9.15	8.82	8.16
21.	05:00 A M	0.33	8.91	8.25	8.53
22.	06:00 A M	0.31	8.44	9.11	8.69
23.	07:00 A M	0.33	9.19	9.4	8.98
24.	08:00 A M	0.36	8.43	9.5	8.85
Average Concentration		**0.43**	**9.30**	**10.37**	**10.44**
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 Noise Level Monitoring Results (Second Quarter, 2023)

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AMBIENT NOISE MONITORING REPORT

Reference Number	BHPP/ENV/49-2023	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Monitoring Location:**	Dam Site (Paras Valley)
Monitoring Date:	13-06-2023	**Reporting Date:**	26-06-2023
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)	59.4	62.7	61.05
2.	10:00 A.M		59.2	62.5	60.85
3.	11:00 A.M		59	62.3	60.65
4.	12:00 P.M		58.8	62.1	60.45
5.	01:00 P.M		58.5	61.8	60.15
6.	02:00 P.M		58.3	61.6	59.95
7.	03:00 P.M		58.1	61.4	59.75
8.	04:00 P.M		57.9	61.2	59.55
9.	05:00 P.M		57.7	61	59.35
10.	06:00 P.M		57.5	60.8	59.15
11.	07:00 P.M		57.2	60.5	58.85
12.	08:00 P.M		57	60.3	58.65
13.	09:00 P M		56.8	60.1	58.45
14.	10:00 P M		56.6	59.9	58.25
15.	11:00 P M		56.4	59.7	58.05
16.	12:00 A M		56.1	59.4	57.75
17.	01:00 A M		55.9	59.2	57.55
18.	02:00 A M		55.7	59	57.35
19.	03:00 A M		58.5	61.8	60.15
20.	04:00 A M		58.3	61.5	59.9
21.	05:00 A M		58	61.3	59.65
22.	06:00 A M		57.8	61.1	59.45
23.	07:00 A M		57.6	60.9	59.25
24.	08:00 A M		59.1	62.5	60.8
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/51-2023	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Monitoring Location:**	Adit-1 (Thobi)
Monitoring Date:	18-06-2023	**Reporting Date:**	26-06-2023
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)	54.3	57.5	55.9
2.	10:00 A.M		54.1	57.2	55.65
3.	11:00 A.M		53.8	57	55.4
4.	12:00 P.M		53.6	56.8	55.2
5.	01:00 P.M		53.4	56.6	55
6.	02:00 P.M		53.2	56.4	54.8
7.	03:00 P.M		53	56.2	54.6
8.	04:00 P.M		52.8	55.9	54.35
9.	05:00 P.M		52.5	55.7	54.1
10.	06:00 P.M		52.3	55.5	53.9
11.	07:00 P.M		52.1	55.3	53.7
12.	08:00 P.M		51.9	55.1	53.5
13.	09:00 P M		51.7	54.9	53.3
14.	10:00 P M		51.5	54.6	53.05
15.	11:00 P M		41.4	44.6	43
16.	12:00 A M		41.1	44.3	42.7
17.	01:00 A M		40.9	44.1	42.5
18.	02:00 A M		40.7	43.9	42.3
19.	03:00 A M		40.5	43.7	42.1
20.	04:00 A M		40.3	43.4	41.85
21.	05:00 A M		40	43.2	41.6
22.	06:00 A M		39.8	43	41.4
23.	07:00 A M		39.6	42.8	41.2
24.	08:00 A M		39.4	42.6	41
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/49-2023	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Monitoring Location:**	Adit-2 (Ghanool)
Monitoring Date:	14-06-2023	**Reporting Date:**	26-06-2023
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)	60.8	64.9	62.85
2.	10:00 A.M		60.6	64.6	62.6
3.	11:00 A.M		60.3	64.4	62.35
4.	12:00 P.M		60.1	64.2	62.15
5.	01:00 P.M		59.9	64	61.95
6.	02:00 P.M		59.7	63.8	61.75
7.	03:00 P.M		59.5	63.6	61.55
8.	04:00 P.M		59.3	63.3	61.3
9.	05:00 P.M		59	63.1	61.05
10.	06:00 P.M		58.8	62.9	60.85
11.	07:00 P.M		58.6	62.7	60.65
12.	08:00 P.M		58.4	62.5	60.45
13.	09:00 P M		58.2	62.3	60.25
14.	10:00 P M		58	62	60
15.	11:00 P M		57.7	61.8	59.75
16.	12:00 A M		57.5	61.6	59.55
17.	01:00 A M		57.3	61.4	59.35
18.	02:00 A M		57.1	61.2	59.15
19.	03:00 A M		56.9	61	58.95
20.	04:00 A M		56.7	60.7	58.7
21.	05:00 A M		56.4	60.5	58.45
22.	06:00 A M		56.2	60.3	58.25
23.	07:00 A M		62.3	66.4	64.35
24.	08:00 A M		64.1	68.7	66.4

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:

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AMBIENT NOISE MONITORING REPORT

Reference Number	BHPP/ENV/49-2023	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Monitoring Location:**	Adit-3 (Kholian)
Monitoring Date:	15-06-2023	**Reporting Date:**	26-06-2023
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)	68.8	72	70.4
2.	10:00 A.M		68.6	71.7	70.15
3.	11:00 A.M		68.3	71.5	69.9
4.	12:00 P.M		68.1	71.3	69.7
5.	01:00 P.M		67.9	71.1	69.5
6.	02:00 P.M		63.2	66.4	64.8
7.	03:00 P.M		63	66.2	64.6
8.	04:00 P.M		62.8	65.9	64.35
9.	05:00 P.M		62.5	65.7	64.1
10.	06:00 P.M		62.3	65.5	63.9
11.	07:00 P.M		62.1	65.3	63.7
12.	08:00 P.M		61.9	65.1	63.5
13.	09:00 P M		61.7	64.9	63.3
14.	10:00 P M		61.5	64.6	63.05
15.	11:00 P M		59.8	63	61.4
16.	12:00 A M		59.5	62.7	61.1
17.	01:00 A M		59.3	62.5	60.9
18.	02:00 A M		59.1	62.3	60.7
19.	03:00 A M		58.9	62.1	60.5
20.	04:00 A M		58.7	61.8	60.25
21.	05:00 A M		58.4	61.6	60
22.	06:00 A M		58.2	61.4	59.8
23.	07:00 A M		60.7	64.6	62.65
24.	08:00 A M		65.1	68.1	66.6

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/49-2023	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Monitoring Location:**	Powerhouse (Barkot)
Monitoring Date:	16-06-2023	**Reporting Date:**	26-06-2023
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)	48.7	52.1	50.4
2.	10:00 A.M		48.5	51.8	50.15
3.	11:00 A.M		48.2	51.6	49.9
4.	12:00 P.M		48	51.4	49.7
5.	01:00 P.M		47.8	51.2	49.5
6.	02:00 P.M		47.6	51	49.3
7.	03:00 P.M		47.4	50.8	49.1
8.	04:00 P.M		47.2	50.5	48.85
9.	05:00 P.M		46.9	50.3	48.6
10.	06:00 P.M		46.7	50.1	48.4
11.	07:00 P.M		46.5	49.9	48.2
12.	08:00 P.M		46.3	49.7	48
13.	09:00 P M		46.1	49.5	47.8
14.	10:00 P M		45.9	49.2	47.55
15.	11:00 P M		45.6	49	47.3
16.	12:00 A M		45.4	48.8	47.1
17.	01:00 A M		45.2	48.6	46.9
18.	02:00 A M		45	48.4	46.7
19.	03:00 A M		44.8	48.2	46.5
20.	04:00 A M		44.6	47.9	46.25
21.	05:00 A M		44.3	47.7	46
22.	06:00 A M		44.1	47.5	45.8
23.	07:00 A M		43.9	47.3	45.6
24.	08:00 A M		43.7	47.1	45.4
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:

- 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/49-2023	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Monitoring Location:**	Tailrace Upstream (Barkot)
Monitoring Date:	17-06-2023	**Reporting Date:**	26-06-2023
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)	54.5	57.8	56.15
2.	10:00 A.M		54.3	57.6	55.95
3.	11:00 A.M		54.1	57.4	55.75
4.	12:00 P.M		53.9	57.2	55.55
5.	01:00 P.M		53.7	56.9	55.3
6.	02:00 P.M		53.4	56.7	55.05
7.	03:00 P.M		53.2	56.5	54.85
8.	04:00 P.M		53	56.3	54.65
9.	05:00 P.M		52.8	56.1	54.45
10.	06:00 P.M		52.6	55.9	54.25
11.	07:00 P.M		52.4	55.6	54
12.	08:00 P.M		52.1	55.4	53.75
13.	09:00 P M		51.9	55.2	53.55
14.	10:00 P M		51.7	55	53.35
15.	11:00 P M		51.5	54.8	53.15
16.	12:00 A M		51.3	54.6	52.95
17.	01:00 A M		51.1	54.4	52.75
18.	02:00 A M		50.9	54.2	52.55
19.	03:00 A M		50.7	54	52.35
20.	04:00 A M		50.5	53.7	52.1
21.	05:00 A M		50.2	53.5	51.85
22.	06:00 A M		50	53.3	51.65
23.	07:00 A M		49.8	53.1	51.45
24.	08:00 A M		49.6	52.9	51.25
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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AMBIENT NOISE MONITORING REPORT

Reference Number	BHPP/ENV/51-2023	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Monitoring Location:**	GRC Camp Office (Sanghar)
Monitoring Date:	19-06-2023	**Reporting Date:**	26-06-2023
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)	59.6	62.5	61.05
2.	10:00 A.M		59.4	62.2	60.8
3.	11:00 A.M		59.1	62	60.55
4.	12:00 P.M		58.9	61.8	60.35
5.	01:00 P.M		58.7	61.6	60.15
6.	02:00 P.M		58.5	61.4	59.95
7.	03:00 P.M		58.3	61.2	59.75
8.	04:00 P.M		58.1	60.9	59.5
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		44.7	47.6	46.15

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:

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

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AMBIENT NOISE MONITORING REPORT

Reference Number	BHPP/ENV/51-2023	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Monitoring Location:**	Colony Area (Sanghar)
Monitoring Date:	20-06-2023	**Reporting Date:**	26-06-2023
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)	63.5	66.4	64.95
2.	10:00 A.M		63.3	66.1	64.7
3.	11:00 A.M		63	65.9	64.45
4.	12:00 P.M		62.8	65.7	64.25
5.	01:00 P.M		62.6	65.5	64.05
6.	02:00 P.M		62.4	65.3	63.85
7.	03:00 P.M		62.2	65.1	63.65
8.	04:00 P.M		62	64.8	63.4
9.	05:00 P.M		61.7	64.6	63.15
10.	06:00 P.M		61.5	64.4	62.95
11.	07:00 P.M		61.3	64.2	62.75
12.	08:00 P.M		61.1	64	62.55
13.	09:00 P M		60.9	63.8	62.35
14.	10:00 P M		60.7	63.5	62.1
15.	11:00 P M		50.6	53.5	52.05
16.	12:00 A M		50.3	53.2	51.75
17.	01:00 A M		50.1	53	51.55
18.	02:00 A M		49.9	52.8	51.35
19.	03:00 A M		49.7	52.6	51.15
20.	04:00 A M		49.5	52.3	50.9
21.	05:00 A M		49.2	52.1	50.65
22.	06:00 A M		49	51.9	50.45
23.	07:00 A M		48.8	51.7	50.25
24.	08:00 A M		48.6	51.5	50.05

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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Signature of Analyst:

Signature of Chief Chemist

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Drinking Water Monitoring Results (Second Quarter, 2023)

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DRINKING WATER ANALYSIS REPORT

Reference Number	BHPP/ENV/49-2023	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Sampling Location:**	Dam Site (Paras Valley)
Sampling Date:	20-06-2023	**Reporting Date:**	26-06-2023
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	7.5
2.	Temperature	---	°C	---	----	14
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
6.	Total Dissolved Solids (TDS)	APHA-2540 C	mg/L	< 1000	<1000	328
7.	Total Hardness as $CaCO_3$	APHA-2340 C	mg/L	-------	<500	264
8.	Nitrate (NO_3)	APHA-4500NO3 B	mg/L	50	≤50	1
9.	Nitrite (NO_2)	APHA-4500NO2 B	mg/L	3	≤3	0.004
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
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	0.002
16.	Fluoride	APHA-4500F- C	mg/L	1.5	≤1.5	0.56
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	0.052
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	0.02
23.	Zinc (Zn)	APHA- 3500 Zn B	mg/L	3	5	1.07
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/51-2023	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Sampling Location:**	Adit-1 (Thobi)
Sampling Date:	20-06-2023	**Reporting Date:**	20-06-2023
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	7.54
2.	Temperature	---	°C	---	-----	8
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	4.2
6.	Total Dissolved Solids (TDS)	APHA-2540 C	mg/L	< 1000	<1000	390
7.	Total Hardness as $CaCO_3$	APHA-2340 C	mg/L	--------	<500	245
8.	Nitrate (NO_3)	APHA-4500NO3 B	mg/l	50	≤50	2.3
9.	Nitrite (NO_2)	APHA-4500NO2 B	mg/L	3	≤3	0.007
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	0.0012
12.	Antimony (Sb)	APHA-3500Sb B	mg/L	0.005	<0.005	N.D.
13.	Chloride (Cl)	APHA-4500Cl- B	mg/L	250	<250	137
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	0.67
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	0.072
23.	Zinc (Zn)	APHA- 3500 Zn B	mg/L	3	5	1.15
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/49-2023	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Sampling Location:**	Adit-2 (Ghanol)
Sampling Date:	20-06-2023	**Reporting Date:**	26-06-2023
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	7.4
2.	Temperature	---	°C	---	----	13
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
6.	Total Dissolved Solids (TDS)	APHA-2540 C	mg/L	< 1000	<1000	361
7.	Total Hardness as $CaCO_3$	APHA-2340 C	mg/L	-------	<500	259
8.	Nitrate (NO_3)	APHA-4500NO3 B	mg/L	50	≤50	0.94
9.	Nitrite (NO_2)	APHA-4500NO2 B	mg/L	3	≤3	0.07
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	0.001
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	0.24
15.	Lead (Pb)	APHA-3500 Pb-B	mg/L	0.01	≤0.05	0.003
16.	Fluoride	APHA-4500F- C	mg/L	1.5	≤1.5	0.79
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	0.08
21.	Mercury (Hg)	APHA-3500 Hg-B	mg/L	0.001	≤0.001	N.D.
22.	Copper (Cu)	APHA- 3500 Cu-B	mg/L	?	?	0.027
23.	Zinc (Zn)	APHA- 3500 Zn B	mg/L	3	5	1.02
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/49-2023	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Sampling Location:**	Adit-3 (Kholian)
Sampling Date:	20-06-2023	**Reporting Date:**	26-06-2023
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	4
5.	Turbidity	APHA-2130 B	NTU	<5	<5	3
6.	Total Dissolved Solids (TDS)	APHA-2540 C	mg/L	< 1000	<1000	387
7.	Total Hardness as $CaCO_3$	APHA-2340 C	mg/L	-------	<500	261
8.	Nitrate (NO_3)	APHA-4500NO3 B	mg/L	50	≤50	1.05
9.	Nitrite (NO_2)	APHA-4500NO2 B	mg/L	3	≤3	0.16
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
12.	Antimony (Sb)	APHA-3500Sb B	mg/L	0.005	<0.005	N.D.
13.	Chloride (Cl)	APHA-4500Cl- B	mg/L	250	<250	119
14.	Chlorine	APHA-4500 CL	mg/L		0.5-1.5	0.12
15.	Lead (Pb)	APHA-3500 Pb-B	mg/L	0.01	≤0.05	0.004
16.	Fluoride	APHA-4500F- C	mg/L	1.5	≤1.5	0.71
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	N.D.
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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DRINKING WATER ANALYSIS REPORT

Reference Number	BHPP/ENV/49-2023	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Sampling Location:**	Powerhouse (Barkot)
Sampling Date:	20-06-2023	**Reporting Date:**	26-06-2023
Source: **GPS Coordinates;**	Spring Water (Sanduri) 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	---	----	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
6.	Total Dissolved Solids (TDS)	APHA-2540 C	mg/L	< 1000	<1000	389
7.	Total Hardness as $CaCO_3$	APHA-2340 C	mg/L	-------	<500	318
8.	Nitrate (NO_3)	APHA-4500NO3 B	mg/L	50	≤50	1.06
9.	Nitrite (NO_2)	APHA-4500NO2 B	mg/L	3	≤3	0.34
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
12.	Antimony (Sb)	APHA-3500Sb B	mg/L	0.005	<0.005	N.D.
13.	Chloride (Cl)	APHA-4500Cl- B	mg/L	250	<250	111
14.	Chlorine	APHA-4500 CL	mg/L		0.5-1.5	0.05
15.	Lead (Pb)	APHA-3500 Pb-B	mg/L	0.01	≤0.05	0.004
16.	Fluoride	APHA-4500F- C	mg/L	1.5	≤1.5	0.86
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	0.06
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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DRINKING WATER ANALYSIS REPORT

Reference Number	BHPP/ENV/51-2023	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Sampling Location:**	GRC Camp Office (Sanghar)
Sampling Date:	20-06-2023	**Reporting Date:**	26-06-2023
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	7.36
2.	Temperature	---	°C	---	----	14
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	3.8
6.	Total Dissolved Solids (TDS)	APHA-2540 C	mg/L	< 1000	<1000	399
7.	Total Hardness as $CaCO_3$	APHA-2340 C	mg/L	-------	<500	371
8.	Nitrate (NO_3)	APHA-4500NO3 B	mg/L	50	≤50	1.4
9.	Nitrite (NO_2)	APHA-4500NO2 B	mg/L	3	≤3	0.51
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	0.0062
12.	Antimony (Sb)	APHA-3500Sb B	mg/L	0.005	<0.005	N.D.
13.	Chloride (Cl)	APHA-4500Cl- B	mg/L	250	<250	146
14.	Chlorine	APHA-4500 CL	mg/L		0.5-1.5	0.2
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	0.68
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	0.07
23.	Zinc (Zn)	APHA- 3500 Zn B	mg/L	3	5	1.31
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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SURFACE WATER ANALYSIS REPORT

Reference Number	BHPP/ENV/49-2023	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Sampling Location:**	Dam Site (Paras Valley)
Sampling Date:	20-06-2023	**Reporting Date:**	26-06-2023
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	11
2)	pH	APHA-4500H+ B	--	6-9	7.9
3)	Chemical Oxygen Demand (COD)	APHA-5220-D	mg/l	150	84
4)	Biological Oxygen Demand (BOD5) at 20 °C	APHA, 5210	mg/l	80	61.7
5)	Total Dissolved Solids (TDS)	APHA-2540 C	mg/l	3500	2176
6)	Total Suspended Solids (TSS)	APHA-2540 D	mg/l	200	96
7)	Total Hardness	APHA-2340 C	mg/l	--	142
8)	Oil & Grease	Separation Method	mg/l	10	1.3
9)	Chromium (Hexa & Trivalent)	APHA-3500Cr B	mg/l	1.0	0.53
10)	Total Iron	APHA-3500-Fe-B	mg/l	8.0	3.6
11)	Chloride	APHA-4500Cl- B	mg/l	1000	254
12)	Flouride	APHA-4500F- C	mg/l	10	2.97
13)	Ammonia	ASTM-D1426-15	mg/l	40	5.8
14)	Cadmium	APHA-3500 Cd-B	mg/l	0.1	0
15)	Lead	APHA-3500-Pb B	mg/l	0.5	0.01
16)	Arsenic	APHA-3500As B	mg/l	1.0	N D
17)	Copper	APHA-3500Cu B	mg/l	1.0	0.18
18)	Barium	APHA-3500Ba B	mg/l	1.5	0.07
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	0.59
23)	Nickel	ASTM E3047-16	mg/l	1.0	0.13
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	0.29
27)	Sulphate (SO_4)	APHA-4500-SO_4 C	mg/l	600	406
28)	An Ionic Detergent (as MBAS)	----	mg/l	20	1.01
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
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/49-2023	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Sampling Location:**	Tailrace Upstream (Barkot)
Sampling Date:	20-06-2023	**Reporting Date:**	26-06-2023
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	13
2)	pH	APHA-4500H+ B	--	6-9	8.2
3)	Chemical Oxygen Demand (COD)	APHA-5220-D	mg/l	150	86
4)	Biological Oxygen Demand (BOD5) at 20 °C	APHA, 5210	mg/l	80	63.1
5)	Total Dissolved Solids (TDS)	APHA-2540 C	mg/l	3500	2564
6)	Total Suspended Solids (TSS)	APHA-2540 D	mg/l	200	106
7)	Total Hardness	APHA-2340 C	mg/l	--	151
8)	Oil & Grease	Separation Method	mg/l	10	1.69
9)	Chromium (Hexa & Trivalent)	APHA-3500Cr B	mg/l	1.0	0.59
10)	Total Iron	APHA-3500-Fe-B	mg/l	8.0	3.88
11)	Chloride	APHA-4500Cl- B	mg/l	1000	249
12)	Flouride	APHA-4500F- C	mg/l	10	1.81
13)	Ammonia	ASTM-D1426-15	mg/l	40	3.2
14)	Cadmium	APHA-3500 Cd-B	mg/l	0.1	N.D
15)	Lead	APHA-3500-Pb B	mg/l	0.5	0.005
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	0.09
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	0.28
22)	Zinc	APHA-3500-Zn B	mg/l	5.0	0.46
23)	Nickel	ASTM E3047-16	mg/l	1.0	0.09
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	0.37
27)	Sulphate (SO_4)	APHA-4500-SO_4 C	mg/l	600	356
28)	An Ionic Detergent (as MBAS)	----	mg/l	20	1.06
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
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/51-2023	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Sampling Location:**	Colony Area (Sanghar)
Sampling Date:	20-06-2023	**Reporting Date:**	26-06-2023
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	8
2)	pH	APHA-4500H+ B	--	6-9	8.4
3)	Chemical Oxygen Demand (COD)	APHA-5220-D	mg/l	150	71
4)	Biological Oxygen Demand (BOD5) at 20 °C	APHA, 5210	mg/l	80	46.2
5)	Total Dissolved Solids (TDS)	APHA-2540 C	mg/l	3500	1895
6)	Total Suspended Solids (TSS)	APHA-2540 D	mg/l	200	119.7
7)	Total Hardness	APHA-2340 C	mg/l	--	146
8)	Oil & Grease	Separation Method	mg/l	10	1.23
9)	Chromium (Hexa & Trivalent)	APHA-3500Cr B	mg/l	1.0	0.37
10)	Total Iron	APHA-3500-Fe-B	mg/l	8.0	2.51
11)	Chloride	APHA-4500Cl- B	mg/l	1000	234
12)	Flouride	APHA-4500F- C	mg/l	10	1.21
13)	Ammonia	ASTM-D1426-15	mg/l	40	3.4
14)	Cadmium	APHA-3500 Cd-B	mg/l	0.1	N.D
15)	Lead	APHA-3500-Pb B	mg/l	0.5	0.0079
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	0.0071
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	0.22
22)	Zinc	APHA-3500-Zn B	mg/l	5.0	0.33
23)	Nickel	ASTM E3047-16	mg/l	1.0	0.03
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	0.16
27)	Sulphate (SO_4)	APHA-4500-SO_4 C	mg/l	600	356
28)	An Ionic Detergent (as MBAS)	----	mg/l	20	0.57
29)	Phenolic Compound (as Phenol)	APHA-5530-D	mg/l	0.1	0.013
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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Soil Analysis Results (Second Quarter, 2023)

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SOIL ANALYSIS REPORT

Reference Number	BHPP/ENV/51-2023	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Sampling Location :**	Adit-1 (Thobi)
Monitoring Date:	20-06-2023	**Reporting Date:**	26-06-2023
Source:	Soil Sample		

Sr. No.	Parameters		Results
1	Soil Texture	Sand %	19
		Silt%	49
		Clay %	32
		Texture Class	Silty Clay Loam
2	pH		8.1
3	Electrical Conductivity EC (μSm^{-1})		238
4	Phosphorus ($mgkg^{-1}$)		2.01
5	Sodium Absorption Ratio		4.07

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/49-2023	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Sampling Location :**	Adit-2 (Ghanol)
Monitoring Date:	20-06-2023	**Reporting Date:**	26-06-2023
Source:	Soil Sample		

Sr. No.	Parameters		Results
1	Soil Texture	Sand %	13
		Silt%	49
		Clay %	38
		Texture Class	Silty Clay Loam
2	pH		8.1
3	Electrical Conductivity EC (μSm^{-1})		238
4	Phosphorus ($mgkg^{-1}$)		2.01
5	Sodium Absorption Ratio		4.07

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/49-2023	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Sampling Location :**	Adit-3 (Kholian)
Monitoring Date:	20-06-2023	**Reporting Date:**	26-06-2023
Source:	Soil Sample		

Sr. No.	Parameters		Results
1	Soil Texture	Sand %	19
		Silt%	53
		Clay %	28
		Texture Class	Silty Clay Loam
2	pH		8.0
3	Electrical Conductivity EC (μSm^{-1})		231
4	Phosphorus ($mgkg^{-1}$)		3.2
5	Sodium Absorption Ratio		3.54

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/51-2023	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Sampling Location :**	GRC Camp Office (Sanghar)
Monitoring Date:	20-06-2023	**Reporting Date:**	26-06-2023
Source:	Soil Sample		

Sr. No.	Parameters		Results
1	Soil Texture	Sand %	17
		Silt%	45
		Clay %	38
		Texture Class	Silty Clay Loam
2	pH		8.0
3	Electrical Conductivity EC (μSm^{-1})		231
4	Phosphorus ($mgkg^{-1}$)		3.2
5	Sodium Absorption Ratio		3.54

μSm^{-1}: Micro siemens/meter

$mgkg^{-1}$: milligram per Kilogram

Signature of Analyst:

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SOIL ANALYSIS REPORT

Reference Number	BHPP/ENV/49-2023	**Client Name**	CGGC JV GRC
Project Name:	Balakot Hydropower Project (300 MW)	**Sampling Location :**	Powerhouse (Barkot)
Monitoring Date:	20-06-2023	**Reporting Date:**	26-06-2023
Source:	Soil Sample		

Sr. No.	Parameters		Results
1	Soil Texture	Sand %	16
		Silt%	57
		Clay %	27
		Texture Class	Silty Clay Loam
2	pH		8.1
3	Electrical Conductivity EC (μSm^{-1})		229
4	Phosphorus ($mgkg^{-1}$)		2.9
5	Sodium Absorption Ratio		3.37

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

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
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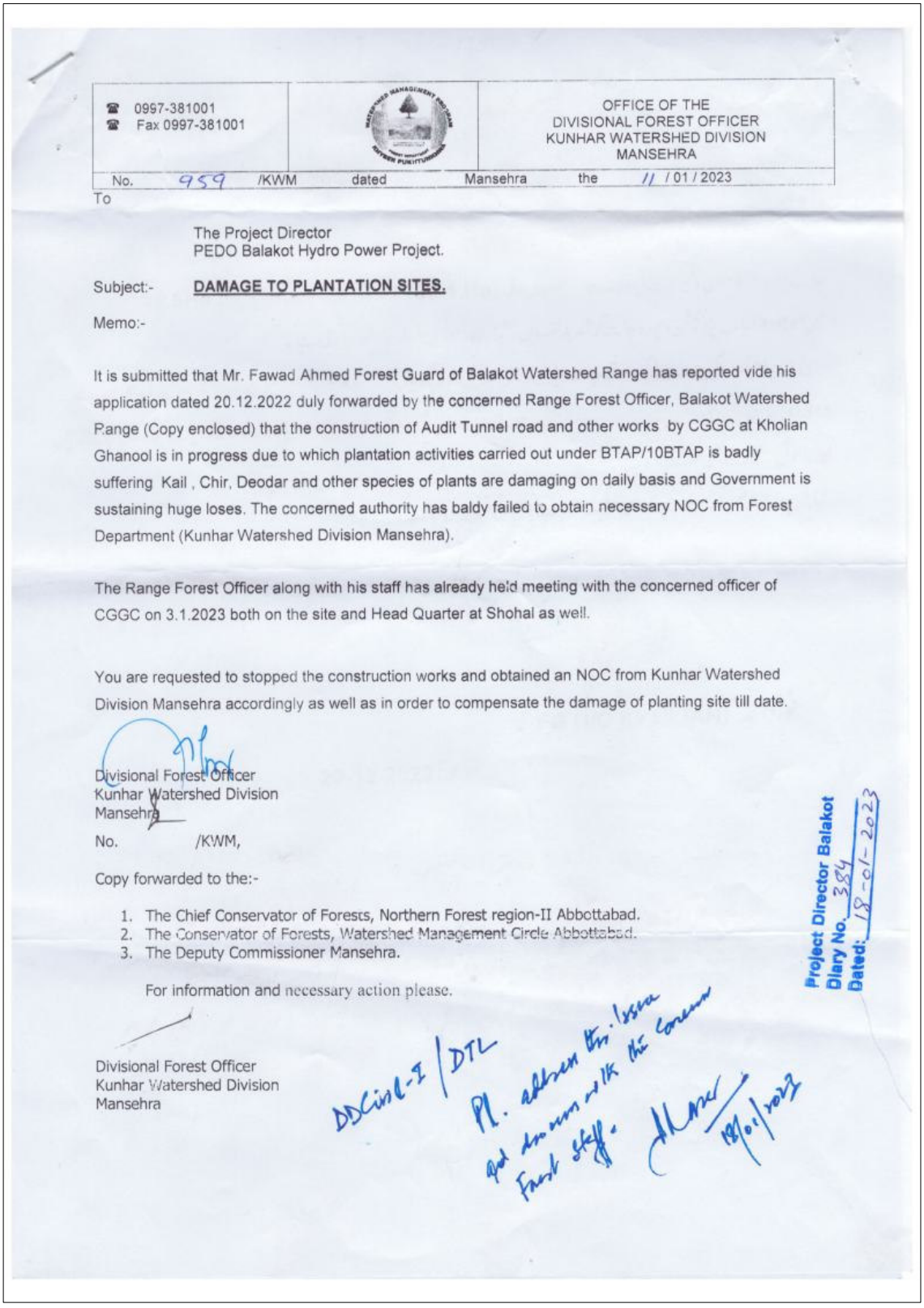
Environmental Protection Agency (EPA-KPK) Certified

Annexure-05: Copy of the DFO Kunhar River Watershed Division Complaint

Copy of the DFO Kunhar River Watershed Division Complaint



☎ 0997-381001
☎ Fax 0997-381001

OFFICE OF THE
DIVISIONAL FOREST OFFICER
KUNHAR WATERSHED DIVISION
MANSEHRA

No. 959 /KWM dated Mansehra the 11 / 01 / 2023

To

The Project Director
PEDO Balakot Hydro Power Project.

Subject:- **DAMAGE TO PLANTATION SITES.**

Memo:-

It is submitted that Mr. Fawad Ahmed Forest Guard of Balakot Watershed Range has reported vide his application dated 20.12.2022 duly forwarded by the concerned Range Forest Officer, Balakot Watershed Range (Copy enclosed) that the construction of Audit Tunnel road and other works by CGGC at Kholian Ghanool is in progress due to which plantation activities carried out under BTAP/10BTAP is badly suffering Kail , Chir, Deodar and other species of plants are damaging on daily basis and Government is sustaining huge loses. The concerned authority has baldy failed to obtain necessary NOC from Forest Department (Kunhar Watershed Division Mansehra).

The Range Forest Officer along with his staff has already held meeting with the concerned officer of CGGC on 3.1.2023 both on the site and Head Quarter at Shohal as well.

You are requested to stopped the construction works and obtained an NOC from Kunhar Watershed Division Mansehra accordingly as well as in order to compensate the damage of planting site till date.

Divisional Forest Officer
Kunhar Watershed Division
Mansehra

No. /KWM,

Copy forwarded to the:-

1. The Chief Conservator of Forests, Northern Forest region-II Abbottabad.
2. The Conservator of Forests, Watershed Management Circle Abbottabad.
3. The Deputy Commissioner Mansehra.

For information and necessary action please.

Divisional Forest Officer
Kunhar Watershed Division
Mansehra

Project Director Balakot
Diary No. 384
Dated: 18-01-2023

DDCivil-I / DTL
Pl. address the issue
and discuss with the concern
Focal staff.
18/01/2023