Semi-Annual Environmental Monitoring Report

Project Number: 53178-001

Semestral Report (January - June 2022)

July 2022

Georgia: East-West Highway (Shorapani – Argveta Section) Improvement Project

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Versions		
1.0	19 July 2022	SAEMR Submitted to ADB
	11 October 2022	ADB provided comments/clarifications
2.0		Revised SAEMR to address ADB clarifications

ABBREVIATIONS

ADB	Asian Development Bank
AP	Affected Person
BOD	Bio-Chemical Oxygen Demand
BP	Batching Plant
CAR	Corrective Action Requirement
CAREC	Central Asia Regional Economic Corridor
CC	Construction Contractor
COD	Chemical Oxygen Demand
CLO	Community Liaison Officer
CSCS	Consultancy Services for Construction Supervision
CSC	Construction Supervision Consultant
CSEMP	Contractor's Contract Specific Environmental Management Plan
dB (A)	Decibel
DO	Dissolved Oxygen
EIA	Environmental Impact Assessment
EIB	European Investment Bank
EMP	Environmental Management Plan
EMR	Environmental Monitoring Report
ESR	Environmental Sensitive Receiver
GRM	Grievance Redress Mechanism
HIV	Human Immunodeficiency Virus
HS	Health & Safety
HSE	Health Safety and Environment
IEE	Initial Environmental Examination
IFC	International Finance Corporation
MAC	Maximum Admissible Concentration
MoEPA	Ministry of Environmental Protection and Agriculture
MoESD	Ministry of Economy and Sustainable Development
MoM	Minutes of Meeting
MRDI	Ministry of Regional Development and Infrastructure of Georgia
NCN	Non-Conformance Notice
NCR	Non-Conformance Report
NFA	National Forest Agency
NOC	No Objection Certificate
OSHA	Occupational Safety and Health Administration
PPE	Personnel Protective Equipment'

PAPs	Project Affected Persons
PIU	Project Implementation Unit
QC	Quality Control
RD	Road Department
RoW	Right of Way
SC	Supervision Consultant
SEMP	Site Specific Environmental Management Plan
SFF	State Forest Fund
SPS	Safeguard Policy Statement
STD	Sexually Transmitted Diseases
TSS	Total Suspended Solids
VG	Village Governor

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1. INTRODUCTION

1.1 Preamble

1. This report presents the Semi-Annual Environmental Monitoring review of the Shorapani–Argveta Section (E60 Highway Route), Lot F4 Construction Project, and covers the period of January to June 2022.
2. This report is the fifth Semi-Annual Environmental Monitoring Report (SAEMR) prepared for the Project.

1.2 Headline Information

3. The Project is a newly built two-lane highway project with a total length of 14.7 km and involves the construction of a new road section of the E-60 highway, namely Lot F4, located in the Imereti region that is one of the main historical, economic, cultural and educational regions of central Georgia. Lot F4 forms the Shoropani–Argveta portion of the Khevi-Ubisa-Shorapani-Argveta section of the E-60.
4. The project involves the construction of 2*6 tunnels, 2*7 bridges, 4 interchanges, 2*1 overpasses, 5 underpasses, and 50 culverts. The length of the Project road is given below:
    1) Right lane (TA – meaning Tbilisi – Argveta direction) - 14.778 km,
    2) Left lane (AT – meaning Argveta – Tbilisi direction) - 14.726 km
5. The Project alignment is located within Zestaphoni Municipality, which covers a total area of 423 square kilometers and includes the towns of Zestaphoni and Shorapani as well as numerous small villages such as Kveda Tseva, Shorapani, Zestaphoni, Kveda Sakara, and Argveta. Besides, the alignment runs through forest areas, agricultural land plots, hilly forest slopes, residential areas, and riparian ecosystems.
6. The Project outlines (km 0+000 – 14.7+000):
    - Classification of road: Highway
    - Design speed: 100 km/h
    - Speed Limit: 80 km/h
    - Road length: 14.7 km
    - Road width: 27.60 m
    - Numbers of lanes: 2x2
    - Lane width: 3.75 m
7. The official work commencement date for the construction is 20 October 2020. The period of implementation of the contract, including the Defects Notification Period and until the issuing of the Final Acceptance and Performance Certificate is 60 (sixty) months after the Commencement Date. The construction completion date for the Project is 20 October 2023.

2. PROJECT DESCRIPTION AND CURRENT ACTIVITIES

2.1 Project Description

8. E-60 highway connecting the Black Sea coast to the capital of Georgia passes through a mountainous area 600-850 meters above the sea level. The Project road comprises Lot F4 (Shoropani – Argveta) of the Khevi-Ubisa-Shorapani-Argveta Road (E-60). The proposed highway is located in the complex hilly-mountainous geographical area and crosses numerous mountains, rivers, and ravines. Mixed forests, typical of this climate zone, cover the slopes of the mountains.

9. The alignment is located on the left side of the existing 2-lane road both as an exposed road and through two tunnels. The existing road passes through difficult mountainous terrain paralleling first the River Rikotula and then, the River Dzirula and consists of multiple bridges and several tunnels.

10. The government of Georgia has requested ADB to finance the construction of the proposed highway. The project is classified as Category A Project – Environmental Safeguards under ADB SPS 2009 since it is considered to have significant diverse impacts over a wide area, such as noise impacts, significant quantities of spoil disposal, road safety impacts, and vibration. Environmental Impact Assessment (EIA) was prepared in May 2019 and disclosed on the ADB website in October 2019.

11. The National EIA document was prepared and submitted by the Roads Department (RD) to the Ministry of Environmental Protection and Agriculture (MoEPA) in December 2017. State Ecological Expertise approval was obtained from MoEPA on 26-03-2018. This covers all scopes under the Project.

12. The Project involves the construction of a new road section of the E-60 highway located in the Imereti Region of Central Georgia (Figure 1). Proposed Lot F4 forms the Shorapani-Argveta portion of the Khevi-Ubisa-Shorapani-Argveta section of the E-60. The length of the Project road is given below:

    1) Right lane (TA – meaning Tbilisi – Argveta direction) - 14.778 km,
    2) Left lane (AT – meaning Argveta – Tbilisi direction) - 14.726 km

Figure 1: Location of Project Area

13. The project includes the construction of 12 tunnels with a total length of 8506.36 meters, 14 bridges with a total length of 5020.54 meters, 2 overpasses with a total length of 84.64 meters, 5 underpasses with a total length of 198 meters, 50 culverts with a total length of 1552.07 meters and 4 interchanges.

14. Bridges' length will vary from 32 meters to 846 meters. Tunnels will be constructed with double tubes with lengths from 399 meters to 1193 meters.

15. Technical parameters of the alignment considered during detail design include:

- Design speed:100 km/h,
- Speed Limit: 80 km/h,
- Number of traffic lanes: 4,
- Width of traffic lane: 3.75 m,
- Width of each carriageway: 7.5 m,
- Width of paved shoulder (emergency lane): 2.5 m,
- Width of verge:1.0 m,
- Width of central reserve: 5.0 m,
- Width of the paved shoulder at the central reserve: 1.0 m,
- Total width of each paved platform: 11.0 m,
- Width of roadbed: 27.60 m,
- Carriageway cross-fall on straight sections: 2.5%,
- The minimum radius of the horizontal curve: 400 m,
- Maximum longitudinal gradient: 4%,
- Minimum convex curve: 15 000 m, and
- Minimum concaved curve: 15 000 m.

2.2 Project Contracts and Management

16. Information related to the project execution is given in Table 1 below:

Table 1: Project Information

Employer	Roads Department of Georgia, Ministry of Regional Development and Infrastructure of Georgia
Funding Source	Asian Development Bank (ADB)
The Engineer	UBM Uluslararası Birleşmiş Müşavirler Müşavirlik Hizmetleri A.Ş. (Turkey) and SMEC International PTY LTD (Australia)
Contractor	Guizhou Highway Engineering Group Co Ltd and China National Technical Import & Export Corporation Joint Venture
Contract Number	SARP/CW/OCB-01
Contract Date of the Contractor	16.01.2020
Starting Date of Construction	20.10.2020
Contract Period	36 months (36+24 month engineer)
Original Completion Date	20.10.2023
Expired time	15
Remaining time	21 months
Defects Notification Period	24.3 months 730 days
Contract Price (GEL)	GEL 582 777 310.00

17. The TOR for the Consultancy Services for Construction Supervision (CSCS) Contract contains the following tasks for the environmental specialists:

- Scrutinize the Contractor's construction method statement for its compliance with environmental aspects,
- Review and approve Contractor Site Specific EMPs,
- Supervise the Contractor in all matters concerning environmental aspects,
- Monitor compliance with the EMP by the Contractor and issue Non-conformances Reports as needed,
- Review Contractor's Corrective Action Plans,
- Review and approve temporary construction areas use and associated Site-Specific EMPs for such sites,
- Assist the Employer in undertaking and monitoring environmental safeguards,
- Identify and report any environmental issues that may arise during construction to the Team Leader and the Employer,
- Perform regular coordination with the Employer for any matters related to the implementation, monitoring, and reporting of ADB's safeguards policy.

18. The obligation of the Contractor, to safeguard, mitigate adverse impacts, and rehabilitate the environment is addressed through environmental provisions in the FIDIC conditions of the contract for construction, MDB harmonized addition- June 2010, and special clauses included in the contract related to the environment, especially, section 116 (pollution) and Appendix X of technical specifications. FIDIC clauses 4.18 (protection of the environment), 4.8 (safety procedures), 6.4 (labor laws), 16.3 (cessation of work/ remedial work), 2.3b (employer's personnel), 4.21 (progress report) are important in this regard.

19. The Contract for CSCS was awarded to UBM for three phases of the project:

1) Phase 1: Design review, to be completed in a period of three months and submitted to RD
2) Phase 2: Construction supervision and contract administration. The construction period is for 36 months
3) Phase 3: Defects Notification Period, 24 months

20. Contact details of ADB (Asian Development Bank), SC (Supervision Consultant), CC (Construction Contractor), and RD (Road Department) representatives are given in Table 2 below:

Table 2: Main Environmental Staff of ADB, CC, SC, and RD

Organization	Position	Name	Nationality
ADB	Head Office, Senior Environment Specialist, Portfolio, Results, Safeguards and Gender Unit (PSG), CWRD	Name: Ninette Pajarillaga e-mail: npajarillaga@adb.org	Philippines
	ADB National Environmental Safeguards Consultant	Name: Giorgi Kobaladze Cell: +995599689834 e-mail: gkobaladze.consultant@adb.org	Georgian
	Associate Safeguards Officer Georgia Resident Mission	Name: Nino Nadashvili Cell: +995 595 070442 e-mail: nnadashvili@adb.org	Georgian
RD	Environmental Specialist	Name: Luiza Bubashvili	Georgian

		Cell:+9995219141 e-mail: likabubashvili@yahoo.com	
	Deputy Head of Environmental Unit	Name: Gia Sopadze Cell: +10599939209 e-mail: sopgia@gmail.com	Georgian
SC	International Environmental Specialist	Emre Duran (started work on June 2022) Cell:+905325258556 e-mail:eduran@ubm.com.tr	Turkish
	Environmental Expert	Mari Kechkhuashvili (started work on May 2022) Cell:+995599398777 e-mail: kechxuashvili.mari94@gmail.com	Georgian
CC	Project Manager	Name: Chen Yuqiang Cell: +995599200396 e-mail: gggg3bc@gmail.com	Chinese
	Environmental Specialist	Name: David Kurdadze Cell: +995595116017 e-mail: d.kurdadze@capto.ge	Georgian

21. The summary of civil works contracts and works' progress is summarized in Table 3. All awarded contracts included EMPs cleared by ADB and any conditions of applicable national EIA clearance.

Table 3: Summary of Civil Works Contracts and Works' Progress

Package	Scope	Contractor	Signed	Approval Date			Environmental personnel		Civil Work		Progress as of	
				SSE MP	COVID -19 HSMP	ERP	Environment Officer	Health and Safety Officer	Start	End	1 Jan 2022	30 Jun 2022
F4	SUPERVISION OF CONSTRUCTION WORKS FOR THE F4 SHORAPANI-ARGVETA PROJECT (E60 HIGHWAY ROUTE). 1. Right lane (TA - Tbilisi-Argveta direction)- 14.778km; 2) Left lane (AT - Argveta -Tbilisi direction) - 14.726km.	GGG	16 January 2020	07 Jun 2021	17 Aug 2021	17 Nov 2020	Davit Kurdadze	Giorgi Karelidze	20 Oct 2020	20 Oct 2023	5.7% Financial Completion	13.84% Financial Completion 14.23% physical completion
	1.2 m Pile Drilling for foundation construction	Babu Ltd	31 May 2021						31 May 2021	In Progress	18%	56.38%
	1.2 m Pile Drilling for foundation construction	Marmara Inshaat Ltd	10 Apr 2021						10 Apr 2021	In Progress	18%	56.38%
	1.2 m Pile Drilling for foundation construction	Pozitivi Pile LLC	30 Jun 2021						13 Mar 2020	In Progress	0%	56.38%
	Relocation of Water Pipes	Sandro Ltd	07 Jun 2021						07 Jun 2021	23 Aug 2021	50%	50%
	Relocation of Gas Pipes	Gazproekti 2009 Ltd	17 Jun 2021						17 Jun 2021	2 Aug 2021	100%	100%
	Relocation of Power Lines	Mshenebeli 2017,Ltd							10 Feb 2021 The Company approval date but the subcontractors contract indicates 27/05/2020	In Progress	52%	87.21%

22. Under the contract, the Contractor shall comply with all applicable national and local environmental laws and regulations as well as applicable respective standards under the Contract. The contractor is responsible to:

- Establish an operational system for managing environmental impacts,
- Develop the SEMP as well as topic-specific EMPs by identifying environmental risks arising from the works, the mitigation measures to be applied, and monitoring to be carried out,
- Implement the required mitigation measures and monitoring,
- Take any corrective or preventative actions set out in safeguards monitoring reports that the Employer will prepare from time to time to monitor the implementation of the EMP,
- Submit monthly compliance reports to the engineer.

23. The contractor, Guizhou Highway Engineering Group Co Ltd, is responsible for the implementation of SEMP throughout the project during the construction phase. The Supervision Consultant, UBM (Engineer), is responsible to:

- Monitor the implementation of SEMP by the Contractor at all its active construction sites and project-related facilities,
- Prepare monthly and semi-annual Environmental Monitoring reports for the Employer based on the SEMP monitoring and implementation activities.

24. Responsibility for daily management for environmental monitoring and implementation of the SEMP is given to the HSE Manager, Mr. Du Jun. He has direct authority from the Project Manager to give instruction to all site staff regarding environmental issues. The project organization chart for key management staff of Guizhou Highway Engineering Group Co Ltd is provided in Figure 2 below:

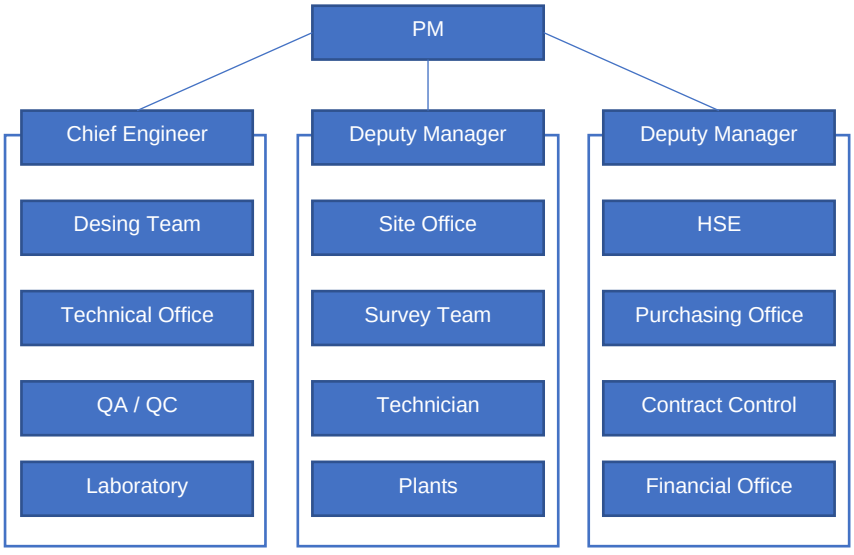


Figure 2: Contractor Project Management Staff

25. The contractor revised the organization chart for Health, Safety, Environmental and Social management as shown in Figure 3. According to the new management structure, Community Liaison Officer (CLO) directly reports to the Project Manager of the Contractor. Moreover, the Contractor appointed a Traffic Officer during this reporting period to organize and regulate equipment and traffic relevant issues. The team is responsible for the implementation, supervision, and monitoring of the activities on-site.

Figure 3: Contractor's H&S, Environmental and Social Organization Chart

2.3 Project Activities during Current Reporting Period

26. Table 4 summarizes the construction activities being undertaken during this monitoring and reporting period at different sections of the Project.

Table 4: Project Activities Carried Out during the Reporting Period

Tunnel №1, Tbilisi side	Cutting of slope and construction of the access road
Tunnel №1 AT, Argveta side	Commenced mechanical excavation of the tunnel, installation of steel ribs, and 20 - cm shotcrete spraying
Tunnel №1 TA, Argveta side	Construction of micro piles for the temporary portal is completed and commenced construction of the temporary portal
Tunnel №2 AT, Tbilisi side	Continued excavation by the mean of blasting, installation of steel ribs, and 20 - cm shotcrete spraying
Tunnel №2 TA, Tbilisi side	Continued excavation by the mean of blasting, installation of steel ribs, and 20 - cm shotcrete spraying
Tunnel №2, Argveta side	Construction of fill for the access road to the portals
Tunnel №3 AT Tbilisi side	Continued excavation of the tunnel by the mean of blasting, installation of steel ribs, and 20 - cm shotcrete spraying
Tunnel №3 TA Tbilisi side	Continued excavation of the tunnel by the mean of blasting, installation of steel ribs, and 20 - cm shotcrete spraying
Tunnel №3, Argveta side	Commenced earthworks for the construction of the temporary portal
Tunnel №4, TA Argveta side,	Continued excavation of the tunnel by blasting and mechanisms, installation of steel ribs, and 20 - cm shotcrete spraying

Tunnel №4, AT, Argveta side	Continued excavation of the tunnel by blasting and mechanism, installation of steel ribs, and 20 - cm shotcrete spraying
Tunnel №5 TA, Tbilisi side	Continued excavation by the mean of blasting, installation of steel ribs, and 20 - cm shotcrete spraying
Tunnel №5 AT, Tbilisi side	Continued excavation by the mean of blasting, installation of steel ribs, and 20 - cm shotcrete spraying
Tunnel №5 TA, Argveta side	Continued mechanical excavation, installation of steel ribs, and 20 - cm shotcrete spraying. Commenced construction of the tunnel's invert
Tunnel №5 AT, Argveta side	Continued mechanical excavation, installation of steel ribs, and 20 - cm shotcrete spraying
Culvert № 4216	Construction of the culvert completed
Culvert № 4217	Construction of the culvert completed
Underpass № 4302	Construction of the underpass completed
Interchange №3, Ramp Culverts	Culverts construction continued, culverts 4237, 4238, 4239, 4240, 4241, 4243 and 4248 completed
Interchange №3, Retaining wall	Continued drilling of D 900 mm piles for construction of retaining wall
Interchange №1	Earthworks are ongoing.
Interchange №2	Earthworks are ongoing
Interchange №3	Continued construction of embankment fill from delivered material
Interchange №3 Overpass 4401	Continued assembling of steel cages and concrete pour for Abutments
Interchange №4	Delivery and compaction of borrowed pit material
Bridge №1	Continued drilling of piles
Bridge №2	Construction of pile caps, piers columns, and cross beams is ongoing
Bridge №3	Drilling of piles, construction of raft foundations, pier columns, and cross beams continued
Bridges №4 AT and TA	Construction of piers is ongoing - continued construction of raft foundations, pier columns, and cross beams
Bridge №5	Completed drilling of piles, continued construction of abutments and piers columns and cross beams

Bridge №6	Continued construction of piers columns and cross beams
Km 0, Tbilisi side	Continued cutting of slope and construction of the access road to the Tunnel N1 portals
Km 1+950	Commenced mechanical cutting of slope
Km 4 - Road to Phuti Village	Continued construction of the local road to Phuti village - construction of sub-base and base layers completed, asphalt pavement remains
Km 4+900 to km 5	Continued trimming of the slope by excavators
Km 4+900 to km 5	Continued slope protection works
PK 8+300 to PK 8+700 (Batching Plant N2 area)	Excavation of soil and transportation at the dumpsite
Km 10 to km 11	Continued construction of embankment fill between Bridge N6 and culvert N 4214
Km 13 to km 14	Continued delivery and compaction of soil for embankment fill
Utilities	Relocation of Gas pipes, high voltage electrical lines (including pylons), and water pipes ongoing
Pre-Stressed concrete beams	Commenced prefabrication of Pre-stressed concrete beams and concrete deck slabs

27. Progress of works carried out during the reporting period is summarized in Table 5 below:

Table 5: Construction Progress during Reporting Period

Row	Description of Main Activities	% W.F.	Progress	Cumulative Progress Including May	Cumulative Progress including April	Progress in May
1	Bill No 1. General Items	0,00%	Actual			
			Planned			
2	Bill No 2. Setting Out and Site Clearance	0,23%	Actual	67,38%	67,38%	
			Planned	96,12%	95,14%	0,99%
3	Bill No 3. Earthworks	4,21%	Actual	21,92%	21,92%	
			Planned	60,66%	54,95%	3,34%
4	Bill No 4. Culverts and Drainage	1,31%	Actual	39,10%	39,10%	
			Planned	75,83%	72,48%	3,34%
5	Bill No 5. Bridges and Overpasses	46,00%	Actual	3,97%	3,97%	
			Planned	28,67%	22,20%	6,47%

6	Bill No 6 & 7 Tunnels	36,49%	Actual	6,78%	6,78%	
			Planned	51,88%	48,65%	3,23%
7	Bill No 8. Road Pavement	4,07%	Actual	0,56%	0,56%	
			Planned	9,57%	8,57%	1,01%
8	Bill No 9. Road Furniture	3,42%	Actual			
			Planned			
9	Bill No 10. Interchanges	1,81%	Actual	6,34%	6,34%	
			Planned	54,53%	54,28%	0,25%
10	Bill No 11. Relocation Of Utilities	0,94%	Actual	72,51%	72,51%	
			Planned	100,00%	100,00%	
11	Bill No 12. Greenery	0,55%	Actual			
			Planned			
12	Bill No 13. Retaining Walls	0,47%	Actual			
			Planned	85,70%	84,76%	0,94%
13	Bill No 14. Lighting	0,43%	Actual			
			Planned			
14	Daywork	0,05%	Actual			
			Planned			
Overall Progress of the Project		100,00%	Actual	6,72%	6,72%	0,0%
			Planned	38,61%	34,12%	4,49%

2.4 Information on Personnel Working at Construction Site

28. Overall personnel hired by the Contractor as of June 2022 is summarized below and Table 6 shows detailed information about personnel working at the site.

- Total number of employees: 1033
- Foreign Staff (including Management, Administration, and Technical Staff): 514
- Local Staff (skilled and unskilled workers): 519

Table 6: Information of Personnel Working at Site as of June 2022

#	Human Resources	Total
1	Company leaders	4
2	Project Manager	1
3	Quality Control	6
4	Technical office	49

5	Administration	18
6	Site Manager	5
7	Site Engineers	31
8	HSE	7
9	Surveyors	8
10	Foremens	20
11	Operators	121
12	Drivers	20
13	Plant Operators Plant Operators and labors	20
14	Garage facilities and camp	19
15	Mess hall	27
16	Skilled workers	320
17	Unskilled workers	254
18	Security	25
19	Flagmen	23
20	Sub-Contractors	55
21	Total	1033
HSE Staff (breakdown of 7 personnel)		

29. The graphical presentation of the number of foreign and local staff hired by the Contractor is shown in Figure 4. The total number of the Contractor's staff is increased by 75% compared to the 2nd half of 2021 within this reporting period.

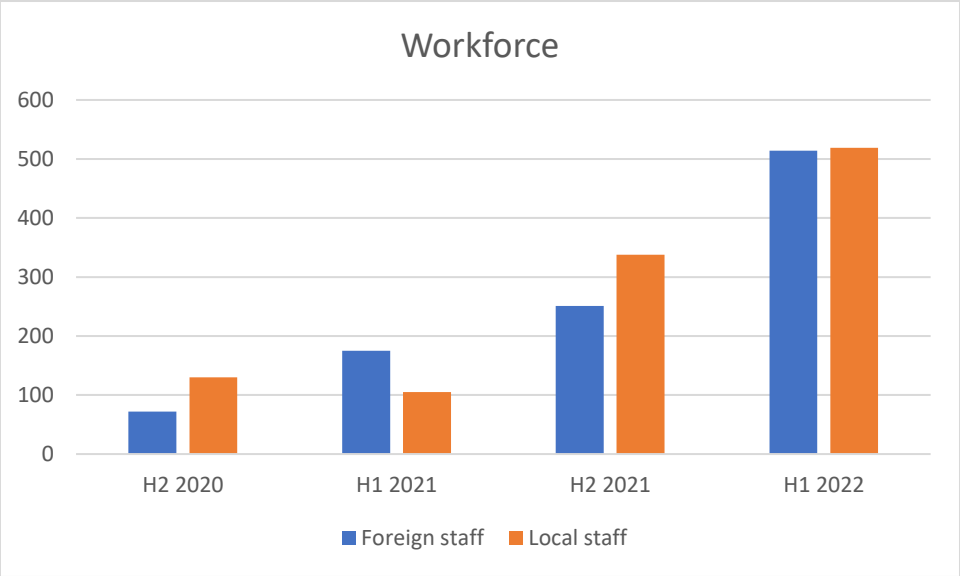


Figure 4: **Project Workforce as of June 2022**

2.5 Description of any Changes to Project Design

30. There is no change in project design during the reporting period; however, the Contractor submitted a variation proposal for Tunnel 6 (April 22, 2021, Ref 20210422-017-GHEC-UBM). The contractor proposed to change the initial design to an open excavation roadbed. On April 1, 2021, RD, Engineer, and Contractor jointly inspected the site and a meeting was also held regarding this between the RD, Engineer, and Contractor on April 7, 2021, accordingly to evaluate and discuss the proposal. RD demanded from the Contractor to prepare the cost and time impact report. The variation has not been yet finalized as the contractor has not submitted the necessary documentation in full for review.
31. Assessment of impacts.
32. Required mitigation measures.
33. Records of communication and agreement with contractor of the required mitigation measures.

2.6 Description of Any Changes to Agreed Construction Methods

34. There are no changes to the agreed construction methods `that were approved during the reporting period.

3. ENVIRONMENT SAFEGUARD ACTIVITIES

3.1 General Description of Environment Safeguards Activities

35. Mari Kechkhuashvili has been assigned as a local Environmental Specialist in May 2022 to check the environmental impacts caused by the construction activities and the compliance with the requirements of EIA, SEMP, and conditions of contracts in May 2022.
36. During this reporting period, the Engineer has not issued any NCR (Non-Conformance Report) to the Contractor. In case of any non-conformance is detected (with the photo evidence) it has been recorded and the Contractor has been informed in written inspection reports to take corrective actions. Since the Contractor has implemented required measures in time effectively, none of the non-conformity has been turned into an NCR.

37. The Engineer's environmental specialists prepare the monthly and semi-annual reports to be submitted to the RD. These reports depict the ongoing construction activities, environmental issues, health and safety issues, grievance status, implementations of mitigation measures defined in EIA, and the status of compliance.

Table xxx: Summary of Engineer's Monthly Environmental Reports

Monthly Report	Date Submitted	Detailed Findings	Required Actions
Jan 2022			
Feb 2022			
Mar 2022			
April 2022			
May 2022			
June 2022			

38. Environmental specialists of the Contractor and the Engineer are conducting regular site visits to monitor the compliance of EMP. In addition to that, the HS specialist of the Contractor and Engineer are monitoring the compliance of PPEs, traffic safety, and other safety-related issues.

Table xxx: Summary of Site Visits During the Reporting Period (Jan-Jun 2022)

Date of Site Visit	Staff	Detailed Findings	Required Actions	Date of Report Submitted and to whom

39. Grievance Redress Mechanism (GRM) and HSE logbooks are being maintained by the engineer's social team and contractor's HSE team respectively. However, these good practices need to be maintained on a continual basis.

40. The GRM logbook has the following information that should be recorded: xxx, xxx, xxx, xxx, xxx, xxx, xxx. During the inspection conducted on xxx, the following information has been noted: xxx, xxx, xxx, xxx, xxx. The following actions are required to be completed by (date): xxx, xxx, xxx, xxx

41. The HSE has the following information that should be recorded: xxx, xxx, xxx, xxx, xxx, xxx, xxx. During the inspection conducted on xxx, the following information has been noted: xxx, xxx, xxx, xxx, xxx. The following actions are required to be completed by (date): xxx, xxx, xxx, xxx

42. The construction Contractor's Consultant in environmental issues is Sustainable Development Solutions Caucasus (SDSC) LLC.

3.2 Site Audits

43. Frequent site visits were carried out by the environmental expert of the Engineer, Ms. Mari Kechkhuashvili, to the following sites:

- Office sites,
- Camp areas,
- Access roads,
- Concrete batch plant 1,
- Cutting of trees,
- Topsoil Stripping,
- Interchange 1 & 2,
- Construction of Access Road for Tunnel 3,
- Tunnel 2 & 3 Portals, and
- Steel Bar Processing Plant.

Table xxx: Summary of Site Visits During the Reporting Period (Jan-Jun 2022)

Date of Site Visit	Locations	Detailed Findings	Required Actions	Date of Report Submitted and to whom

44. International environmental expert of the Engineer, Ms. Gülden Baydar, has resigned, and to replace the new International Environmental expert (Emre Duran) has been nominated in June 2022. This semi-annual environmental monitoring report has been prepared in the light of information gathered from the national environmental expert, and HSE personnel and review of the documentation received, communication with project parties, inspection reports, monthly progress reports, and weekly construction minutes of meetings (MoMs).
45. The method adopted for inspection includes visual inspection, interviews with workers, review of permits obtained, daily quality control reports, and monthly reports.
46. The implementation Status of Corrective Actions proposed in the previous monitoring report is presented in Table 8 below.
47. The engineer has established NCRs and corrective action tracking register for following up on the open NCRs on the project level and reminders are being sent on a regular basis. There are no NCRs in this reporting period. The corresponding detail between engineer and contractor during the reporting period regarding plans, monitoring reports, and resolving of environmental issues is given in Table 7 and Table 8.

Table 7: Implementation Status of Corrective Actions Proposed in the Previous Monitoring Report(s)

Issue	**Required Action**	**Responsibility**	**Timing (Target Dates)**	**Description of Resolution and Timing (Actual)**	**If not yet resolved, indicate the reason why and specify further required action and timeframe.**
1. Contractor has not provided an HIV (Human Immunodeficiency Virus) Awareness	The contractor was notified to start this training by the 2nd week of June 2021.	CC	Sept 2021	CC provided an HIV aid program in February 2022.	Resolved .

Issue	Required Action	Responsibility	Timing (Target Dates)	Description of Resolution and Timing (Actual)	If not yet resolved, indicate the reason why and specify further required action and timeframe.
Program covering of HIV/AIDS management plan, orientation and awareness to workers about sexually transmitted diseases (STD), screening tests of workers, distribution of promotional material, etc.	NO HIV aid management plan is submitted yet and the contractor informed that they are searching for a subcontractor to conduct the training				
2. Contractor has not assigned permanent medical personnel yet for providing medical assistance in case of a medical emergency, including safe evacuation of the injured person. There is only one Nurse Nino Okhroshidze at the site.	Contractor to hire the Doctor at the site	CC	Q1, Q2 2022	CC hired a doctor at the site beginning of 2022.	Resolved

Table 8: Correspondence between SC and CC to Resolve Environmental Issues Including NCRs and Corrective Actions

Date	Record Number	Topic	Issues/Concerns	Required Actions	Target Date of Completion	Progress
6.01.2022	0924-CSAE60F4-UBM-GE	Propose Xi'an Jianzhukeda Engineering &Technology Co, Ltd as a third-party company for Blasting Vibration monitoring				
20.01.2022	0969-CSAE60F4-UBM-GE	Batching Plant NQ 1 Plan - Air Emission Inventory				
1.03.2022	1036-CSAE60F4-UBM-GE	The Tree Compensation Planting Plan				

Date	Record Number	Topic	Issues/Concerns	Required Actions	Target Date of Completion	Progress
21.03.2022	1094-CSAE60F4-UBM-GE	The Detailed Project and Management Plan of Main Construction Camp in village Pirveli Sviri				
31.03.2022	1115-CSAE60F4-UBM-GE	Blasting Vibration Monitoring Report of Tunnel N2 3 at PK45+20.5				
5.04.2022	1120-CSAE60F4-UBM-GE	The Detailed Project and Management Plan of Worker's Camps				
3.05.2022	1163-CSAE60F4-UBM-GE	Noise and Vibration Monitoring Report for 22 and 23.03.22 near Ushangi Shavgulidze and David Khijakadze Residential House				
6.05.2022	1166-CSAE60F4-UBM-GE	Environmental Decision Order N 2-181 on Construction and Operation of Section F4 of E60 Highway 26032018 Fulfillment of the Condition of Paragraph 3.6 (E-60 EWH F4 Construction Workers Temporary Accommodation Camp № 3 Detailed Project and Management Plan				
6.05.2022	1169-CSAE60F4-UBM-GE	The Night Activity Noise and Vibration Monitoring Report on top of tunnel 4005				
6.05.2022	1170-CSAE60F4-UBM-GE	Environmental Decision Order N 2-181 on Construction and Operation of Section F4 of E60 Highway				

Date	Record Number	Topic	Issues/Concerns	Required Actions	Target Date of Completion	Progress
		26/03/2018 Fulfillment of the Condition of Paragraph 3.6 (E-60 EWH F4 Construction Workers Temporary Accommodation Camp, №1 Detailed Project and Management Plan)				
6.05.2022	1171-CSAE60F4-UBM-GE	Environmental Decision Order N 2-181 on Construction and Operation of Section F4 of E60 Highway 26/03/2018 Fulfillment of the Condition of Paragraph 3.6 (Workers Temporary Accommodation Camp №2 Detailed Project and Management Plan)				
10.05.2022	1172-CSAE60F4-UBM-GE	Environmental Decision Order N 2-181 on Construction and Operation of Section F4 of E60 Highway 26/03/2018 Fulfillment of the Condition of Paragraph 3.6 (E-60 EWH F4 Construction Workers Temporary Accommodation Camp, №3 Detailed Project and Management Plan)				
14.05.2022	1178-CSAE60F4-UBM-GE	Environmental Decision Order N 2-181 on Construction and Operation of Section F4 of E60 Highway 26.03.2018 Fulfillment of				

Date	Record Number	Topic	Issues/Concerns	Required Actions	Target Date of Completion	Progress
		the Condition of Paragraph 3.6 (Water Discharge Limits)				
20.05.2022	1189-CSAE60F4-UBM-GE	Environmental Decision Order N 2-181 on Construction and Operation of Section F4 of E60 Highway 26/03/2018 Fulfillment of the Condition of Paragraph 3.6 (Emission's inventory technical report of the batching plant and workshops)				
26.05.2022	1197-CSAE60F4UBM-GE	The Engineer's Environmental Report				
23/06/2022	1269-CSAE60F4UBM-GE	Environmental Decision Order N 2-181 on Construction and Operation of Section F4 of E60 Highway 26/03/2018 Fulfillment of the Condition of Paragraph 3.6 (E-60 EWH F4 Tunnel Groundwater Management Plan)				
28/06/2022	1279-CSAE60F4-UBM-GE	Environmental Decision Order N 2-181 on Construction and Operation of Section F4 of E60 Highway 26/03/2018 Fulfillment of the Condition of Paragraph 3.6 (Tree Compensation Plan)				

3.3. Issues Tracking

48. Statistics of corrective action requirements in work during the reporting period are given in Table 9. There was no pending issue from the previous reporting period.

Table 9: Summary of Issue Tracking for the Reporting Period

Issues opened during this reporting period	216
Issues closed this reporting period	201
Number of open issues	19
Closed in percentage	91%

49. Data on the number of closed and open issues are presented in Figure 5. This data is based on the issues that were observed and have been closed or remained open during the Project. Out of Two hundred sixteen (216) issues, two hundred and one (201) issues were closed and there are nineteen (19) corrective action requirements for the next semi-annual report to follow up.

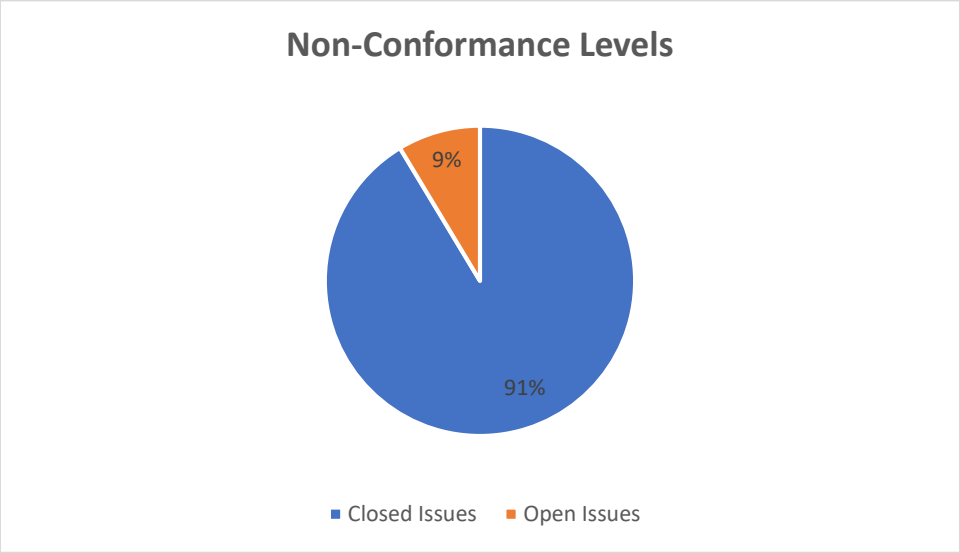


Figure 5: Non-Conformance Levels during the Project

50. Identified non-conformities that occurred in work sites were issued to the Contractor through inspection reports (Annex 2) by the Engineer to take corrective actions. Issues raised, required mitigation measures.

3.4 Trends

51. Most of the violations observed during the reporting period requiring special attention to resolve include Oil drums without drip trays, deep excavation without guard rails, poor housekeeping, steep slopes, workers without PPEs, and access roads to be paved. However, the contractor has a positive attitude towards resolving problems. Most of the issues are being fixed regularly; however, some are repeated due to workers' behavior for which CC is conducting regular training, TBTs, and Toolbox meetings.

Table XXX: Comparison of Contractor's Performance (Previous and Current Reporting Period)

Monitoring/Inspection Questions		Previous SAEMR (2021 Jul-Dec)	This SAEMR (2022 Jan-Dec)	Observation (improved/worse) and Reason/ Justification	Required Action
1.	Contractor EHS Onsite				
	a. Is an Environment Supervisor available?				
	b. Is the Safety Officer on-site?				

Monitoring/Inspection Questions		Previous SAEMR (2021 Jul-Dec)	This SAEMR (2022 Jan-Dec)	Observation (improved/worse) and Reason/ Justification	Required Action
	c. Is a copy of the SSEMP available on-site and in worksites?				
	d. Has Contractor established an operational system for HSE?				
	e. Has the Contractor established data management system for HSE?				
	f. Laborers hired from licensed manpower suppliers only?				
	g. All workers (including manpower supply laborers) are insured?				
	h. Number of workers provided with orientation on safeguards and HSE?				
	i. Medical screening carried out for all workers for communicable diseases such as HIV and COVID-19?				
	j. Company EHS policy available and displayed?				
	k. Site risk assessment carried out before start of work?				
	l. Permit to work system followed for critical works?				
	m. Incident reporting and investigation system in place?				
	n. Health and Safety committee established and OHS performance reviewed periodically?				
2.	The Facilities				
	a. Are there first aiders and first aid kits on site? (1 kit and 1 first aider for every 25 workers)				
	b. Are emergency contact details available on-site?				
	c. Are there PPEs available? What are they?				
	d. Are the PPEs in good condition?				
	e. Are there firefighting equipment on site?				
	f. Are there separate sanitary facilities/toilets for male and female workers?				
	g. Are the toilets in good conditions, clean, and provided with water all the time?				
	h. Is drinking water supply available for workers?				

Monitoring/Inspection Questions		Previous SAEMR (2021 Jul-Dec)	This SAEMR (2022 Jan-Dec)	Observation (improved/worse) and Reason/ Justification	Required Action
	i. Is there a rest area for workers?				
	j. Are storage areas for chemicals available and with protection? İn safe locations?				
	k. Protection from extreme weather provided?				
	l. Are the workers camp kept in clean and safe conditions?				
3.	Occupational Health and Safety				
	a. Are the PPEs being used by workers **at all times**?				
	b. Toolbox talk given to all workers **on daily basis**				
	c. Has the Health and Safety Plan been reviewed and revised during the six-month period?				
	d. Is the Health and Safety Plan translated to local language understandable by foreign and local workers?				
	e. Are excavation trenches provided with shores or protection from landslide?				
	f. Excavation and trenches deeper than 2 meters are done through permit to work system and following the safe system of work?				
	g. Is break time for workers provided?				
	h. Adequate level of light is maintained for working during dark hours?				
	i. Buried and overhead utilities identified and controls taken; as appropriate?				
	j. Electrical tools being used are double insulated and damage free?				
	k. Equipment and tools being used are safe and not broken?				
	l. All work above 2 meters at height is done with guard rails installed and wearing full body harness?				
	m. Confined space entry is done through Permit to work system?				
	n. Are workers (contractors and ubcontractors) covered by accident insurance?				
	o. Are signages and warning signs installed on worksites?				

Monitoring/Inspection Questions		Previous SAEMR (2021 Jul-Dec)	This SAEMR (2022 Jan-Dec)	Observation (improved/worse) and Reason/ Justification	Required Action
	How many per xxx meters and locations?				
	p. Are signages and warning signs translated to local language?				
	q. Are signages and warning signs visible even at night time?				
	r. Number of accidents during reporting period				
	s. Is there a logbook for Health and Safety?				
4.	Community Safety				
	a. Are excavation areas provided with hard barricades around them to protect accidental fall?				
	b. Are safety signages posted around the sites where there are houses, business, or communities?				
	c. Are temporary and safe walkways for pedestrians available near work sites?				
	d. Are there traffic officers or flagman/flagmen to manage traffic and speed limit?				
	e. Are there traffic officers or flagman/flagmen near sites where there are houses, business, or communities?				
	f. Is there a record of treated water quality testing/measurement?				
	g. Is there a logbook for community feedback and/or complaints?				
	h. How many stakeholders engagement, consultations, and information disclosure on EHS have been conducted?				
5.	Solid Waste Management				
	a. Are excavated materials placed sufficiently away from water courses (at least 20 meters)?				
	b. Is solid waste segregation and management in each work site?				
	c. Are hazardous wastes stored separately from non-hazardous wastes?				
	d. Is there a daily collection of solid wastes from work sites?				

Monitoring/Inspection Questions		Previous SAEMR (2021 Jul-Dec)	This SAEMR (2022 Jan-Dec)	Observation (improved/worse) and Reason/ Justification	Required Action
	e. Is there a temporary storage area for wastes at worker's camp?				
	f. Are reuseable and recyclable materials segregated?				
	g. Is there a logbook for waste collection and disposal?				
6.	Water and Wastewater Management				
	a. Are instrumental water quality monitoring activities conducted per agreed SSEMP and monitoring program?				
	b. Are instrumental wasterwater quality monitoring activities conducted per agreed SSEMP and monitoring program?				
	c. Does the Contractor test the water supplied to workers for drinking and other domestic use?				
	d. Are there separate sanitary facilities for various types of use (septic tanks, urination, washing, etc.)?				
	e. Is any wastewater discharged to storm drains?				
	f. Is any wastewater being treated prior to discharge?				
	g. Are measures in place to avoid siltation of nearby drainage or receiving bodies of water?				
	h. Are silt traps or sedimentation ponds installed for surface runoff regularly cleaned and freed of silts or sediments?				
	i. Is there a logbook for water and wastewater quality monitoring?				
7.	Dust Control				
	a. Are instrumental air quality monitoring activities conducted per agreed SSEMP and monitoring program?				
	b. Is the construction site watered on daily basis to minimize generation of dust?				
	c. Are roads within and around the construction sites sprayed with water on regular intervals?				
	d. Is there a speed control for vehicles at construction sites?				

Monitoring/Inspection Questions		Previous SAEMR (2021 Jul-Dec)	This SAEMR (2022 Jan-Dec)	Observation (improved/worse) and Reason/ Justification	Required Action
	e. Are stockpiles of sand, cement and other construction materials covered to avoid being airborne?				
	f. Are construction vehicles carrying soils and other excavated materials/spoils covered?				
	g. Are power/diesel generators provided with air pollution control devices?				
	h. Are all vehicles regularly maintained to minimize emission of black smoke? Do they have valid emission permits?				
	i. Is there a logbook for air quality monitoring?				
8.	Noise Control				
	a. Are instrumental noise monitoring activities conducted per agreed SSEMP and monitoring program?				
	b. Are there any works near sensitive receptors during night time?				
	c. Do generators operate with doors closed or provided with sound barrier around them?				
	d. Is idle equipment turned off or throttled down?				
	e. Are there noise mitigation measures adopted at construction sites?				
	f. Are neighboring residents notified in advance of any noisy activities expected at construction sites?				
	g. Is there a logbook for noise level monitoring?				
9.	Soil Contamination Control				
	a. Are fuels, oils, lubricants, bitumen and other similar materials stored in a covered and concrete-lined storage area?				
	b. Are the fuel tanks/storage constructed with bund to prevent oil, fuels, or chemicals from escaping into the environment if the tank/storage leak or burst?				
	c. Are fuels, oils, lubricants, bitumen and other similar materials properly labeled?				

Monitoring/Inspection Questions		Previous SAEMR (2021 Jul-Dec)	This SAEMR (2022 Jan-Dec)	Observation (improved/worse) and Reason/ Justification	Required Action
	d. Are storage areas inspected on daily basis?				
	e. Are there sufficient equipment and materials to manage spills?				
	f. There are no source of fire or spark near the storage areas (within 20 meters)?				
	g. Are material safety data sheet (MSDS) available on site?				
	h. Are excess chemicals or materials disposed according the MSDS?				
10.	Traffic Management				
	a. Are reflective traffic signages available around the construction sites and nearby roads?				
	b. Are re-routing signages sufficient to guide motorists?				
	c. Are the excavation sites along roads provided with hard barricades with reflectors?				
	d. Are the excavation sites provided with sufficient lighting at night?				
	e. Are contractor's vehicles and heavy equipment parked properly and not causing additional traffic burden?				
	f. Are affected residents, business and local communities informed in advance of traffic rerouting, works, or road closure?				
10.	Grievance Redressal, Stakeholders Engagement, and Information Disclosure				
	a. Has the contractors posted contact details of focal persons in case of complaints?				
	b. Are the contact details readable and understable by target audience?				
	c. Are the workers (contractors and subcontractors) informed of the GRM?				
	d. Have the PIU, supervising consultants, and contractors provided EHS-related information to local communities, business, and sensitive receptors?				
	e. Are EHS records/documents readily available at the site, to				

Monitoring/Inspection Questions		Previous SAEMR (2021 Jul-Dec)	This SAEMR (2022 Jan-Dec)	Observation (improved/worse) and Reason/ Justification	Required Action
	the inspection team, and stakeholders?				

52. xxxxx

3.5 Unanticipated Impacts or Risk

53. Contractors taking actively protective measures against COVID-19 and following the recommendations related to COVID -19 issued by relevant Authorities. The contractor distributed the "Coronavirus Protection Manual" among the staff and provided the PPEs, face masks, disposable hand sanitizer, and disinfection of the working areas regularly. CC ensures to take the temperature for everyone twice per day.

54. In particular, the Contractor launched a poster campaign providing necessary instructions (information posters) within all Camp facilities and worksites. Strict procedures were developed for entering the Contractor's facilities, such as thermal screening by a touch-free thermometer, adequate provision of a rapid test at the project site offices, and provision of disinfectant of alcohol-based sanitizer at the project site office and worksites.

55. All the training postponed that required groups of people and the number of meetings was reduced together with the number of attendees. Social distance is practiced during the necessary toolbox talks. Personnel is entering the dining facilities in small groups and tables are distanced from each other.

56. All these control measures are being supervised by the Contractors management team, in order to stay in compliance. The Engineer is constantly monitoring this process.

4. RESULTS OF ENVIRONMENTAL MONITORING

4.1 Overview of the Monitoring Conducted During Current Period

57. During the monitoring period, the Contractor has hired a certified laboratory, namely Sustainable Development Solutions Caucasus (SDSC) LLC for noise, vibration, air quality, and surface water quality instrumental analysis. The sampling and measurements were conducted in May 2022. The latest monitoring report including noise, vibration, air quality, and surface water quality measurements was sent via an official letter on 22nd, June.

58. The sampling location for air, noise, vibration, and water quality were selected considering the ongoing construction activities as shown in Figure 6 and Figure 7. The objective was to evaluate the potential impacts on the environmental sensitive receptors resulting from the construction activities. The results of the instrumental monitoring are given in tabular, while details are given in Annex 3.

Figure 6: Surface Water Quality Sampling Locations

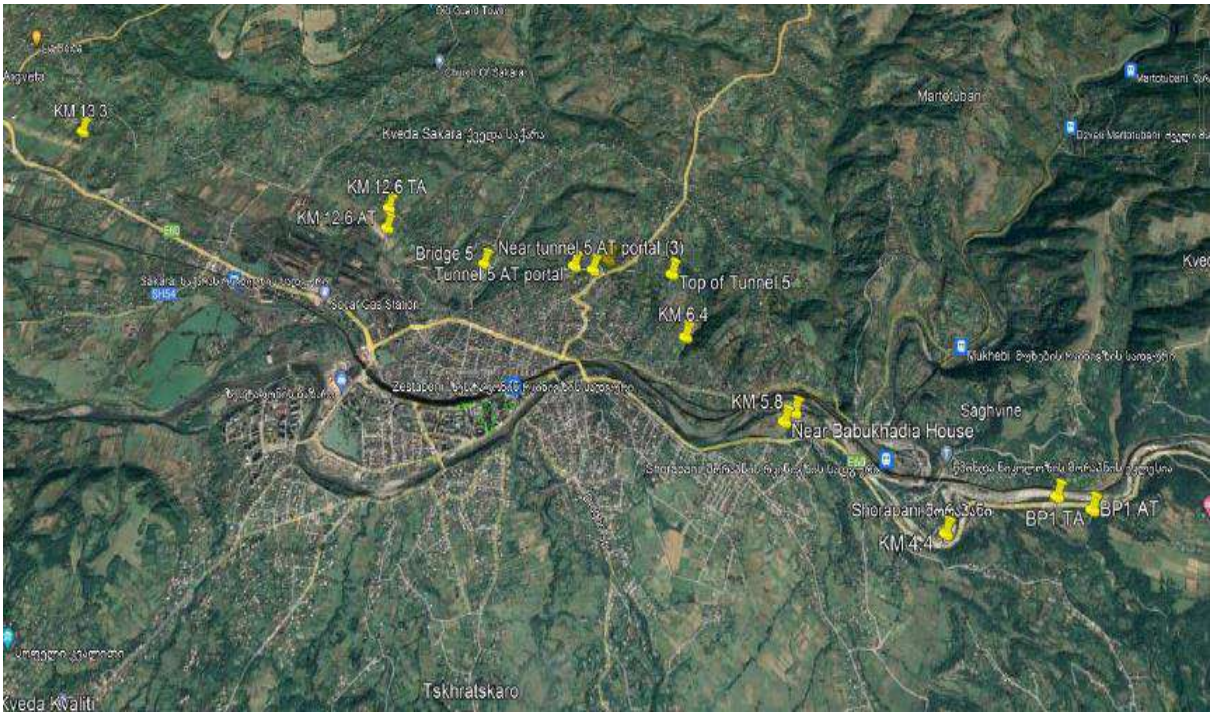


Figure 7: Noise, Vibration, and Ambient Air Quality Sampling Locations

Surface Water Quality

59. During the reporting period January – June 2022 there were 5 monthly sampling sessions for surface water quality analysis. The surface water samples were collected from River Dzirula (Bridge N1), River Dzirula (Bridge N2), River Borimela (Bridge N3), and River Kvirila (Bridge N4) as shown in Table 10. The samples were taken 50 meters upstream and 50 meters downstream (where possible) from the construction site to evaluate the water quality difference before and after the

construction activities. The results are shown between Table 11 and Table 14. Important parameters which are exceeding the National MAC levels are shown between Figures 8 and 11. The results indicated slight variations in terms of Total Suspended Solids (TSS) in the river water quality upstream and downstream from the bridge piling activities. CC to restrict all kinds of machinery entering the river protection zone. Moreover, COD levels and Total Coliform levels are generally higher than National MAC levels.

Table 10: Surface Water Quality Monitoring Locations

Location	**Coordinates**	
	X	**Y**
River Dzirula (Bridge N1)	340316.57	4663074.32
River Dzirula (Bridge N2)	342153.91	4661762.47
River Borimela (Bridge N3)	343185.48	4662005.84
River Kvirila (Bridge N4)	344312.76	4661999.60

Table 11: Surface Water Analysis Results of Dzirula River (Bridge N1) Up and Down Stream

Parameters	Unit	EIA Standards (National MAC)	*Baseline results- Upstream (Feb 2022)*	*Baseline results- Downstream (Feb 2022)*	Upstream (Mar 2022)	Downstream (Mar 2022)	Upstream (Apr 2022)	Downstream (Apr 2022)	Upstream (May 2022)	Downstream (May 2022)
pH	-	6.5-8.5	7,85	7,87	7,90	7,88	7,90	7,92	7,80	7,90
BOD	mg/L	6,00	<3	<3	<3	<3	<3	<3	<3	<3
COD	mg/L	30,00	80,00	76,00	64,00	60,00	64,00	62,00	76,00	79,00
TSS	mg/L	Increase no more than 0.75 mg/L	10,00	12,00	26,00	37,00	38,00	34,00	48,00	42,00
Total N	mg/L	NA	1,50	1,20	<0,5	<0,5	<0,5	<0,5	1,30	1,00
Total P	mg/L	2,00	0,20	0,28	<0,06	<0,06	0,03	0,03	0,21	0,30
Nitrates	mg/L	40,00	<1	<1	<1	<1	<1	<1	<1	<1
Phosphates	mg/L	44684,00	0,79	0,80	<0,02	<0,02	0,09	0,09	0,88	0,88
Oil and Grease	mg/L	0.3	<0,3	<0,3	<0,3	<0,3	<0,3	<0,3	<0,3	<0,3
Total Coliforms	MPN	400,00	1.800	2.400	350	390	8.000	8.700	75.000	32.000

Not 1. The parameters with red color are higher than the National MAC levels at that analysis period.

Not 2. The highlighted parameters are significantly higher than the upstream levels at that analysis period.

Table 12: Surface Water Results of Dzirula River (Bridge N2) Up and Down Stream

Parameters	Unit	EIA Standards (National MAC)	*Baseline results (June 2021)*	Upstream (Jan 2022)	Downstream (Jan 2022)	Upstream (Feb 2022)	Upstream (Feb 2022)	Upstream (Mar 2022)	Downstream (Mar 2022)	Upstream (Apr 2022)	Downstream (Apr 2022)	Upstream (May 2022)	Downstream (May 2022)
pH	-	6.5-8.5	8,12	8,05	8,07	8,02	8,03	8,05	8,05	7,85	7,89	7,85	7,90
BOD	mg/L	6,00	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3
COD	mg/L	30,00	28,00	73,00	87,00	70,00	72,00	72,00	70,00	57,00	60,00	78,00	82,00
TSS	mg/L	Increase no more than 0.75 mg/L	15,00	17,00	24,00	12,00	14,00	7,00	8,00	26,00	24,00	32,00	42,00
Total N	mg/L	NA	<0,5	1,30	1,70	1,00	1,20	<0,5	<0,5	<0,5	<0,5	1,10	1,20
Total P	mg/L	2,00	0,083	0,25	0,40	0,15	0,20	0,29	0,30	0,15	0,14	0,28	0,25
Nitrates	mg/L	40,00	2,00	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Phosphates	mg/L	44684,00	0,25	0,82	1,29	0,72	0,78	0,78	0,89	0,68	0,65	0,87	0,85
Oil and Grease	mg/L	0.3	<0,1	<0,3	<0,3	<0,3	<0,3	<0,3	<0,3	<0,3	<0,3	<0,3	<0,3
Total Coliforms	MPN	400,00	ND	700	800	3.100	3.700	550	600	6.500	10.000	15.000	25.000

Not 1. The parameters with red color are higher than the National MAC levels at that analysis period.

Not 2. The highlighted parameters are significantly higher than the upstream levels at that analysis period.

Table 13: Surface Water Results of Borimela River (Bridge N3) Up and Down Stream

Parameters	Unit	EIA Standards (National MAC)	*Baseline results (June 2021)*	Upstream (Jan 2022)	Downstream (Jan 2022)	Upstream (Feb 2022)	Upstream (Feb 2022)	Upstream (Mar 2022)	Downstream (Mar 2022)	Upstream (Apr 2022)	Downstream (Apr 2022)	Upstream (May 2022)	Downstream (May 2022)
pH	-	6.5-8.5	8,16	8,12	8,01	8,04	8,03	8,10	8,08	7,91	7,86	7,80	7,79
BOD	mg/L	6,00	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3
COD	mg/L	30,00	32,00	65,00	88,00	65,00	62,00	80,00	74,00	72,00	74,00	82,00	84,00
TSS	mg/L	Increase no more than 0.75 mg/L	20,00	4,00	6,00	18,00	24,00	9,00	7,00	17,00	19,00	36,00	37,00
Total N	mg/L	NA	1,50	1,10	0,98	0,90	1,00	<0,5	<0,5	<0,5	<0,5	1,00	1,30
Total P	mg/L	2,00	0,150	0,26	0,38	0,30	0,28	0,13	0,13	0,13	0,11	0,35	0,38
Nitrates	mg/L	40,00	4,00	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Phosphates	mg/L	44684,00	0,45	0,87	0,98	0,90	0,87	0,43	0,40	0,43	0,38	0,90	0,92
Oil and Grease	mg/L	0.3	<0,1	<0,3	<0,3	<0,3	<0,3	<0,3	<0,3	<0,3	<0,3	<0,3	<0,3
Total Coliforms	MPN	400,00	ND	2.300	3.100	2.300	3.400	580	650	3.500	4.700	22.000	18.000

Not 1. The parameters with red color are higher than the National MAC levels at that analysis period.

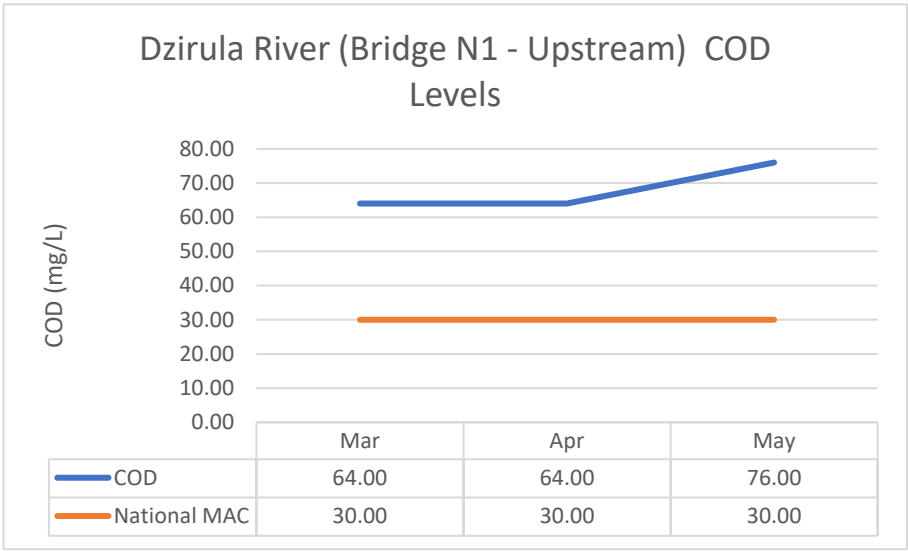
Not 2. The highlighted parameters are significantly higher than the upstream levels at that analysis period.

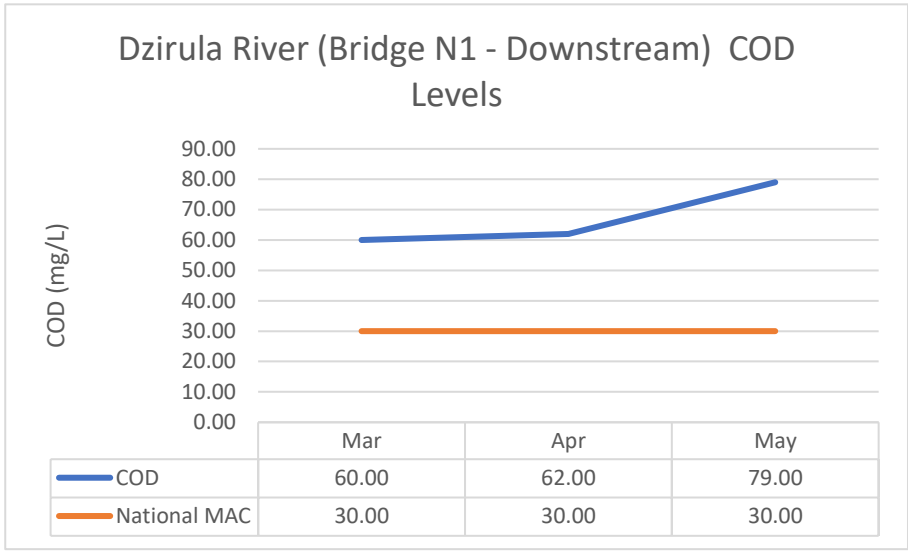
Table 14: Surface Water Results of Kvirila River (Bridge N4) Up and Down Stream

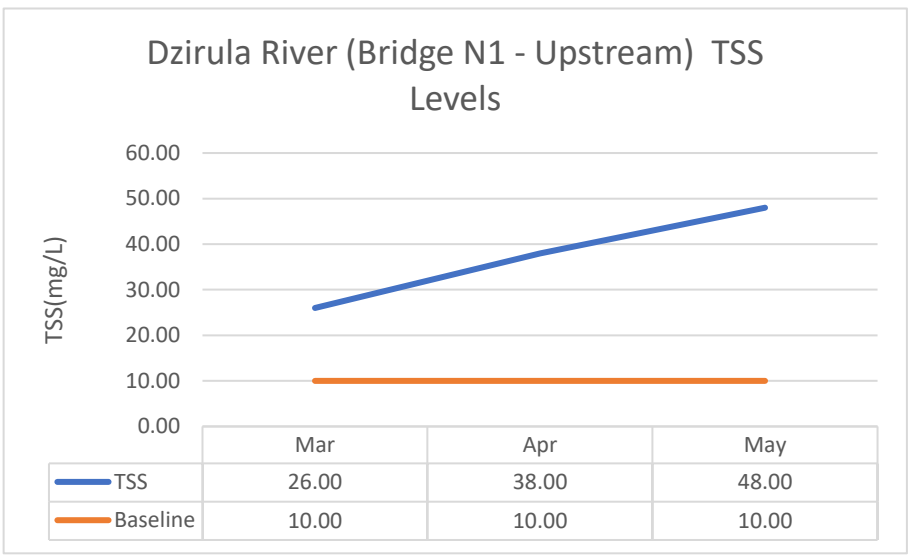
Parameters	Unit	EIA Standards (National MAC)	*Baseline results (June 2021)*	Upstream (Jan 2022)	Downstream (Jan 2022)	Upstream (Feb 2022)	Upstream (Feb 2022)	Upstream (Mar 2022)	Downstream (Mar 2022)	Upstream (Apr 2022)	Downstream (Apr 2022)	Upstream (May 2022)	Downstream (May 2022)
pH	-	6.5-8.5	8,12	7,81	7,84	7,90	7,98	8,00	8,02	7,90	7,87	7,98	8,21
BOD	mg/L	6,00	<3	<3	<3	<3	<3	<3	<3	<3	<3	10,00	12,00
COD	mg/L	30,00	30,00	87,00	89,00	60,00	62,00	96,00	98,00	80,00	78,00	76,00	82,00
TSS	mg/L	Increase no more than 0.75 mg/L	2085,00	64,00	59,00	69,00	62,00	92,00	80,00	14,00	21,00	48,00	46,00
Total N	mg/L	NA	<0,5	1,20	1,00	1,20	1,30	<0,5	<0,5	<0,5	<0,5	1,00	1,00
Total P	mg/L	2,00	0,092	0,29	0,31	0,10	0,12	0,20	0,21	0,18	0,19	0,28	0,39
Nitrates	mg/L	40,00	2,00	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Phosphates	mg/L	44684,00	0,28	0,87	0,88	0,46	0,47	0,62	0,60	0,50	0,52	0,87	1,27
Oil and Grease	mg/L	0.3	<0,1	<0,3	<0,3	<0,3	<0,3	<0,3	<0,3	<0,3	<0,3	<0,3	<0,3
Total Coliforms	MPN	400	250.000	19.000	21.000	1.900	2.400	400	650	3.500	3.800	12.000	14.700

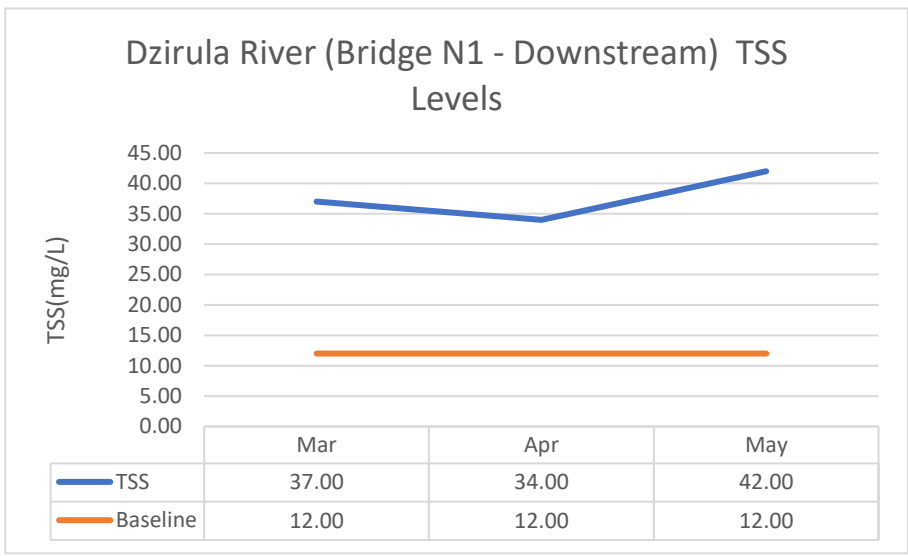
Not 1. The parameters with red color are higher than the National MAC levels at that analysis period.

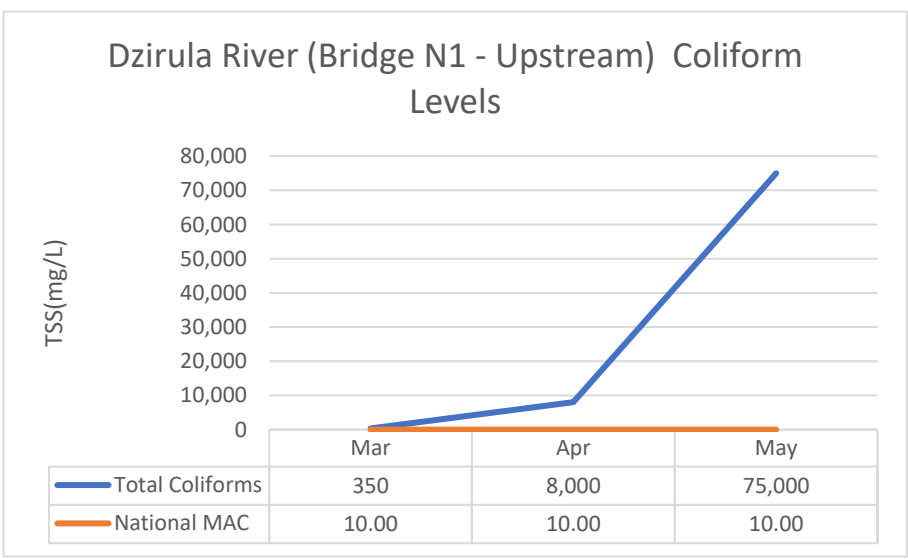
Not 2. The highlighted parameters are significantly higher than the upstream levels at that analysis period.











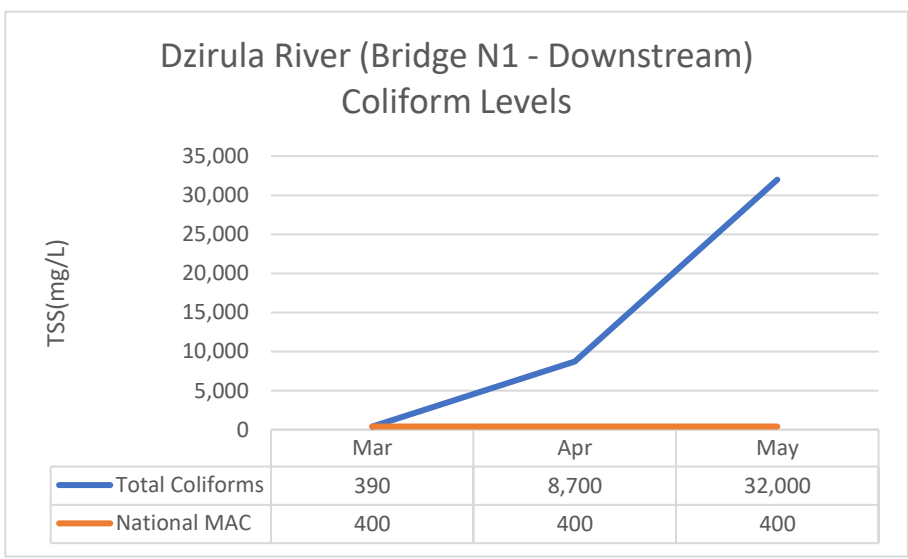
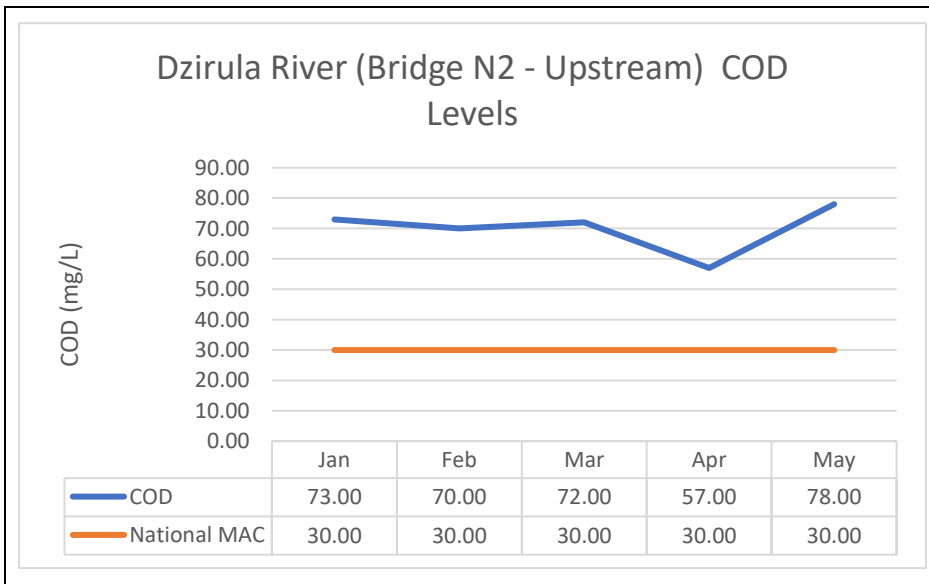
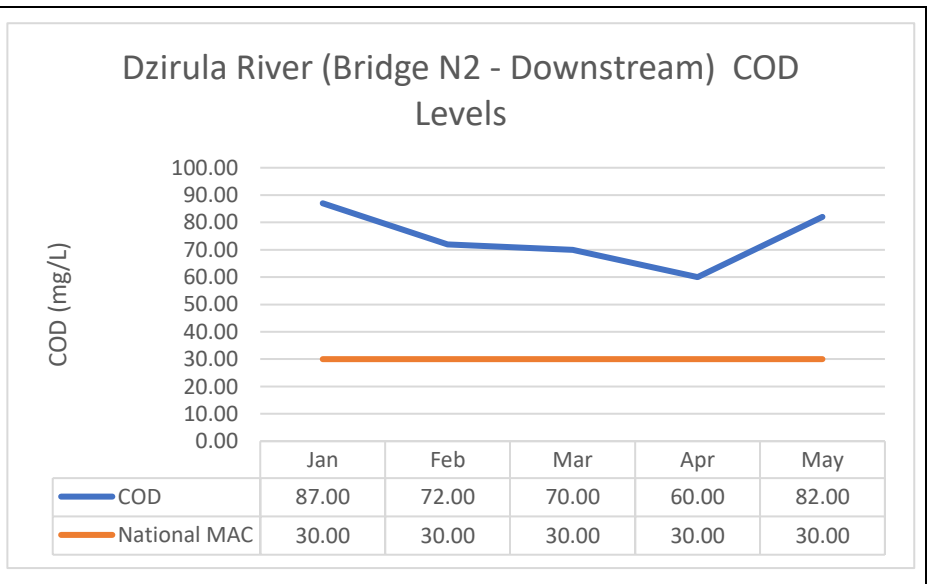
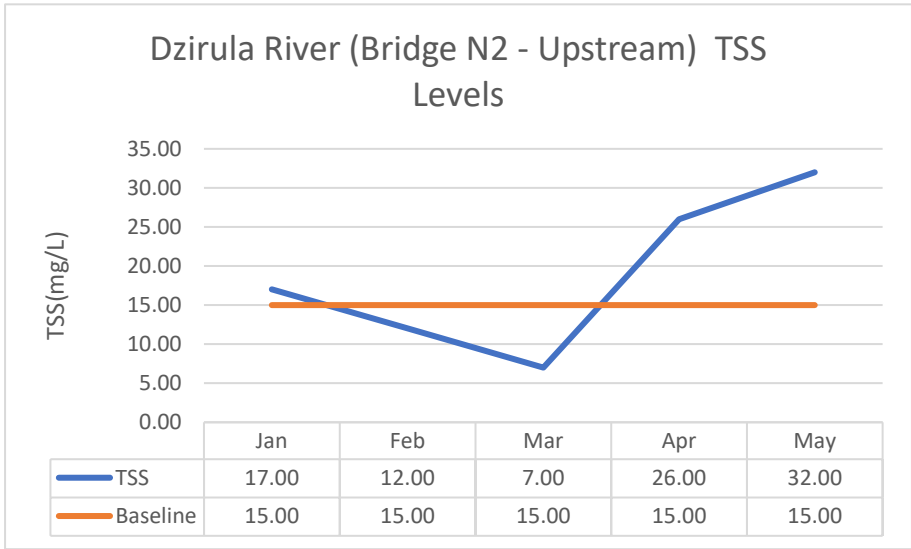
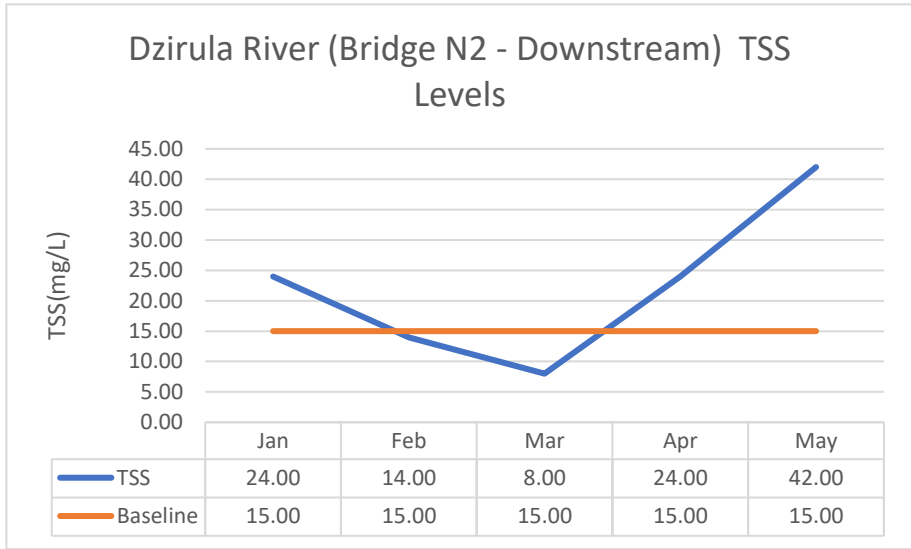


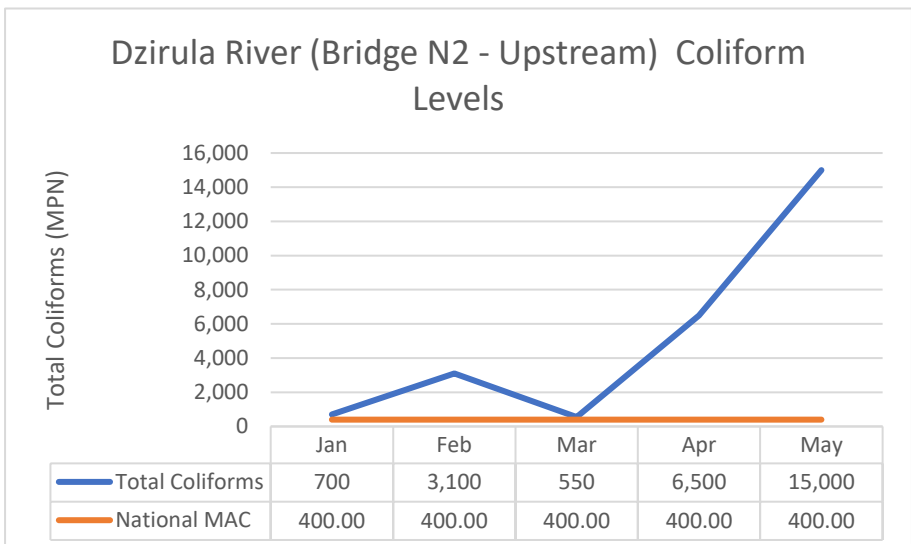
Figure 8: Dzirula River (Bridge N1) Upstream and Downstream COD, TSS, and Total Coliform Charts (March-May 2022)











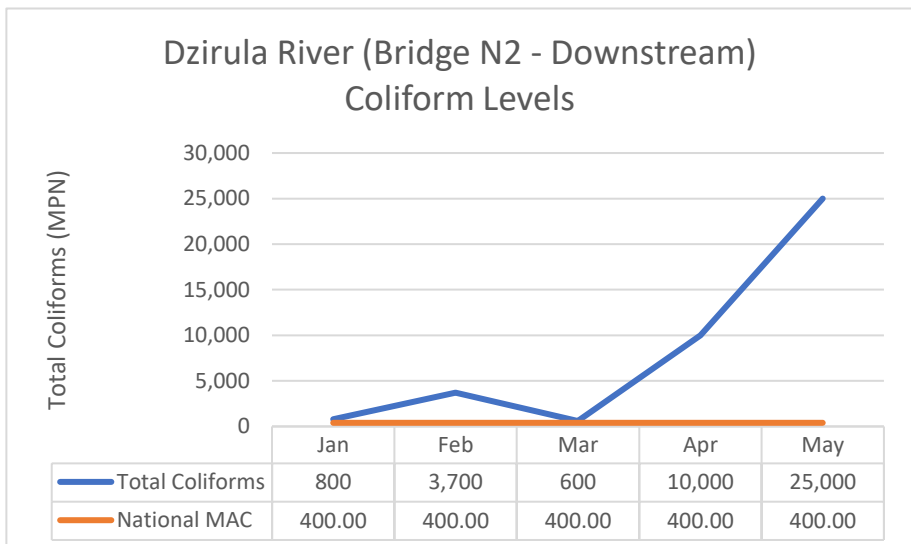
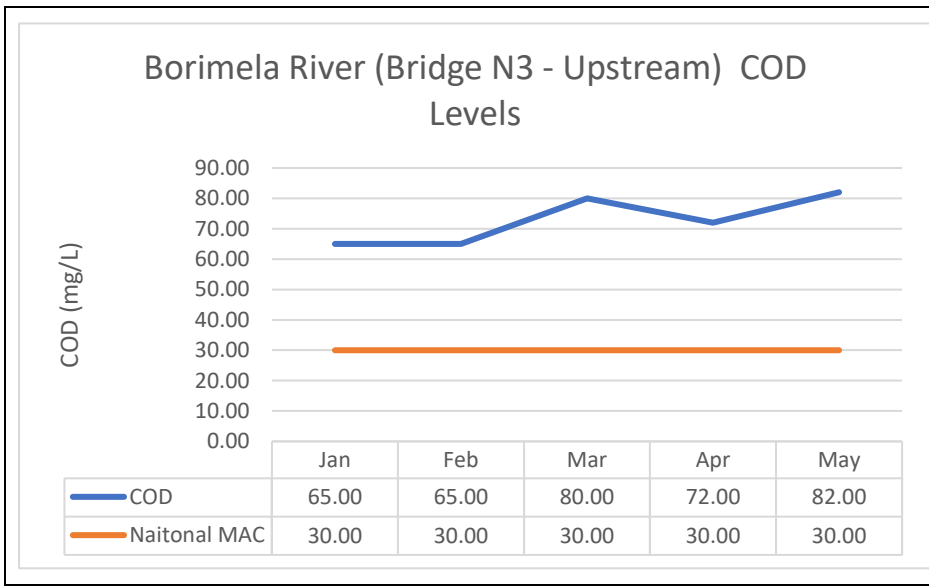
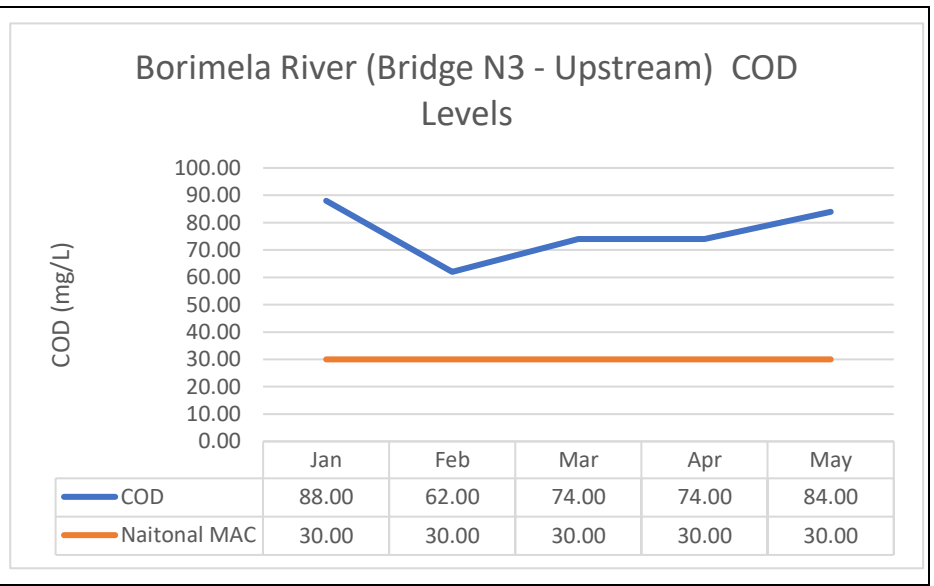
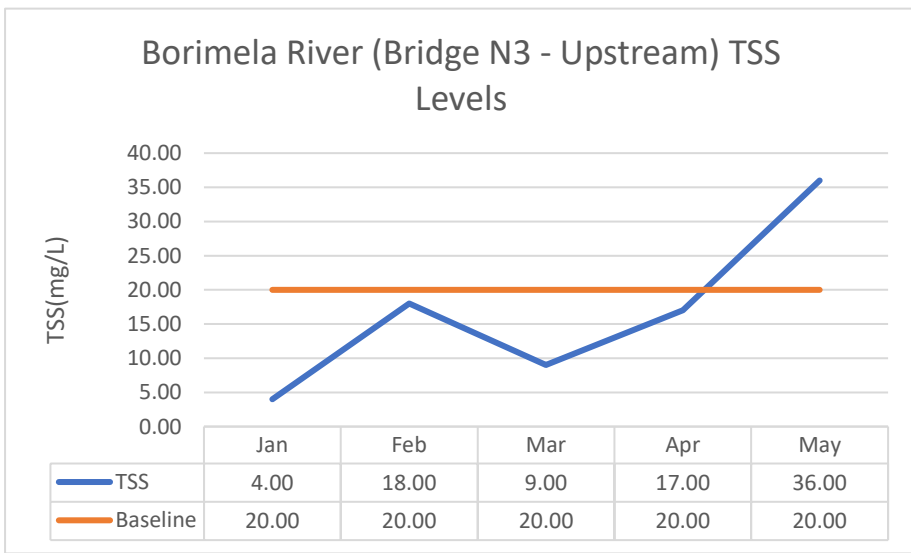
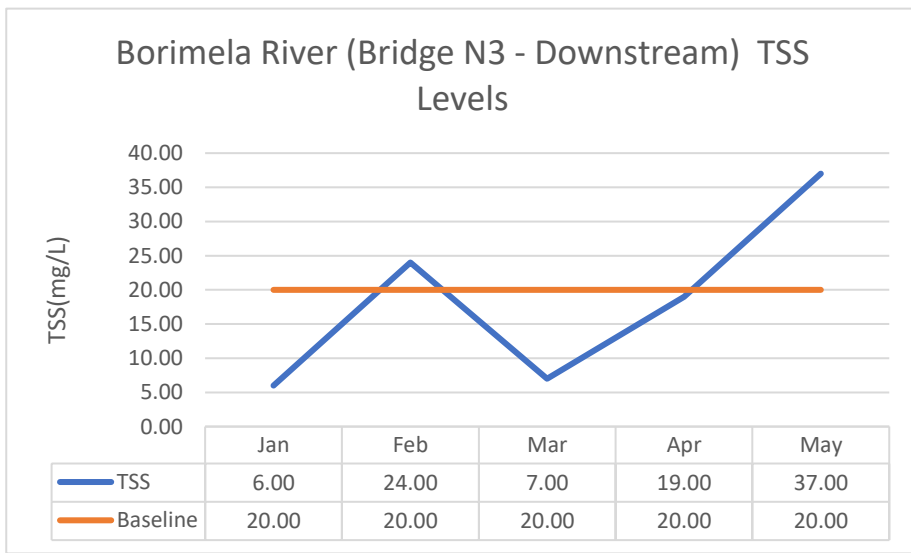


Figure 9: Dzirula River (Bridge N2) Upstream and Downstream COD, TSS, and Total Coliform Charts (January-May 2022)









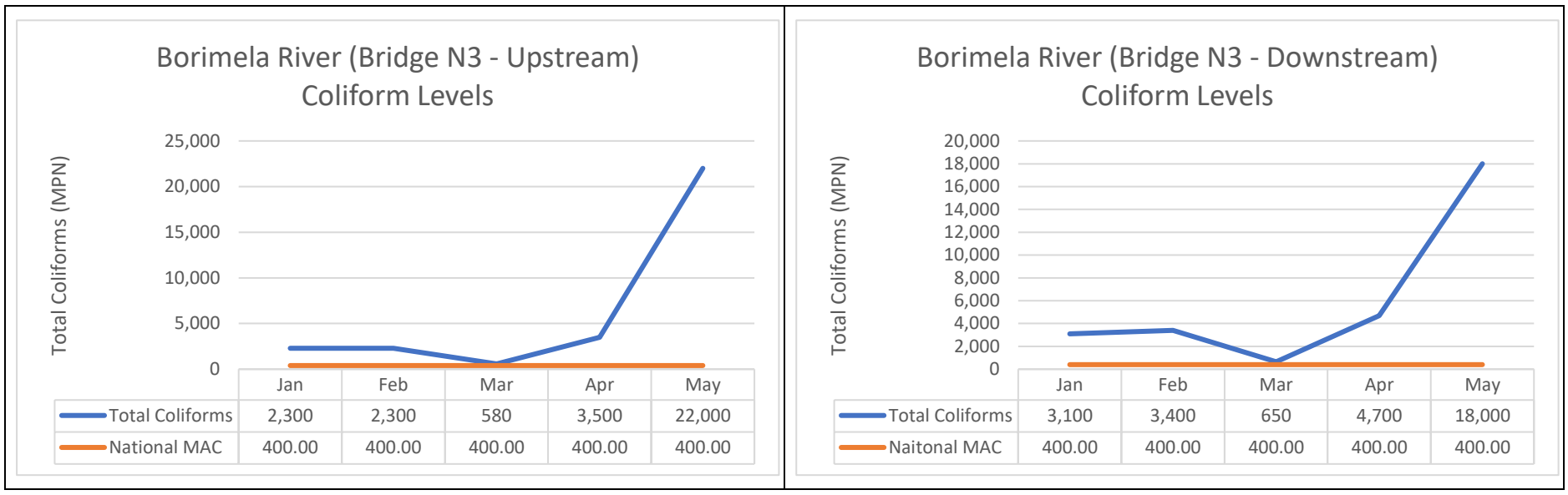


Figure 10: Borimela River (Bridge N3) Upstream and Downstream COD, TSS, and Total Coliform Charts (January-May 2022)

Figure 11: Kvirila River (Bridge N4) Upstream and Downstream COD, TSS, and Total Coliform Charts (January-May 2022)

Noise and Vibration Monitoring

60. Noise monitoring locations were selected to evaluate the impact on the Noise sensitive receptors (NSR) due to various construction activities during the reporting period. The noise monitoring locations are given in Table 15.

Table 15: Noise Monitoring Locations

Location	Coordinates	
	X	Y
Batch Plant 2 (BP2)	338617.08	4664404.19
Near Nebieridze house (Nebieridze)	334912.03	4666175.68
Near Babukhadia house (Babukhadia)	340212	4662807
Between tunnels 4 & 5 (T4-T5)	339444	4663581
Batch Plant 1 (BP1) TA	342363	4661841
Top of Tunnel 5 (T5)	339472	4664180
Tunnel 5 AT portal (T5-AT)	338583	4664433
Bridge 5 (B5)	337746	4664626

61. The average equivalent noise levels (LAeq) recorded during different monitoring locations and periods are indicated in Table 16 and compared with the daytime IFC limits of 55 dB(A) for the residential areas and educational institutions.

62. Overall, the LAeq results vary between 41.5 dB (A) to 72.1 dB(A). According to outdoor-indoor noise reduction (OINR) by the Federal Highway Administration US Department of Transportation, "Noise Measurement Handbook (FHWA-HEP-18-065)" the noise reduction in the interior of the building with masonry structure and the single glazed window would be up to 25 dB(A) while the windows are closed and with open windows, the reduction is 10 dB(A). This means that a slightly higher noise level outside the building would not be felt inside the building by the residents. Moreover, noise levels were taken close to the active construction sites.

63. Vibration monitoring locations were selected to evaluate the impact on the Noise sensitive receptors (NSR) due to various construction activities during the reporting period. The vibration monitoring locations are given in Table 17.

Table 17: Vibration Measurement Locations

Location	Coordinates	
	X	Y
Batch Plant 2 (BP2)	338617.08	4664404.19
Nebieridze	334912.03	4666175.68
Batch Plant 1 TA_opposite (BP1-TA-O)	342361	4661908
Between tunnels 4 & 5 (T4-T5)	339444	4663581
BP 2 (1) (BP2-1)	338903	4664449
BP 2 (1)_opposite (BP2-1O)	338913	4664419
BP 2 (3) (BO2-3)	338752	4664365
Top of Tunnel 5 (T5)	339472	4664180
Tunnel 5 AT portal (T5-AT)	338583	4664433
Near Tunnel 5 AT portal (1) (NT5-AT-1)	338903	4664449
Near Tunnel 5 AT portal (1)_opposite (NT5-AT-1-O)	338913	4664419
Near Tunnel 5 AT portal (3) (NT5-AT-3)	338752	4664365
Bridge 5 (B5)	337746	4664626

64. Results of the vibrations as indicated in Table 18 reveal that the vibrational levels are in most places insignificant and within the permissible range of the criteria set in the EIA and conditions of the contract. However, the vibration level is higher than the Georgian legislation limit at the measurement location of "Near tunnel 5 AT portal (1) opposite (near Nebieridze house), "Batch Plant 1 TA Opposite", "Batch Plant 2-(1) Opposite", "Batch Plant 2 (3)", and Bridge 5" both in working and non-working hours. Batching Plant 2 is closed and will have no vibration effect on the surrounding.

65. According to the criteria set in EIA based on BS 6472 and German standard DIN 4150-3: 1999 for damage to structures, there is no damage likely to structure building due to vibration at PPV less than 5 mm/sec, risk of cosmetic damage from 5-15 mm/sec and risk of structural damage at PPV greater than 15 mm/sec.

Table 16: Average Equivalent Noise Levels Result during the Monitoring Period

	Average Equivalent Noise level (LAeq) Measurement dB(A)																			
Location/Month	BP2 - S1*	BP2 - S2*	Nebieridze - S1*	Nebieridze - S2*	BP2 – NW**	BP2 – W***	Babukhadia	T4-T5	Top of T5 - NW	Top of T5 - W	Top of T5 – E	BP1 TA – NW**	BP1 TA – W***	T5-AT – NW	T5-AT – W	B5 – NW	B5 – W	B5 – E****	B5 - S1	B5 - S2	**IFC Standard**
Jan-22	60,2	55,4	49,1	57,3																	
Feb-22					41,9	56,5	69,8	50,5				70,7	82,5								
Mar-22					58,1	54,8	69,3		42,5	42,8		71,2	69,8						58,5	67,9	**55,0**
Apr-22							69,6				46,5	72,1	71,1	61,0	61,1						
May-22											41,5	68,2	71,3	57,3	59,9	52,0	61,5	50,5		41,5	

*S - Session
**NW- non-working
***W – working
****E – Evening

Table 18: Vibrational Monitoring Results

Location/Session	**Month**	**Peak Particle Velocity (PPV) mm/sec**			**Peak Vector Max Values**		**Legislation limits**	
		Transversal Y	**Vertical Z**	**Longitudinal X**	**mm/sec**	**db**	**mm/sec**	**db**
BP2 - W*	Jan	0,292	0,134	0,205	0,322	76,20	1,10	67 (+10)
	Mar	0,095	0,087	0,142	0,148	69,40	1,10	67 (+10)
BP2 - NW**	Jan	0,095	0,118	0,110	0,161	70,20	1,10	67 (+10)
	Mar	0,244	0,229	0,339	0,393	77,90	1,10	67 (+10)
Nebieridze (background)	Jan	0,158	0,158	0,118	0,212	72,50	1,10	67 (+10)
Nebieridze - W	Jan	1,072	0,497	0,694	1,223	87,80	1,10	67 (+10)
	Feb	0,859	0,418	0,560	0,902	85,10	1,10	67 (+10)
	Feb	0,508	0,381	0,635	0,898	85,10	1,10	67 (+10)
BP1-TA-O - NW	Feb	0,300	0,276	0,307	0,397	78,00	1,10	67 (+10)
	Mar	0,599	0,607	0,906	0,928	85,40	1,10	67 (+10)
BP1-TA-O - W	Feb	1,364	1,293	0,914	1,609	90,20	1,10	67 (+10)
	Mar	0,378	0,197	0,544	0,550	80,80	1,10	67 (+10)
T4-T5	Jan	0,087	0,087	0,087	0,123	67,80	1,10	67 (+10)
BP2-1 - NW	Feb	0,646	0,631	0,244	0,770	83,80	1,10	67 (+10)
	Mar	0,347	0,426	0,355	0,505	80,10	1,10	67 (+10)
BP2-1 - W	Feb	0,323	0,355	0,244	0,420	78,50	1,10	67 (+10)
	Mar	0,229	0,307	0,268	0,324	76,20	1,10	67 (+10)
BP2-1O -NW	Feb	0,410	1,379	0,772	1,413	89,00	1,10	67 (+10)
BP2-1O -W	Feb	0,615	1,253	0,552	1,285	88,20	1,10	67 (+10)
BP2-3 - NW	Feb	0,173	0,575	0,292	0,587	81,40	1,10	67 (+10)
	Mar	0,205	0,441	0,307	0,503	80,10	1,10	67 (+10)
BP2-3 - W	Feb	0,205	0,307	0,244	0,308	75,80	1,10	67 (+10)
	Mar	1,111	0,678	1,592	1,855	91,40	1,10	67 (+10)
T5-AT NW**	Feb	0,134	0,118	0,118	0,178	71,00	1,100	67 (+10)
	May	0.394	0.339	0.638	0.668	82.5	1,100	67 (+10)

T5-AT W*	Feb	0,110	0,197	0,150	0,257	74,20	1,100	67 (+10)
	May	0.276	0.434	0.307	0.450	79.1	1,100	67 (+10)
Top of T5 (baseline)	Mar	0,142	0,095	0,166	0,192	71,70	1,100	67 (+10)
	Apr	0,126	0,142	0,292	0,323	76,20	1,100	67 (+10)
Top of T5 - W	Mar	0,118	0,142	0,134	0,168	70,50	1,100	67 (+10)
	Apr	0,205	0,300	0,300	0,385	77,70	1,100	67 (+10)
Top of T5 – E****	Apr	0,489	0,410	0,244	0,629	82,00	1,100	67 (+10)
	May	0.095	0.102	0.118	0.153	69.7	1,100	67 (+10)
NT5-AT-1 - NW	Apr	0,520	0,701	0,378	0,734	83,30	1,100	67 (+10)
	May	0.473	0.520	0.276	0.593	81.5	1,100	67 (+10)
NT5-AT-1 - W	May	0.410	0.765	0.583	0.773	83.8	1,100	67 (+10)
NT5-AT-1-O NW	May	0.560	0.828	1,364	1,495	89.5	1,100	67 (+10)
NT5-AT-1-O W	Apr	0,347	0,646	0,300	0,657	82,40	1,100	67 (+10)
	May	0.812	1,963	0.725	2,010	92.1	1,100	67 (+10)
NT5-AT-3 NW	May	0.268	0.575	0.292	0.606	81.7	1,100	67 (+10)
NT5-AT-3 W	Apr	0,205	0,370	0,197	0,390	77,80	1,100	67 (+10)
	May	0.315	0.520	0.457	0.590	81.4	1,100	67 (+10)
B5 NW	Mar	0,221	0,244	0,284	0,329	76,40	1,100	67 (+10)
	May	0.126	0.166	0.126	0.195	71.8	1,100	67 (+10)
B5 W	Mar	0,528	1,159	1,490	1,491	89,50	1,100	67 (+10)
	May	0.292	0.252	0.331	0.409	78.2	1,100	67 (+10)
	Apr	0,158	0,181	0,173	0,217	72,70	1,100	67 (+10)
B5 E	May	0.134	0.110	0.181	0.224	73,00	1,100	67 (+10)

*S - Session
**NW- non-working
***W – working
****E – Evening

Air Quality Monitoring

66. Air quality monitoring locations were selected to evaluate the impact of the construction activities on the nearest sensitive receptors. Table 19 shows the measurement locations for passive NO_x and SO_x samplings and dust measurement.

Table 19: Air Quality Measurement Locations

Location	Measurement	Coordinates	
		X	Y
Batch Plant 1 (BP1) AT	NO_x, SO_x	342607	4661686
Batch Plant 1 (BP1) TA	NO_x, SO_x	342363	4661841
Batch Plant 2 (BP2)	NO_x, SO_x, dust	338617.08	4664404.19
KM 4.4	NO_x, SO_x	341326	4661731
KM 5.8	NO_x, SO_x	340323.98	4662868.69
Near Babukhadia's house	NO_x, SO_x, dust	340212	4662807
KM 6.4	NO_x, SO_x	339493.72	4663649.74
Near Babukhadia's house (Babukhadia)	NO_x, SO_x, dust	340212	4662807
Tunnel 5 AT portal (T5)	NO_x, SO_x, dust	338583	4664433
KM 12.6 AT	NO_x, SO_x	336852	4665151
KM 12.6 TA	NO_x, SO_x	336881.01	4665342.12
KM 13.3	NO_x, SO_x	333856	4666662

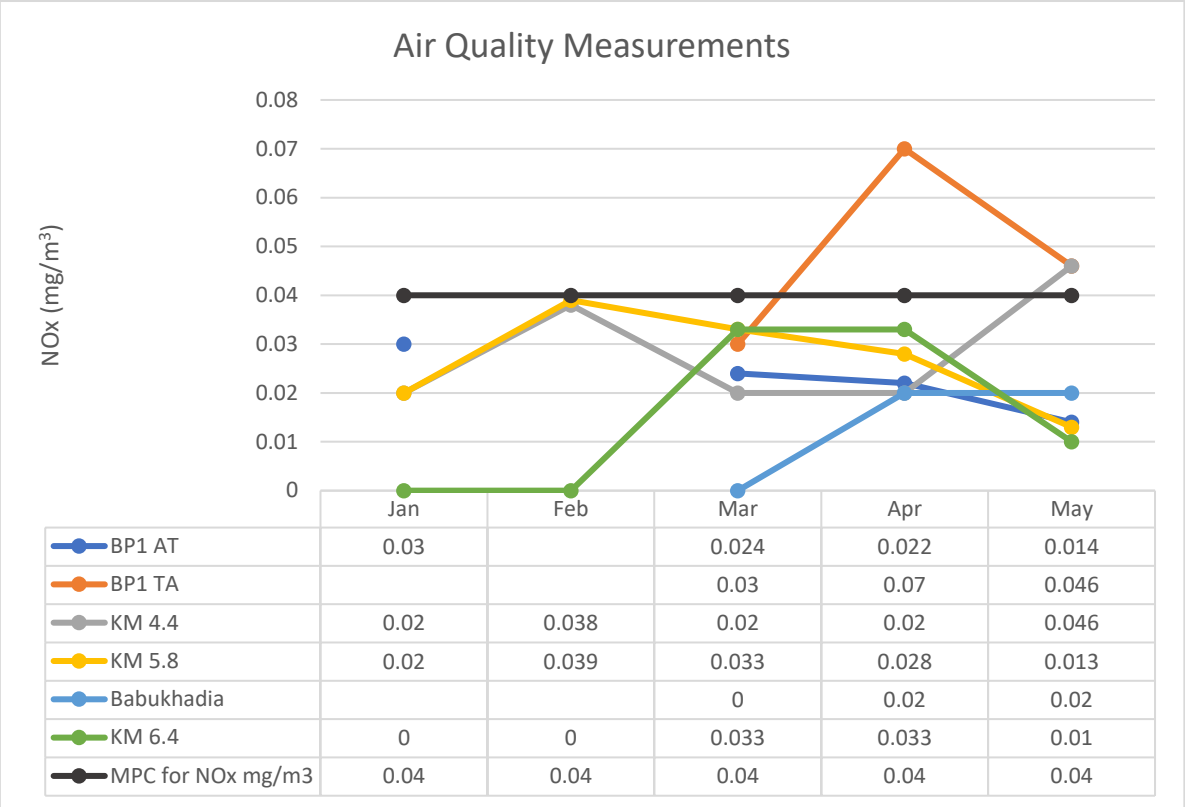
67. The air quality test results are given in Table 20 and Table 21. According to the measurements, PM levels are within the national limits for air quality in Georgia. There are several locations where NOx levels are slightly higher than the MPC limits. These data are shown in Figure 12.

Table 20: Air Quality (SO_x, NO_x) Measurement Results

Location	Month	Exposure time (h)	SO_x mg/m^3	NO_x mg/m^3	*MPC for SO_x mg/m^3	MPC for NO_x mg/m^3
BP1 AT	Jan	692,08	<0,002	0,03	0,05	0,04
	Feb				0,05	0,04
	Mar	629	<0,002	0,024	0,05	0,04
	Apr	670	<0,02	0,022	0,05	0,04
	May	695	<0,02	0,014	0,05	0,04
BP1 TA	Jan					
	Feb					
	Mar	626,6	<0,002	0,03	0,05	0,04
	Apr	670	<0,02	0,07	0,05	0,04
	May	695	<0,02	0,046	0,05	0,04
KM 4.4	Jan	692,22	<0,002	0,02	0,05	0,04
	Feb	1011,25	<0,002	0,038	0,05	0,04
	Mar	646,4	<0,02	0,02	0,05	0,04
	Apr	677	<0,02	0,02	0,05	0,04
	May	695,08	<0,02	0,046	0,05	0,04

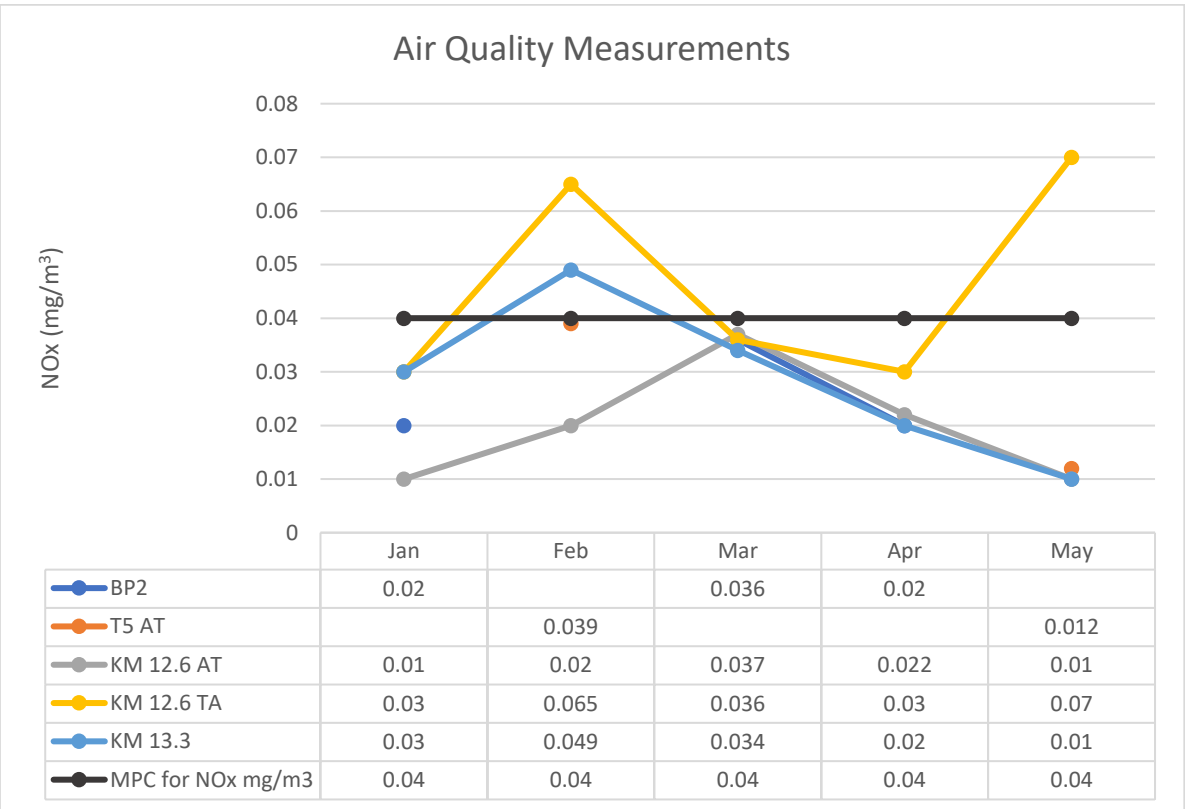
KM 5.8	Jan	692,15	<0,002	0,02	0,05	0,04
	Feb	1011,27	<0,002	0,039	0,05	0,04
	Mar	627,5	<0,02	0,033	0,05	0,04
	Apr	677	<0,02	0,028	0,05	0,04
	May	698,08	<0,02	0,013	0,05	0,04
Babukhadia	Jan					
	Feb					
	Mar	678,9	<0,02	<0,02	0,05	0,04
	Apr	665	<0,02	0,02	0,05	0,04
	May	696,05	<0,02	0,02	0,05	0,04
KM 6.4	Jan	692,03	<0,002	<0,01	0,05	0,04
	Feb	989,68	0,03	<0,02	0,05	0,04
	Mar	673,7	<0,02	0,033	0,05	0,04
	Apr	668	<0,02	0,033	0,05	0,04
	May	697,8	<0,02	0,01	0,05	0,04
BP2	Jan	674,63	<0,002	0,02	0,05	0,04
	Feb					
	Mar	645,8	<0,02	0,036	0,05	0,04
	Apr	669	<0,02	0,02	0,05	0,04
	May					
T5 AT	Jan					
	Feb	1009,3	<0,02	0,039	0,05	0,04
	Mar					
	Apr					
	May	695,58	<0,02	0,012	0,05	0,04
KM 12.6 AT	Jan	675,87	<0,002	0,01	0,05	0,04
	Feb	1002,28	<0,002	0,02	0,05	0,04
	Mar	654	<0,02	0,037	0,05	0,04
	Apr	665	<0,02	0,022	0,05	0,04
	May	677,92	<0,02	0,01	0,05	0,04
KM 12.6 TA	Jan	675,87	<0,002	0,03	0,05	0,04
	Feb	1002,17	<0,002	0,065	0,05	0,04
	Mar	653,7	<0,02	0,036	0,05	0,04
	Apr	669	<0,02	0,03	0,05	0,04
	May	677,92	<0,02	0,07	0,05	0,04
KM 13.3	Jan	671,87	<0,002	0,03	0,05	0,04
	Feb	1006,85	<0,002	0,049	0,05	0,04
	Mar	654,2	<0,02	0,034	0,05	0,04
	Apr	669	<0,02	0,02	0,05	0,04
	May	697,17	<0,02	0,01	0,05	0,04

*Maximum permissible concentrations (MPC) of atmospheric air pollutants in populated areas hygiene norms 2.1.6. 002 -01.



	Jan	Feb	Mar	Apr	May
BP1 AT	0.03		0.024	0.022	0.014
BP1 TA			0.03	0.07	0.046
KM 4.4	0.02	0.038	0.02	0.02	0.046
KM 5.8	0.02	0.039	0.033	0.028	0.013
Babukhadia			0	0.02	0.02
KM 6.4	0	0	0.033	0.033	0.01
MPC for NOx mg/m3	0.04	0.04	0.04	0.04	0.04

Figure 12: Air Quality Measurement Results of NOx



	Jan	Feb	Mar	Apr	May
BP2	0.02		0.036	0.02	
T5 AT		0.039			0.012
KM 12.6 AT	0.01	0.02	0.037	0.022	0.01
KM 12.6 TA	0.03	0.065	0.036	0.03	0.07
KM 13.3	0.03	0.049	0.034	0.02	0.01
MPC for NOx mg/m3	0.04	0.04	0.04	0.04	0.04

Figure 12: Air Quality Measurement Results of NOx (cont.)

Table 21: Air Quality (PM) Measurement Results

	Location/Session	PM_{10} (*µg/m3)*			$PM_{2.5}$ (*µg/m3)*			PM_{Total} (*µg/m3)*		
		30 Min Avg.	min	max	30 Min Avg.	min	max	30 Min Avg.	min	max
BP2	Jan - S1*	28	19	50	27	19	49	28	19	50
	Jan - S2	18	16	21	18	15	21	18	16	21
	Mar - W**	22	19	27	22	19	27	22	19	27
	Mar - NW***	20	16	25	19	16	25	20	16	25
	Apr- W**	16	13	19	16	13	19	16	13	19
	Apr- NW***	15	13	18	15	13	18	15	13	18
T5 AT	Feb - W**	19	17	21	19	17	21	19	17	21
	Feb - NW***	20	17	21	19	17	21	20	17	21
	May - W**	8	5	24	8	5	24	8	5	24
	May - NW***	3	1	14	3	1	14	3	1	14
Babukhadia	Feb	50	34	76	49	34	75	50	34	76
	Mar	26	16	33	25	16	33	26	16	36
	Apr	69	49	89	69	49	87	69	49	89
	May	69	49	89	69	49	87	69	49	89

4.2 Summary of Monitoring Outcomes

68. For regular monthly instrumental monitoring of the parameters for air and water quality and noise levels and to control the pollution levels, the contractor has hired the Sustainable Development Solutions Caucasus (SDSC) LLC a certified laboratory and carried out testing on monthly basis from August 2021.

69. Air quality was tested at various locations along the project area and test results revealed that the dust level and gaseous pollutant levels are within the National and IFC acceptable range.

70. Air quality - Comparisson with baseline data.

71. Air quality - Comparisson with previous reporting period.

72. Air quality - Trend since the work started.

73. There is no significant effect of construction activities on river Dzirula as revealed by the water testing at 50 m upstream and 50 downstream of construction activities at different bridge locations. The most important parameters to monitor closely are Chemical Oxygen Demand, Total Suspended Solid, and Total Coliform.

74. Water quality - Comparisson with baseline data.

75. Water quality - Comparisson with previous reporting period.

76. Water quality - Trend since the work started.

77. Vibration levels are insignificant. Maximum noise levels recorded are 72.1 dB(A) close to the active construction sites.

78. Vibration - Comparisson with baseline data.

79. Vibration - Comparisson with previous reporting period.

80. Vibration - Trend since the work started.

81. Air quality - Comparisson with baseline data.

82. Air quality - Comparisson with previous reporting period.

83. Air quality - Trend since the work started.

4.3 Material Resource Mobilization

84. Up to June 2022, the following materials were mobilized on site by the Contractor:

Table 22: Material Mobilization

#	Major materials	Unit	Cumulative
1	Cement	Ton	36,514.62
2	Steel Reinforcement	Ton	8,624.64
3	Bitum and Bitumen emulsion	Ton	13.80
4	Granular materials for Sub Base	M³	0.00
5	Granular materials for Base	M³	6,535.00
6	Granular materials for Concrete	M³	2,881.00
6.1	Sand	M³	67,271.33
6.2	Crushed Aggregates	M³	59,170.46
7	Cages for piles	Unit	0.000

4.4 Waste Management

85. The Contractor developed a Waste Management plan to describe the requirements for establishing and conducting proper waste management and to address the handling, storage, and management of wastes to assure that works are conducted in a manner that minimizes environmental risk and is shared with the MoEPA in 2020. The contractor received comments in January 2021 for the revision of the plan. After revision and resubmission of the plan dated April 23, 2021, it was approved dated May 7, 2021, by the MoEPA. The plan was shared with the Engineer on July 2nd, 2021 officially.

86. The Contractor renewed the agreement with the "Zestafoni Cleaning and Improvement Service Center" of the Zestafoni Municipality regarding the provision of the collection and transportation of domestic wastes on February 2, 2022. The agreement is valid until February 1, 2023.

87. The contractor has developed a waste log to record the movements of all non-hazardous and hazardous wastes. This register/log mainly includes;

- Type of waste,
- The volume or mass of the waste,
- Date of disposal,
- Sub-contractor's name.

88. Detailed information regarding the type of waste disposed of and responsible licensed companies are given in Table 23.

Table 23: Waste Management (January-June 2022)

#	Domestic/Hazardous Waste & Sewage	Volume /kg/m³	Licensed Company
1	Household waste	210 m³	NNLEP "Zestafoni Cleaning and Improvement Service Center" of the Zestafoni Municipality
2	Sewage water	216 m³	Sanitari LLC
3	Used tires	32	Sanitari LLC
4	Hydraulic and used oil	0	Sanitari LLC
5	Waste paints and varnishes	0	Sanitari LLC
6	Chemical additive tanks	0	Sanitari LLC
7	Oil drums	0	Sanitari LLC
8	Used food oil	0	Sanitari LLC

9	Printer tonner	0	Sanitari LLC
10	Absorbents (e.g., oil filters, polluted clothes and materials)	0	Sanitari LLC
11	Medical Waste	0	Sanitari LLC
12	Metal Scraps	0	"Geosteel" LTD
13	Wood Waste	45 m^3	Given to Local Citizens

89. The contractor keeps records of waste transfer notes filled and signed by the Contractor, waste carrier, and receiving facility. During the reporting period, a total of **210 m^3** of domestic waste was transferred to be disposed of.

90. The contractor constructed septic tanks in worker camp no2 and worker camp no3 with a total capacity of 90m^3 and 45m^3 respectively. During the reporting period, the contractor discharged a total of **216 m^3** of domestic wastewater through licensed vacuum trucks owned by "Sanitari LLC".

4.5 Current Period

91. The main source that generates a big amount of the waste is earthworks, specifically: the excavation of the soil and rock soil material excavated from the tunnels. The estimated volume for spoil generation is given below:

    - Estimated spoil generation: 1,830,000 m^3
    - Estimated spoil reuse for embankments: 1,330,000 m^3
    - Spoil needs to be disposed of: 500,000 m^3

92. Two spoil disposal areas were approved by the Ministry of Regional Development and Infrastructure of Georgia (MRDI), and the Roads Department of Georgia (RD). The first approved area is located at the administrative borders of Zestafoni Municipality, N45 Sergo Zakariadze Street (c/c: N32.10.41.096; 32.10.41 .262), right side of the existing E60 main Road KM 185+00 to KM 200+00 with a total area of 42,438 m^2. The second approved spoil area is located in the village Kveda Sakara (C/C N32.03.44.018) with a 10,900 m^2 total area. The contractor has not obtained a "land use permit" for the areas yet.

4.6 Health and Safety

93. HSE Team is responsible implementation, supervision, and monitoring of the construction activities on-site on a daily basis to ensure occupational and community health and safety are maintained. The Contractor's HS specialists include the followings:

    Jan Du: Head HSE officer

    Giorgi Karelidze; Local HSE officer

    Giorgi Kimeridze: Local HSE staff

    Mirza Bagashvil: Local HSE staff

    Lasha Peradze: Traffic Safety

94. Engineer's local HS specialists Mr. Zaal Giorgadze and Nerses Makarov have been continuously monitoring the contractor's HS performance at working areas and have provided advice to the Contractor on how risks must be mitigated. HS specialist, Mr. Giorgadze, prepared and reported approximately 24 weekly safety observation reports during the reporting period. Moreover, Mr. Zura Rukhadze joined to Engineer's team as Road Safety Specialist to ensure traffic safety is ensured during the construction period.

4.6.1 Community Health and Safety

95. No incident reported involving community members or no traffic incident was recorded during the reporting period.

96. The contractor has appointed flagmen to control the movement of heavy vehicles on construction sites and to control the traffic while vehicles entering and exiting the construction sites. All flagmen were trained about the HSE requirements of the project.

97. The contractor has appointed security officers on all construction site entrances and installed a CCTV camera control system in all camp areas and batching plants. Camp areas and batching plants are fenced along to provide isolation. DETECTORI (The Security Company) has installed CCTV Cameras which are being watched and operated by the DETECTOR

4.6.2 Occupational Health and Safety

98. Regular safety inspection of the construction site is being conducted by HS representatives as a continuous process. HS specialist reports all safety deviations to HSE Manager on a daily basis. HS department conducts mandatory HSE induction for new employees and started to provide special safety training for workers to raise safety culture including working at height, flagmen training, driving safety, requirements for earthwork activities, and lifting operations. Moreover, the HS specialist prepares documentation for training, risk assessments for special works, and work procedures.

99. The contractor is providing the mandatory PPEs and special protective equipment for the workers on site. Nevertheless, enforcement of usage is insufficient. The contractor purchased welder's aprons (30 no's) for welders and safety shoes and distributed them to workers.

100. Trends related to the accidents reported during the reporting period are given in Table 24. Based on data provided by the HSE team one major incident with a fatality was reported during the reporting period.

101. The contractor, Engineer, and Road Department started to conduct weekly joint HSE inspections end of May. Additionally, there are daily walkthroughs by the HSE inspectors from the Contractor and Engineer.

Table 24: Types of Accidents Reported

Accident Type	Reporting Period (January 2022 to June 2022)	Total (Dec 2020 to June 2022)
Near Miss	0	0
Accident Minor	0	1
Accident Major	1	1

102. The contractor provided give HIV (Human Immunodeficiency Virus) Awareness training for the workers in the 2nd week of February.

103. The contractor assigned permanent medical personnel (doctor – Irma Porchkhidze and nurse – Nino Okroshidze) for providing medical assistance in case of a medical emergency, including safe evacuation of the injured person. The doctor started working at the beginning of 2022.

4.7 Training

104. The contractor continues the training program to form a lasting culture on the behavior and activities of employees that in turn affects the environmental, social, and safety performances. The program covers both mandatory induction training and work-specific training.

105. During the reporting period, given training covered the following topics:

- Induction training,
- Tree cutting,
- Tops soil stripping and storage,

- Hazardous non-hazardous waste handling storage,
- Refueling process,
- Environmental and social training,
- Earthwork activities,
- Driving safety,
- Lifting operations,
- Working at height,
- Flagmen training,
- Toolbox talks,
- Refresh the Concrete Mixer truck drivers training cisterns to wash out procedure and Usage of the separators,
- Refueling Process, and
- Blasting activities.

106. General Environmental and Social training on environmental issues were conducted for 260 persons of the Contractor's staff. The training covered basic knowledge related to Environmental Legislation, topsoil preservation, air quality, waste management, land contamination, spill prevention, biodiversity, noise, resources management, chemical management, community safety, cultural heritage, and code of conduct. Sample attendance lists are enclosed in Annex 4.

107. During reporting period 2624 toolbox talks were provided by the HS officer or foremen or site supervisor.

108. The contractor continues the training program to form a lasting culture on the behavior and activities of employees that in turn affects the environmental, social, and safety performances. The program covers both mandatory induction training and work-specific training.

4.8 Social Management and Grievance Redress Mechanism

109. The Contractor revised the organization chart for Health, Safety, Environmental, and Social Management and according to the new management structure Contractor's CLO, Mr. Davit Guruli directly reports to the Project Manager. Furthermore, Engineer appointed Dr. Mohammad Isa Ansari (Mobile phone: +91 9910020765) as International Resettlement and Social Development Specialist at the beginning of May 1, 2021. Local Social Development Specialist. Mr. Gelashvili and Dr. Ansari will be monitoring the status of the Contractor's compliance with social management.

110. Grievance Redress Mechanism (GRM) was developed by the Contractor and submitted to Engineer for reviewing and approval (February 19, 2021- Ref: 20210403-0148-GHEC-UBM, April 3, 2021- Ref: 20210316-0134-GHEC-UBM and April 16, 2021-Ref: 20210416-0166-GHEC-UBM). GRM was approved in April 2021.

111. The Contractor has not posted the contact information of GRCE on the notice boards for the community yet. Also, the Contractor has not set up and publicized a 24-hour hotline for complaints. Therefore, the Engineer issued NCR about it on 20th August 2021 with the letter 0523-CSAE60F4-UBM-GE.

112. A total of 60 grievances were received either directly from the local community or through the Employer during the reporting period. Of the total 60 received grievances, 40 related to Damaged structure / Assets, 7 complaints logged were pertinent to design issue/inclusion in LARP, and 9 - Restriction or Loss of Access, 2 are related to disturbance with Noise/Vibration/Dust during the construction work, 1 is about HSE Concerns raised during the construction works and the remaining 1 complaints are about Other issues. Out of 60 grievances, 20 have been resolved, 12 are forwarded to RD for necessary action, 11 are forwarded to the Contractor for their necessary remedial actions and 17 are under review of the Engineer to investigate the matter and afterward forward to the Contractor or to the Employer, as indicated in Table 25. The details of some complaints are given in Annex 5 (Complaints Log)

Table 25: Status of Grievances

No	Nature of Grievances		Status

		No. of Total Grievances	Resolved	Unresolved		
				Forwarded to RD	Forwarded to CC	Under review
1	Damage to Infrastructure / Assets	40	12	6	9	13
2	Inclusion in LARP	7	0	6	1	0
3	Restriction or Loss of Access	9	5	0	0	4
4	Disturbance: Noise / Vibration / Dust	2	1	0	1	0
5	Other	1	1	0	0	0
	Total	1	1	0	0	0

113. The Contractor implements community meetings. However, the Contractor has not kept records for community meetings as defined and required in EIA including minutes of meetings, a list of participants with signatures, and photos of each event with timestamps. Hence, the Engineer issued NCR in this regard on 20th August 2021 with the letter 0523-CSAE60F4-UBM-GE.

5. FUNCTIONING OF SSEMP

5.1 SSEMP Review

114. To ensure that all of the potential mitigation measures are applied during the construction phase, the Contractor shall be responsible in the pre-construction phase for the preparation of his Specific Environmental Management Plans (SEMP). The approved SEMP shall include the following plans:

(i) Topic Specific Plans:

- Waste Management Plan
- Spoil Disposal Plan for Arrangement of Spoil Disposal Area
- Re-cultivation Plan
- Traffic Management Plan
- Occupational Health and Safety Plan
- Community Health and Safety Plan
- Emergency Preparedness and Response Plan
- Air Quality Plan
- Spill Response Plan
- Vibration Monitoring Plan
- Clearance, Re-vegetation, and Restoration Management Plan
- Groundwater Management Plan
- Tunnel Blasting Plan
- Noise Management Plan
- Biodiversity Action Plan
- Topsoil Stripping and Storage Plan
- Chance Find Procedure
- Grievance Redress Mechanism
- H&S and E&S Training Plan
- Bridge Construction Plan
- Community Liaison Management Plan

(ii) Site Specific Plans:

- Construction Camp Management Plan
- Asphalt Plant Plan
- Rock Crushing Plant Plan
- Concrete Batching Plant Plan.
- Site-Specific Method Statement for Working in the Area above the Railway Line at KM 6.3 and at Bridge BR 4.0.1. AT/TA

- Detailed Method of Working in the Water and Workplan
- Contaminated Spoil Treatment Plan

115. SEMP was developed by the Contractor and submitted to the Engineer for reviewing and approval (January 27, 2021-Ref:20210127-0090-GHEC-UBM, February 19, 2021- Ref:20210219-00108-GHEC-UBM, March 2, 2021-Ref:20210302-0118-GHEC-UBM March 15, 2021-Ref: 20210315-0129-GHEC-UBM and May 28, 2021- Ref 20210528-0148). SEMP was approved on June 7, 2021, with Engineer's letter no 0333-CSAE60-F4-UBM-GE.

6. GOOD PRACTICES

6.1 Good Practices

116. Following best practices are being adopted by the contractor due to site inspections, issuance of inspection reports, and discussions during construction progress meetings headed by the Engineer:

- CC regularly carries out disinfection works for the prevention of COVID19.
- CC has purchased additional quantities of gas measuring instruments to use in tunnels.
- CC HS team are regularly conducting daily toolbox talks and meets personnel at workplaces. They inform them about possible hazards and give them instructions on how to avoid possible incidents
- CC maintained/ rehabilitated the access bridges on the river
- CC provided the safety signs of solid material
- CC stabilizing the slopes
- CC providing the necessary PPEs

7. SUMMARY AND RECOMMENDATION

7.1 Summary

117. A sum of 216 nonconformities and corrective action requirements accordingly were issued to the Contractor through inspection reports during the project life. Out of two-hundred-sixteen (216) issues, two-hundred-one (201) issues were closed and there are nineteen (19) corrective action requirements are transferred to the next semi-annual report to follow up.

118. CC has provided the PPEs and provided the fire extinguishers at the site

119. The contractor has hired a certified laboratory, Sustainable Development Solutions Caucasus (SDSC) LLC, and carried out instrumental monitoring during the reporting period.

120. Analyzing the contractor's environmental management system reveals that the contractor pays less attention to the preparation of management system documentation.

121. Taking into account the emergency due to the spread of the pandemic COVID-19 worldwide, the Contractor prepared a "Protective Action Plan against COVID-19" outlining the measures to be taken to prevent the spread of the COVID-19 virus. The contractor showed prompt action to take measures to fight against COVID-19.

7.2 Recommendations & Follow-up Actions for the next Monitoring Period

122. The following recommendations describe any actions required to achieve full compliance with each requirement in the EIA, EMP, and conditions of the contract during the 2nd half of 2022 (H2 2022):

- Housekeeping needs to be improved and the site
- Provision of drip trays for all the on-site generators and oil-contained facilities and also oil/fuel barrels H2 2022;
- Slope stabilization for weak slopes H2 2022;
- All the workers should be provided with PPEs and strict enforcement to wear the required H2 2022;
- All the temporary facilities need to be fenced in H2 2022;
- Setting up a spoil disposal monitoring system in the balance sheet H2 2022;
- Arrangements of concrete washout pits and training to be provided to the drivers H2 2022;
- Tunnels water should be treated prior to discharge into the water bodies H2 2022;
- Speed limits signs to be installed at the site H2 2022;
- Spill kits must be at the site all the time and CC to train spill collection team H2 2022;
- Security persons to restrict the entry of street dogs in the batching plant and campsites H2.

ANNEXES

Annex 1: Project Photos

H&S team giving instruction to truck drivers.

Welding aprons and face shields were delivered to the site and handover to welding team members.

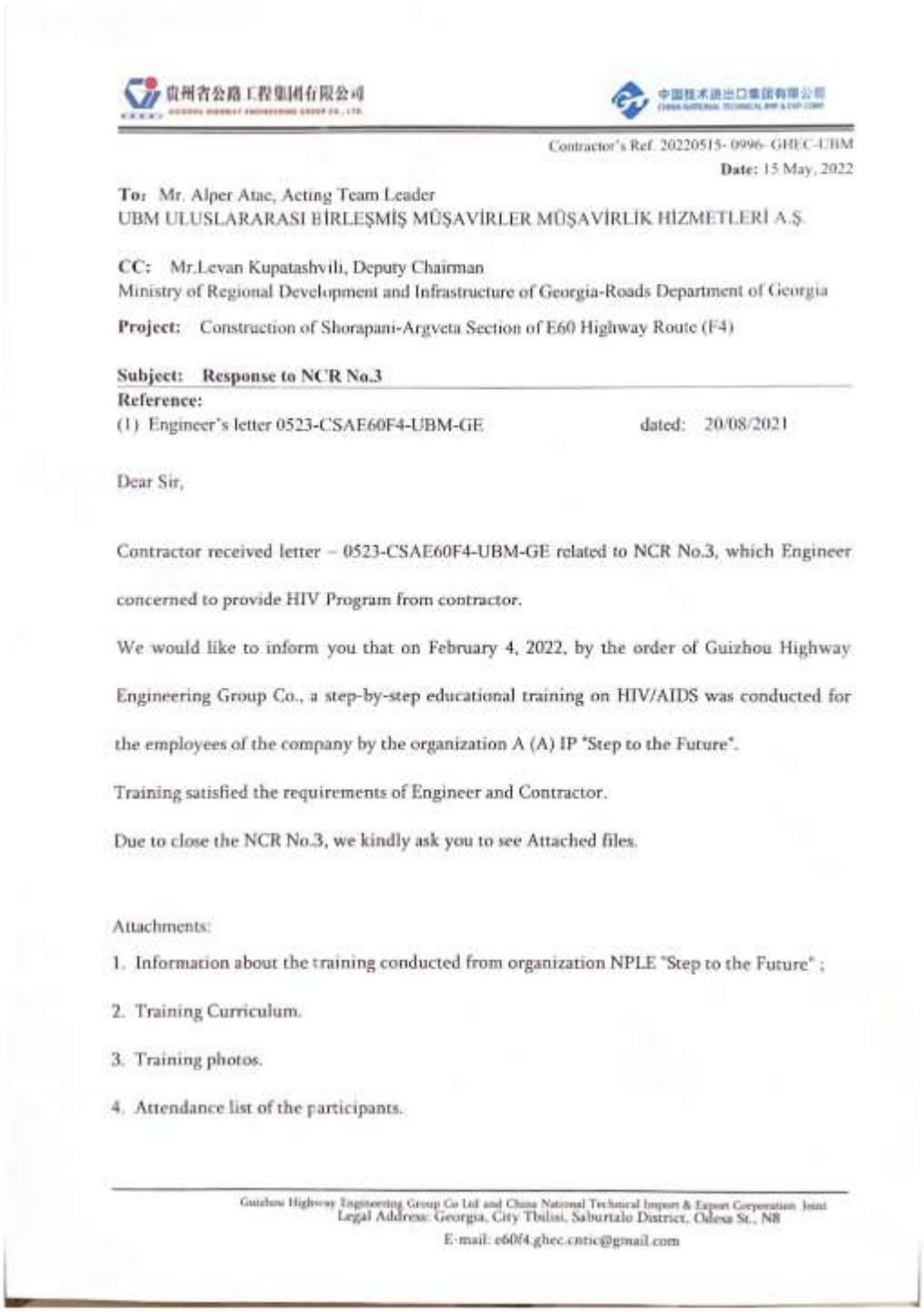
High voltage cables are scattered on the ground in the water

Appropriate safety and warning signs are placed at the tunnel entrance.

Appropriate signs are placed at the waste bins.

A drip Tray provided for the Generator

Annex 2: The Response Letter submitted by the Contractor about the HIV/AIDS Awareness Program NCR



贵州省公路工程集团有限公司

中国技术进出口集团有限公司

Contractor's Ref. 20220515- 0996- GHEC-UBM

Date: 15 May, 2022

To: Mr. Alper Atac, Acting Team Leader
UBM ULUSLARARASI BİRLEŞMİŞ MÜŞAVİRLER MÜŞAVİRLİK HİZMETLERİ A.Ş.

CC: Mr.Levan Kupatashvili, Deputy Chairman
Ministry of Regional Development and Infrastructure of Georgia-Roads Department of Georgia

Project: Construction of Shorapani-Argveta Section of E60 Highway Route (F4)

Subject: Response to NCR No.3

Reference:
(1) Engineer's letter 0523-CSAE60F4-UBM-GE dated: 20/08/2021

Dear Sir,

Contractor received letter – 0523-CSAE60F4-UBM-GE related to NCR No.3, which Engineer concerned to provide HIV Program from contractor.

We would like to inform you that on February 4, 2022, by the order of Guizhou Highway Engineering Group Co., a step-by-step educational training on HIV/AIDS was conducted for the employees of the company by the organization A (A) IP "Step to the Future".

Training satisfied the requirements of Engineer and Contractor.

Due to close the NCR No.3, we kindly ask you to see Attached files.

Attachments:

1. Information about the training conducted from organization NPLE "Step to the Future" ;
2. Training Curriculum.
3. Training photos.
4. Attendance list of the participants.

Guizhou Highway Engineering Group Co Ltd and China National Technical Import & Export Corporation Joint
Legal Address: Georgia, City Tbilisi, Saburtalo District, Odesa St., N8
E-mail: e60f4.ghec.cntic@gmail.com

贵州省公路工程集团有限公司

中国技术进出口集团有限公司

Yours Sincerity
Chen Yuliang

JOINT VENTURE

Representative of Guizhou Highway Engineering Group Co., Ltd and China National Technical Import&Export Corporation

საქართველო. გორი
ასოციაცია
"ნაბიჯი მომავლისაკენ"

GEORGIA. GORI
UNION
"STEP TO FUTURE"

№ 22/3 10 . 02. 2022 წელი

ქ. გორი

ცნობა ჩატარებული ტრენინგის შესახებ

ორგანიზაცია ა(ა)იპ **„ნაბიჯი მომავლისკენ"** აღმასრულებელი დირექტორი, ქეთევან ბიძინაშვილი ვადასტურებ, რომ ა.წ . 04 თებერვალს ორგანიზაციის მიერ წინასწარ მომზადებული და შეთანხმებული კურიკულუმის მიხედვით ჩატარდა ერთი სრული საგანმანათლებლო ტრენინგი თემაზე: „ „აივ/შიდსი" **შპს „გუიჯოუ ჰაივეი ენჯინიარინგ გრუფ კო"** -ს თანამშრომლებისთვის.

პატივისცემით,

ა(ა)იპ „ ნაბიჯი მომავლისკენ"
დირექტორი ქეთევან ბიძინაშვილი

გორი,1400 ბესიკის ქუჩა 3/6 ტელ: 0(370)27 01 72, 598 92 97 13;
E-mail: nabiji02@gmail.com ვებ გვერდი: www. nabiji.com

Training Curriculum

Training title: HIV/Aids

Topic: HIV/AIDS prevention, harm reduction, Treatment of HIV/AIDS

Date: 04/02/2022

Duration: 3 hours

Trainer: Bachana Khutsishvili, (Psychologist, Master of Addiction Studies) – Union "Step to the Future".

Topic	Topic issues	Time
What is HIV/AIDS?	✓ *History of HIV/AIDS, its origin and prevalence in the world*	15 minutes
Transmission of HIV/AIDS:	✓ *Transmission by blood* ✓ *Transmission by sexual contact* ✓ *Mother-To-Child Transmission*	30 minutes
Clinical Presentation of HIV/AIDS virus:	✓ *Characteristics* ✓ *Symptoms* ✓ *Physical signs*	20 minutes
HIV/AIDS statistics:	✓ *Statistics by regions* ✓ *World statistics*	15 minutes
HIV/AIDS Treatment:	✓ *Types of treatment* ✓ *Most recent medical achievements*	20 minutes
Prevention of HIV/AIDS prevalence:	✓ *What should we know and how to avoid infection?* ✓ *Risk management* ✓ *Harm reduction*	30 minutes

Myths, Misinformation about HIV/AIDS:	✓ *Most common myths related on HIV/AIDS*	15 minutes
World's struggle against HIV/AIDS:	✓ *Best practice* ✓ *Ongoing international programs*	15 minutes
Discussion:	✓ *Question/Answer*	20 minutes

贵州省公路工程集团有限公司
GUIZHOU HIGHWAY ENGINEERING GROUP CO., LTD.

CNTIC
中国技术进出口总公司
CHINA NATIONAL TECHNICAL IMPORT & EXPORT CORP.

ტრენინგზე შესვლის ფორმა
Training sign-in form
培训签到表

ლოკაცია:
LOCATION:
位置
GHEC Office

ტრენინგის თემა და ნომერი:
SUBJECT & REF No:
培训主题和编号
艾滋病预防教育培训 / HIV

ტრენინგის ტუტორი:
TRAINING TUTOR:
培训导师
Bachana Khutsishvili

თარიღი:
DATE:
日期:
04.02.2022

	სახელი და გვარი NAME 姓名	კომპანია NAME OF EMPLOYER 单位名称	პოზიცია position 职位	ხელმოწერა Signature 签名
1	[illegible]	step to the future	VCT consultant	[signature]
2	[illegible]	step to the future	social-worker	[signature]
3	[illegible]	GHEC	副项目经理	[signature]
4				
5	王勇	中技公司	总代表	[signature]
6	Jun Du	GHEC	HSE Manager	[signature]
7				
8	许树源	GHEC	安全员	许树源
9	邱路锋	GHEC	试验室	[signature]
10	王男华	GHEC	试验室	王男华
11	丁一	GHEC	综合商务科	丁一
12	苏帅	GHEC	测量	苏帅
13	[illegible]	GHEC	试验室	[signature]
14	陈树开	GHEC	财务	陈树开
15	许建	GHEC		许建
16	邓如冠	GHEC	机料科	邓如冠

17	Zurab Devdariani	GHEC	Driver	
18	李伟	GHEC	设备物资科	李伟
19	Anri Arabidze	GHEC	technical office	
20	朱小儒	GHEC	设备物资科	朱小儒
21	Sepkham Sepklamar	GHEC	QS	
22	刘坤	GHEC	翻译	刘坤
23	Tamuna Tsivtsivadze	GHEC	Translator	
24				
25				
26				
27				
28				
29				
30				

Annex 3: Latest Bi-weekly HS&E Inspection Report

Project:	Construction of "**Shorapani-Argveta**" Section (E60 Highway Route) **Lot F4**
Subject:	On Site Inspection
Inspection Date:	From June 13 to 27, 2022
Issue Date:	June 27, 2022
Occupational Health & Safety Specialists:	Nerses Makarov – Zaza Giorgadze

Detailed Description of Activities

In the weeks, from 13th to 27th of June, 2022, work processes have been inspected on **SHORAPANI-ARGVETA** Section **F4** by **UBM** Health and safety representatives. Inspections were done during the day and night shifts. Site inspections revealed safety violations and good observations. Also, corrective actions were taken against violations that have been revealed in the previous inspection reports. A weekly H&S management meeting has been held on the 15th of June. Discussed health and safety-related issues with the Contractor's H&S team. Agreement reached to continue work hard on the improvement of H&S-related issues during the work process to ensure that the site is a safe working environment for the workers, involved in the tasks at the workplace.

Below is the list of the violations and good observations revealed during the on-site inspection. Some issues, related to Company H&S rules and requirements were solved immediately and some must be corrected in the following week.

Table of Open Issues

Picture Set Number	Issue/Concern	Required Action	Remarks

Supporting Photos with Descriptions.

Possible damage to equipment and personnel injury

Picture 1: Non-Conformance (All tunnels): Visible changes have been made in the design of platforms and in the procedure of using steel structures. Appropriate guardrails and safety signs were fixed on some structures. Special color tags, warning workers about the procedure of how to use mentioned structures, were hung on. Systematical inspections of steel structures have to be done to ensure that the workers are following to instructions provided by the H&S team. **Issue closed.**

Good observation.

Bad observations.

Picture 2: Non-compliance – (Possible injuries of personnel) (All Tunnels and not only)): Continue non-compliances to electrical safety. Many of the electric distribution panels are still not properly locked, because of missing or damaged locks. Access to some of them is still restricted. Engineers are still finding some high voltage cables, thrown in mud or on the wet ground surface. They are continuously asking the Contractor's site responsible persons to follow H&S rules or requirements and solve this problem as soon as possible. The contractor is trying to close this issue (See pictures), but it isn't enough for the full completion of mentioned issue. The contractor has to continue monitoring electrical safety-related issues at workplaces and do

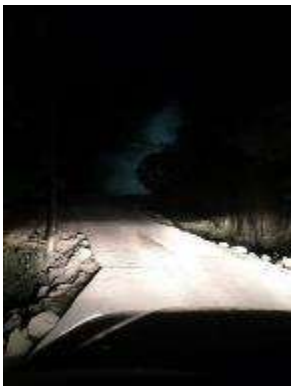
site inspections very often to reduce and finally eliminate all possibilities of having incidents at workplaces. **The issue is still open.**

Picture 3: Non-compliance (Damaged lifting equipment) (All tunnels): - Damaged and cut lifting equipment has been found at workplaces during visiting the tunnels. Site responsible persons from the Contractor Company were informed about it by the Engineer. The Engineer has asked Contractor to pay additional attention to the workplace safety and do inspection of using tools and equipment (Including lifting equipment) very often for to find and remove from the site all damaged or cut equipment. Three of such damaged lifting belts has been found by the Engineer and cut it in pieces to avoid further usage and any type of possible incidents from happening. **Issue closed.**

Picture 4: Non-compliance (Driving safety): Continue non-compliance to international H&S rules and requirement has been observed during site walk. More vehicles and trucks with damaged traffic lights and worn

tires have been observed during site walk in this week. The Engineer asked Contractor's site responsible persons to do periodical inspection of all vehicles and dumper trucks working on this project to avoid possible incidents from happening, but there are no any positive changes in this regard. **Issue is still open.**


Picture 5: Non-compliance (Tools and equipment (Possible damage)) – (Tunnel N5) – Non-compliances to H&S regulations and requirements have been observed during site visit: Storage cages (To store the oxygen cylinders) aren't equipped with proper ventilation system (Cages are fully closed). It may cause possible incidents. Engineer asked Contractor's site responsible persons to react on mentioned above issue as soon as possible, to avoid possible injuries or property damage. **Issue still open.**




Picture 6: Driving safety (Road related incidents) – Access road to Tunnel N5 TA – It is unsafe to drive on access road to tunnel N5, because of poor road quality. It is double danger, when driving in the night time (In some section the road is becoming very narrow and there is a big risk to lose the concentration, drive out the road and turn over. In some section, road is partially damaged). Engineer asked Contractor's site responsible persons to arrange some jersey barriers or flashing safety poles, place it on most dangerous areas of mentioned access road and protect unsafe sections and safe people's life. Waiting for feedback, but there aren't any updates until now. **Issue open.**

Before

After

Picture 7: Non-compliance (Poor ventilation and lighting) (Tunnel N3) –During visiting the tunnel a few days ago, it was observed that the ventilation fan wasn't extended to sufficient length and lighting bulbs were missing too. Contractor's site responsible persons were informed by the Engineer. The Engineer asked to pay additional attention on such issues to avoid possible incidents at workplaces. After few days, the ventilation fan was extended and additional illumination bulbs have been installed **Issue closed.**

Picture 8: Non-compliance (Workplace safety) – Tunnel portal N 4004 TA - Mostly all health & safety related issues were solved on mentioned location, but there are some problems should be paid additional attention on. For example: Arrangement of bio toilet at workplace and improper storage of oxygen cylinders

and other construction materials (Including flammable liquids). The Engineer asked Contractor's site responsible persons to react on mentioned above issues as soon as possible. We are waiting for feedback from the Contractor. **Issue still open.**

Picture 9: Material storage (Possible incident) Tunnel N2 – Engineers are still observing issue related to improper storage of materials at workplaces. Such case has been observed during visiting the tunnel N2. The rubber hoses, using for connecting the propane cylinder to heating torch has been found stored in the same cage with the oxygen cylinders. Also, handmade connections have been found during site inspections. Site responsible person from the Contractor Company was informed about it by the Engineer. The Engineer asked to keep all mentioned above materials separately, especially arranged for such materials designated places. **Issue open.**

Electric cables removed from the water and fixed in the isolated box.

Picture 10: Non-compliance (Possible injury of personnel) (Bridge N3, Pier N3 and 4) – Not properly barricaded open trench (full with water) with no proper access into has been observed during site visit. There is a big risk of falling or rolling down into the open trench and getting injuries not only for the working crew members, also for the animals crossing the working area. By the way, the walls of the trench have started collapsing due to heavy rain and flooding. The electric cables, thrown in the water and mud have been found during site walk. Site responsible persons from the Contractor Company were informed about it by the Engineer and asked to solve it as soon as possible. Several non-compliances were corrected by the Contractor, for example the electric cables and switch gear were removed from the water, moved and fixed in especially arranged for this isolated box (see attached picture), but it isn't enough for fully completion of mentioned above issue. The Engineers are still waiting for feedback from the Contractor. **Issue open.**

Before

After

Picture 11: Non-compliance (Poor level of ventilation) Tunnels №2 and N5 - Violation to Health & Safety rules and requirements have been observed during site walk. Day by day, the number of cut or damaged ventilation fans becomes more and more. Contractor's site responsible persons were informed about it by the Engineers. The Engineer asked Contractor's management team to pay more attention on workplace safety, particularly on ventilation level and quality of ventilation fans to avoid possible incidents at workplaces. Later on, all ventilation fans were inspected by the Engineer and it was found out that all damaged ventilation fans were repaired. Engineer thanked the Contractor for quick reaction to the above issue. **Issue closed.**

Bad observation.

Good performance.

Picture 12: Non-compliance (Safe work process) Tunnels №2 and №3– Non-compliances to the international Health & Safety regulations have been observed during site visit. Tools and equipment (fire extinguishers) with expired inspection dates on it have been observed during site visit. Some fire extinguishers have been found thrown in mud and dust. Engineer asked Contractor's site responsible persons to react on mentioned above issue, organize and provide inspection of fire extinguishers to insure that all are in working order. Dirty fire extinguisher was cleaned out and hanged on visible for everybody height. Contractor has to pay additional attention on workplace safety and care about personnel's health and safety at site. Engineer is waiting for feedback from the Contractor. **Issue open.**

Picture 13: Good performance (Safe work process) (All tunnels) – Good performance has been observed during site visits. Effective control of the work process has been established and implemented by the Contractor. It is easy to manage the work force and be aware of what is the quantity of working personnel involved in the task inside the tunnel for effective fighting when an incident occurs. In some places, the registration boards are installed, but not functioning, because the workers aren't hanging their ID cards and it is difficult to manage, how many persons are busy inside the tunnel for effective fighting when an incident occurs. Engineer thanked the Contractor's management team for doing a good job and asked to continue working on improvement of workplace safety. **Issue closed.**

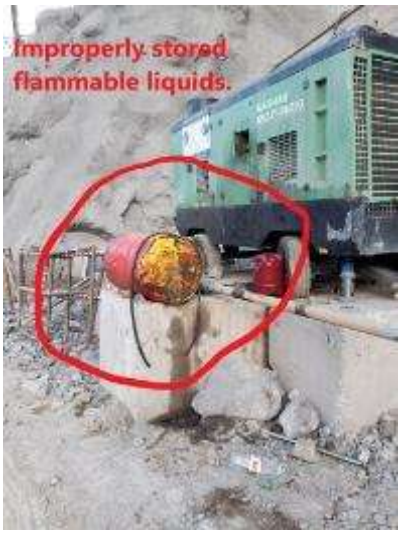
Bad example of workplace housekeeping (Tunnels #2 and 3)

Good example of workplace housekeeping (Tunnel #5 TA and AT)

Picture 14: Workplace housekeeping (Trip, slip and falling hazards) Workshops in Tunnels №2, 3 and 5 – Bad and good examples of workplace housekeeping have been observed during visiting the tunnels. Engineer asked Contractor's site responsible persons to follow to the health & safety rules and regulations and keep all workplaces in clean and tidy to avoid trip, slip and falling hazards. **Issue open.**


Picture 15: Non-compliance (Electrical safety) – (Workshop in Tunnel N2) – Non-compliances to H&S standards have been observed during site walk last week. It was observed that the life electric cable was passing through construction materials (Used rebar) and was pressed between steel parts. There was a big possibility that the cable could become damaged and somebody from working personnel could get electric shock there. Engineer asked Contractor's site responsible person to switch off the power, remove the cable, elevate it and fix it on a safe height to avoid possible incidents. After some time, cable was disconnected from the power supply, collected and redirected by using safer route. **Issue closed.**

Picture 16: Improper storage of materials (Personal injury) Tunnel N3 – Violation to Company H&S rules has been observed by the Engineer during visiting the tunnel N3. It was observed that construction materials weren't stored properly. Somebody from working crew may become stuck between the rolled pipes and become injured there. Engineer asked Contractor's site responsible person to pay more attention on workplace safety to avoid possible incidents from happening. Engineer is waiting for feedback from the management of Contractor's team. **Issue open.**



Bad observation (Oil spillage)(Tunnel #2).


Good performance (Tunnel #5).

Picture 17: Non-compliance – (Improper storage of hazardous materials) (Tunnels N2 and 5) – Non-compliance to H&S rules and requirements has been observed during site inspection. Barrels full with flammable liquids (leaking) have been found placed at the workplace without keeping it in specially arranged for such materials drip trays. It could cause a fire or harm the environment. Engineer informed the site responsible persons from Contractor Company and asked to react on it. Later on some positive changes have been made by Contractor in tunnel #5. Barrel was moved and placed into drip tray. Another barrel with flammable liquid isn't removed yet from tunnel #2. Contractor is informed about it. Engineers are waiting for feedback. **Issue open.**

Bad observation and performance (Tunnels #4 and 5)

Good performance (Tunnel #3 and 5)

Picture 18: Non-compliance (Improper storage of materials-Possible incident) (Tunnels #3, 4 and 5) – Non-compliance to H&S regulation at work has been observed during visiting the tunnels. Oxygen cylinders, which weren't in use, have been observed spread around the working area. Site responsible persons from the Contractor Company were informed about it by the Engineer. Engineer asked to keep all cylinders which aren't in use in designated for it places (Storage cages). After some time, some positive changes have been observed in tunnels #3 and 5. All cylinders were removed and moved into safer place. Additional attention needs to be paid in the other tunnels, because the workers aren't fully aware what may happen if touch or damage the oxygen cylinder. Contractor has to inform its working personnel about it to avoid possible incidents at workplaces. **Issue still open.**

Picture 19: Non-compliance (possible fire) (Workshop at tunnel #3) - The diesel tanker with no warning signs on it and missing anti-lightning chain has been observed during visiting the site. Also, the fire

extinguisher has been found with unknown date of inspection on it. Contractor was informed about it by the Engineer and asked to solve the problem as soon as possible. **Issue open.**



Good observation (Tunnel#2 and 3)

Bad observation (Tunnel #5)

Picture 20: Driving safety (Possible accident) (Tunnels#2, 3 and 5) – Engineers are still observing good and bad examples of driving safety related issues during visiting the tunnels. For example, good observations have been found inside the tunnels #2 and 3 (see pictures attached). In a same time, bad example of driving safety regulation has been found in tunnel #5. Reflective cones, warning drivers about the possible hazards, were missing on the access road. Site responsible person from the Contractor Company was informed about it by the Engineer and asked to fix this issue soon to avoid possible truck related incidents inside the tunnel. **Issue open.**





Before


After

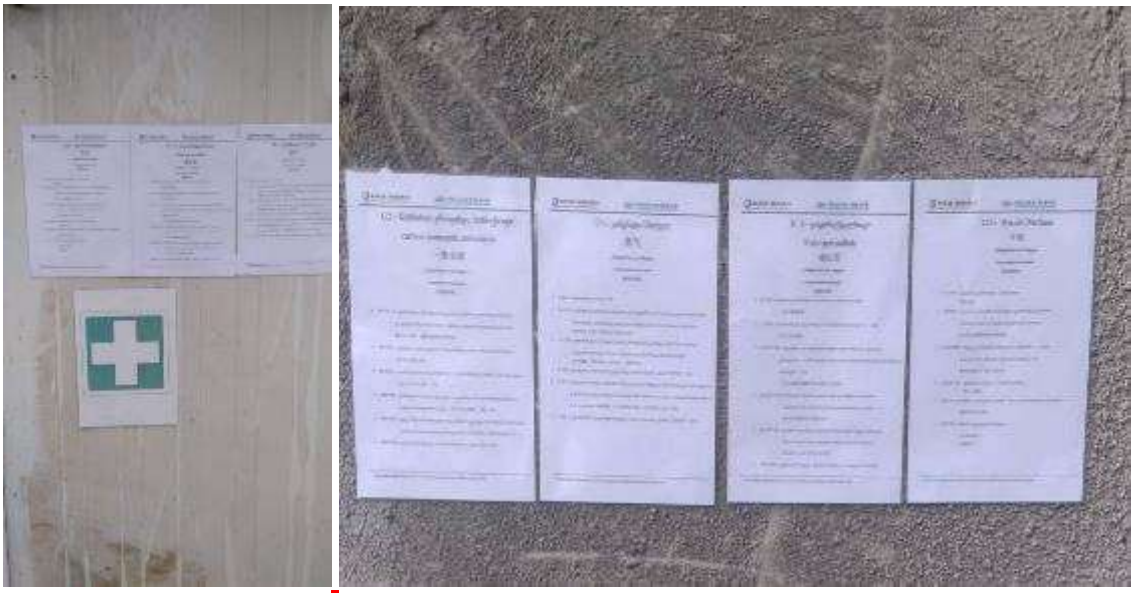
Picture 21: Non-compliance (Work at height-possible fall) (Bridge #5) - Workers have been caught in unsafe position during working at height. They were equipped with personal body harness, but weren't connected to the pipe supports. Actually, they should fix themselves to the scaffolding pipe, to avoid possible falls, but they did not do it. Work activity was suspended for a few minutes. The Engineer asked workers to use body harness properly and fix themselves to the structure and avoid possibility of falling and only after that continue perform the job. After discussion finish, helpers wear the body harnesses on, fixed it to the scaffolding pipe and only after that continue performing the task. Later on, special warning signs, informing workers about the procedure on how to use the scaffold structure, have been fixed on. **Issue closed.**



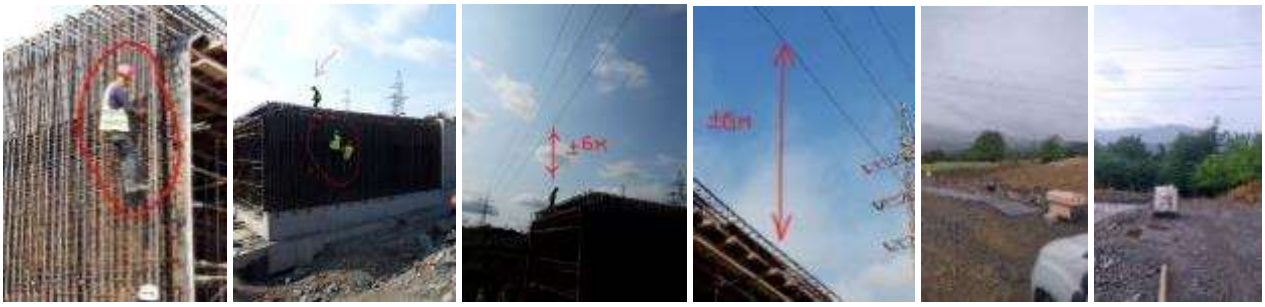


Picture 22: Non-compliance (Poor ventilation-Possible injuries) -Tunnel #2AT- Non-compliance to H&S regulation has been observed during site inspection of tunnel #2. The level of oxygen was very low due to a destroyed ventilation fan (the level of oxygen was tested by tester). Engineer decided to stop the work, because the working personnel, involved in the task inside the tunnel, could get hurt and be injured there. Responsible persons from the Contractor Company were called to site and Engineer has explained that due

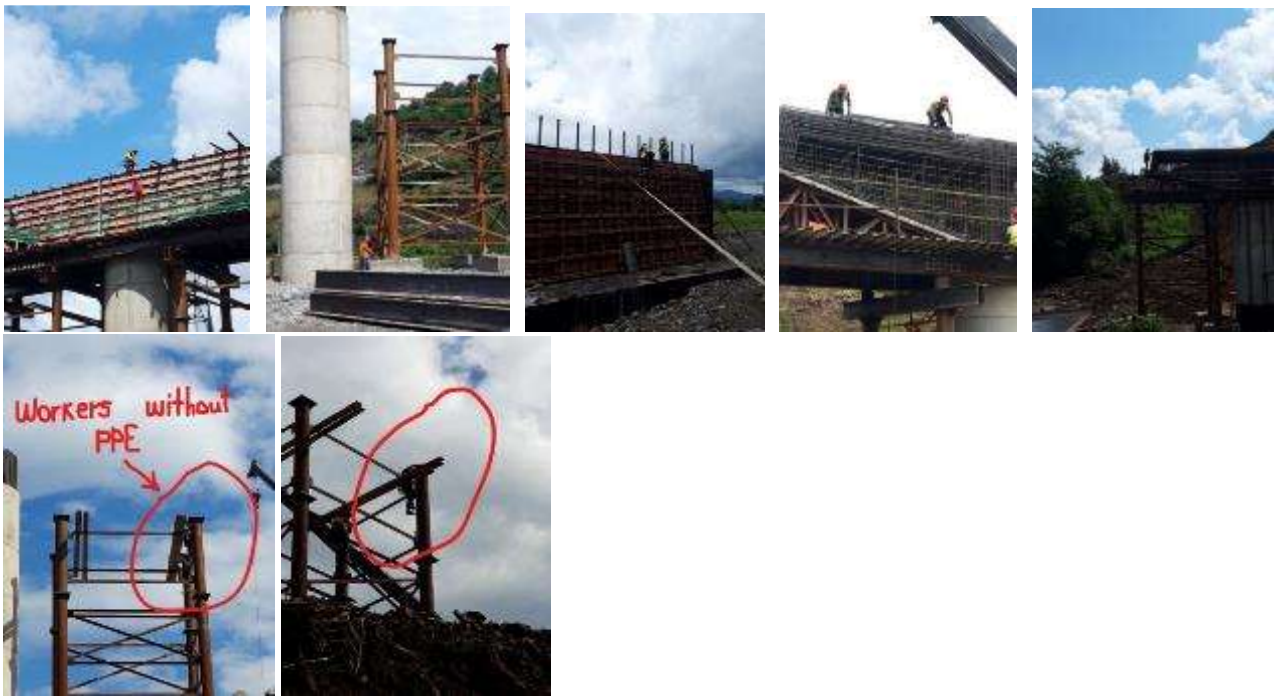
the poor level of oxygen inside the tunnel, they shouldn't continue performing the task otherwise the incident may occurred and somebody could get hurt there. Work was suspended and agreed that the Contractor should not perform the work until they wouldn't repair the ventilation fan. After some time, damaged ventilation fan was replaced on new one. **Issue closed.**



Picture 23: Good observation (Compliance to work process) Tunnel №2 AT, Tunnel №5 AT and TA - Information about the air concentration norms are placed at the entrances of the each tunnels. All the tunnels are equipped with air/gas measuring equipment and air concentration levels in the tunnel is under regularly monitoring (During the specific works in the tunnel air must be systematically monitored and the information must be recorded). Air/Gas Detectors have been tested and they were in working order. A bump test involves exposing the detector's sensors to a concentration of gas that is greater than the alarm set points. During the testing, level of CO was checked up inside the tunnel, and detected increased concentration of CO. It started to flash in red color. **Issue closed.**



Picture 24: Overhead power lines and workplace safety (possible incident) - Culverts N4218, 4219 and 4303 – Non-compliances to health & safety rules and regulations have been observed during visiting the culvert N4303. First of all, it is dangerous to work under a high voltage power line, because the workers may accidentally touch the line when lifting, moving or installing the reinforcing bars (the distance between top of the culvert roof and overhead power line is plus minus 6m). Also there is no special staircase to reach the roof and workers are using installed steel structures as a ladder to climb up. The welding machine that workers are using at the site is partially damaged and must be changed. Based on all non-compliances, mentioned above, Engineers have decided to stop the work, until all non-compliances wouldn't be solved by the Contractor. Contractor's H&S team also was informed about it. Contractor has to solve the problems and only after that continue perform the task. Same situation is on the Culverts # 4218 and 4219 - High voltage cables are not at appropriate safe height (it is very low). Heavy machinery is working on site (crane, concrete pump and excavator) and workers are lifting 12 meter long armatures and moving it during the working process and they are getting very close to the hazard zone. First of all, this location has to be controlled by the Contractor systematically. Second, Goal post with warning tapes and warning signs must be installed. Third, safety training have to give to whole working crew, including mixer, crane, excavator and concrete pump operators, to avoid possible incidents, that already occurred in this location few weeks ago and forth, proper tools and equipment has to be delivered to the work. All safety measures have to be taken by the Contractor to avoid possible incidents. And very important recommendation from the Engineers, nobody has to work in these locations, when heavy rain. The Contractor has to take this requirements from the Engineers under own control. **Issue open.**




Some were moved down and some wear proper PPE.

Picture 25: Non-compliances (possible injuries) Br. N2, piers 1 and 5; Retaining wall, Pk.114 – Workers have been found in unsafe position when working at height. They weren't using fall arrest equipment properly during work process. It could cause possible injuries of working personnel. The Engineer has decided to suspend the work processes in mentioned above locations for a few minutes and gave a verbal warnings to the workers involved in the task. The Contractor site responsible persons were informed about it. The Engineer asked to pay more attention on such issues to avoid possible incidents from happening. After discussion finish, some of them have wear the body harnesses and returned to the work. Some work activities were suspended until necessary equipment shouldn't deliver to the site. It is not a first time that the Engineers are catching the personnel in unsafe position and the Contractor has to act on such non-compliances very effectively to avoid possible incidents. **Issue open.**





Picture 26: Non-compliances (Work at height - possible incident) – Bridge N2, pier#5 – Non-compliances to health & safety regulatin have been observed during visiting the bridge N2, pier#5. Not installed handrails on staircase. Partially rooten wooden timbers placed on walkways. It could cause possible falling or drop and injuries of the working personnel. Incorrect warning signs were fixed on the scaffold structure. The competent persons from Contractor Company were informed about these non-compliances. The Engineer has got promises from the Contractor that they would solve mentioned issues as soon as possible. The Engineer is waiting for feedback. **Issue open.**

Picture 27: Non-compliance (Personal protective equipment) – Bridge N2, pier#5 – Non-compliance to health & safety rules and requirements have been observed dirung visiting the workplace. One of the Contractor's personnel was using brushing machine to clean the steel plate surface and he didn't use the safety glasses to trotect his eyes from possible injury. The Engineer asked him to stop, wear safety glasses and then continue performing the task. The worker wear his safety glasses on and continue performing the task. The responsible persons from the Contractor Company were informed about it. The Engineer asked them to do workplace inspections very often to find out and alliminate all possible risks of getting injury. **Issue closed.**

Picture 28: Non-conformance– (Possible personal injury) - (Tunnel #3 TA) – The cracked piece of big rock has been observed inside the tunnel (Pandus - access road for the drivers). Any time, because of possible vibration, it could become loose, roll down and injured somebody. The Engineer asked the loader operator to demolish this rock and remove it out from the tunnel to avoid possible injuries of working personnel. The Engineer asked responsible persons from the Contractor Company to be more attentive and do everything is necessary there to avoid such situations at workplace. **Issue closed.**

Picture 29: **Non-Conformance – (Possible roll or falls)** **Bridge N5** – Not properly barricaded openings have been observed during site inspection. All openings have to be protected by hard barriers to avoid possible falls or rolls into. The Engineer informed about it the Contractor and asked to react on this issue as soon as possible to avoid possible incidents at workplace. The Engineer is still waiting for feedback from the Contractor. **Issue open.**

REMARK: 1. **No NCR's has been issued during the day or night shifts in this week.**

2. The NCR N10 (Usage of Man lift) have been closed in this week.

Annex 4: The Latest Water, Ambient Air Quality, Noise, and Vibration Monitoring Reports (May&June 2022)

SDSC
Sustainable Development
Solutions Caucasus

ENVIRONMENTAL MONITORING REPORT

WATER, AMBIENT AIR QUALITY, NOISE AND VIBRATION MONITORING

F4, SECTION OF E-60 HIGHWAY

PREPARED BY

SDSC LLC

DIRECTRO: GIORGI GULIASHVILI

May, 2022

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Attachments

Attachment 1 Water tests laboratory reports

Attachment 2 Air quality laboratory results

1. Introduction

1.1. *Project description*

The Government of Georgia is endeavoring to make Georgia a regional and logistics hub and more attractive for businesses. The East West Highway (EWH), stretching 410 km from Sarpi on the Black Sea, at the border with Turkey, through the center of the country to the capital Tbilisi and on to the border with Azerbaijan, is the main inter-regional and international route between western and eastern Georgia, as well as its neighboring.

In light of the traffic growth on EWH, the high percentage of truck traffic, and the difficult terrain and resulting geometric profiles, capacity expansion of the current 2-lane mountainous section between Chumateleti and Argveta is crucial to realizing full potential of the EWH with improvements to the highway either completed or underway on each side of this section.

Therefore, the Government has requested the Asian Development Bank (ADB) and several other development partners to finance the remaining bottleneck sections (Chumateleti - Argveta) on the EWH.

The Project involves construction of a new road section of the E-60 highway located in Imereti Region of central Georgia (see Figure 1-1). Section F4 forms the Shoropani – Argveta portion of the Khevi-Ubisa-Shorapani-Argveta section of the E-60. The length of the Project road is as follows:

- Right lane (TA – meaning Tbilisi – Argveta direction) - 14.778 km;
- Left lane (AT – meaning Argveta – Tbilisi direction) - 14.726 km.

Figure 1-1 Road Location Map

1.2. *Purpose of the monitoring*

As per contract LTD SDSC was requested to conduct regular surface water, Noise, Vibration, air quality and dust monitoring along theF4 section of highway construction.

The purpose of the monitoring was to collect monitoring data of surface water, Air quality, Dust, Noise and Vibration and compare with baseline monitoring results as well as with project specified standards based on EIA.

2. Monitoring locations

2.1. *Water Monitoring Locations*

Water monitoring locations proposed by the client are reflected in Table 2-1, and in Figures 2-1. The monitoring was undertaken 50m up and downstream from each location.

Table 2-1 Surface water monitoring locations

Monitoring Locations	Coordinates	Monitoring Date
River Kvirila (Bridge N4)	340316.57 4663074.32	14/02/22
River Borimela (bridge N3)	342153.91 4661762.47	14/02/22
River Dzirula (bridge N2)	343185.48 4662005.84	14/02/22
River Dzirula (bridge N1)	344312.76 4661999.60	14/02/22

Figure 2-1 Surface water monitoring locations

2.2. Noise, Vibration and Ambient air quality monitoring locations

There are 16 monitoring points along F4 section of the E-60 highway, on which dust, noise, vibration, and air quality measurements were performed in January. GPS Coordinates of monitoring points are shown in the Table 2-2 and general overview on satellite map (Figure 2-2).

Table 2-2 Noise, Vibration and Ambient air quality monitoring locations

#	Point	X	Y	Conducted work/measurement
1	**Batch Plant 1 AT**	342607	4661686	NO_x, SO_x
2	**Batch Plant 1 TA**	342363	4661841	NO_x, SO_x, noise
3	**KM 4.4**	341326	4661731	NO_x, SO_x
4	**KM 5.8**	340323.98	4662868.69	NO_x, SO_x
5	**Near Babukhadia's house**	340212	4662807	NO_x, SO_x
6	**KM 6.4**	339493.72	4663649.74	NO_x, SO_x
7	**Top of tunnel 5**	339472	4664180	Noise, vibration
8	**Tunnel 5 AT portal**	338583	4664433	NO_x, SO_x, dust, noise, vibration
9	**Near tunnel 5 AT portal (1)**	338903	4664449	vibration
10	**Near tunnel 5 AT portal (1)_opposite**	338913	4664419	vibration
11	**Near tunnel 5 AT portal (3)**	338752	4664365	vibration
12	**Bridge 5**	337746	4664626	Noise, vibration
13	**KM 12.6 AT**	336852	4665151	NO_x, SO_x
14	**KM 12.6 TA**	336881.01	4665342.12	NO_x, SO_x
15	**KM 13.3**	333856	4666662	NO_x, SO_x

Figure 2-2 Noise, Vibration and Ambient air quality monitoring locations

3. Monitoring parameters and methodologies

3.1. Surface Water monitoring

Monitoring parameters for surface water monitoring were provided by Client based on EIA requirements. List of parameters to be monitored and test methods are reflected in Table 3-1. National Maximum Allowable Concentrations (MAC) in surface waters have been used as a reference.

Table 3-1 Surface water monitoring parameters

Chemical Parameters	Measuring Unit	Test Method	National MAC
pH	-	SST ISO 10523:2010	6.5-8.5
BOD	mg/l O_2	SST ISO 5815-2:2003/2020	6
COD	mg/l O_2	SST ISO 6060:2010	30
TSS	mg/l	SST ISO 11923: 2007	Increase by no more than 0.75
Total N	mg/l	GD 52.24.364-95	N/A
Total P	mg/l	SST ISO 6878:2004/2020	2
Nitrates (NO_3)	mg/l	SST ISO 7890-3 : 2008	40
phosphates (PO_4)	mg/l	SST ISO 6878:2004/2020	3.5
Oil & Grease	mg/l	EPA 413.1	0.3
Microbiological Parameters			
Total coliforms	MPN in 100 ml	SST ISO 9308-1:2014/2014	400

The water samples are taken by the certified monitoring technicians, which are specially trained for the water sampling activities. The analysis of the water samples was conducted in the accredited DG Consulting Laboratory with ISO 17025 standard and if necessary, samples are sent to SYN LAB (Germany).

3.2. Ambient air quality

Air Quality monitoring methodology

Air monitoring - NOx and SOx sampling was conducted via passive sampler/concentrating tubes using English Company Gradko International standard certified tubes. The detailed information regarding method and model is provided in table below

Table 3-2 monitoring tubes model and methodology

Parameter	NOx	SOx
Manufacturer/Model	Gradko International Diffam 100 RAM	Gradko International Diffam 600 RAM
Integration period	No less 7-day Exposure	No less 7-day Exposure
Sampling Frequency	Continuous	Continuous
MDL/Target	1.4 µg/m3	0.2 µg/m3
Sampling and Analytical Method	Sorbent impregnated diffusion/ion chromatography	Sorbent impregnated diffusion/UV Spectrophotometry

PM10 and PM2.5 monitoring methodology

Dust monitoring was conducted according to the EU standards. The equipment, which was used during the measurement are Dust Trak DRX Desktop aerosol monitor, which is installed in the Environmental Enclosure 8535, which allows the aerosol to measure dust concentration in ambient air in the field conditions.

Before starting the measurements, Zero Calibration was done to the aerosol, which calibrates the device to zero level in order, not to get correct results

The photos below show the used equipment for Dust monitoring and Zero Calibrator.

Figure 3-1 Dust Monitoring equipment

Figure 3-2 Zero calibrator

3.3. *Noise Monitoring Methodology and Equipment*

The noise level measurements were implemented in accordance with the British Standard BS 7445-2:2003 'Description and measurement of environmental noise'. The dust concentration measurements in the ambient air were conducted in accordance to the EU standards.

The monitoring points were selected, so as to represent the impact of the construction on local population as realistically as possible.

According to the above mentioned standard, the following equipment was used during the noise level measurement activities:

- Rion NL-52, First class noise measurement device;
- Windscreen, WS-16;
- Tripod;
- SD Card;

Figure 3-3 Noise monitoring equipment

Noise measurement range: 0-133 dB

Noise measurements were done for one 30-minute session for each monitoring points.

3.4. *Vibration monitoring methodology and equipment*

The vibration level measurements are conducted using the Instantel Minimate Plus Device. It records the waveform data to the integrated memory. After the monitoring activities, the recorded data is processed in the PC Program Blastware, which is also created by the company Instantel.

The vibration measurement is conducted using Transducer (Geophone), which is connected to the Instantel Minimate Plus device. Three ground spikes are attached to the bottom of the transducer, pushed to the ground covering the attached spike fully. The geophone shall be directed towards the vibration source using the directional arrow, which is engraved on the Geophone itself. After this, the sandbag is put on top of the transducer for solid compaction.

After the correct installation of the Geophone, sensorcheck program is launched on the Minimate Plus device for further correct vibration measurements. In order to start vibration monitoring, the tests for sensor check program shall be Passed, which is displayed on the Minimate Plus device. After the mentioned activities, recording of the vibration waveform is starting.

As it was already described above, after recording the Vibration Waveform session, the device saves the session to the integrated hard drive. After what, the session is transferred to the Personal Computer and processed using special program called Blastware, which is also created by the Company Instantel. The program created event report, which includes vibration waveform graphs, timing and other detailed information about the recorded session.

Figure 3-4 Vibration monitoring equipment

4. Laboratories

Water and air quality samples taken during field activities were sent to DG consulting laboratory (Georgia) and SYN LAB (Germany) for analyses. Samples were analyzed in accordance analytical suites and test methods proposed in chapter

5. Sampling activities

5.1. Surface Water Monitoring field activities

Sampling activities were undertaken on 21.05.22. The field team included Lasha Bibichadze and Giorgi Guliashvili. As per initial request from the Client, monitoring plan was included 4 bridge construction sites up and down stream monitoring.

All of the proposed sampling points were sampled successfully during the field visit.

Figure 5-1 Bridge N4 up stream (Kvirila River)

Figure 5-2 Bridge N4 downstream (Kvirila river)

Figure 5-3 Bridge N3 upstream (Barimela River)

Figure 5-4 Bridge N3 downstream (Koromela River)

Figure 5-5 Bridge N2 upstream (Dzirula River)

Figure 5-6 Bridge N2 downstream (Dzirula River)

Figure 5-7 Bridge N1 up stream (Dzirula River)

Figure 5-8 Bridge N1 downstream (Ozurgeti River)

5.2. *Air quality, Noise and Vibration monitoring field activities*

Under the project, various types of monitoring works were carried out at 15 points for two days. Among them, measurements at some points were carried out in 2 or 3 sessions - working and non-working hours to assess the background levels and the impact of the working process on the monitoring components. In addition, one of the points was monitored at night.

Monitoring activities were conducted on May 18th and 19th, 2022. The weather on both working days was favorable, sunny, and windless, the average temperature varied during both days and was 22-25°C..

Figure 5-9 Point N1 Batching plant N1 AT (NOx, Sox)

This point is located near the Batch Plant N1, on the slope where on the edge of the dirt road. While the monitoring team was on site, the works were in a passive phase, only several machines were moving. No dust spreading was observed.

Figure 5-10 Point N2 Batching Plant N1 TA (NOx, Sox, Noise)

The point is located between the E-60 highway and the Batch Plant N1. Noise levels were monitored during both, working and non-working hours to identify the impact of the working process on noise level. The source of noise at this point is not only the operation of the batch plant and the movement of heavy equipment near it, but also the noise caused by traffic.

During the both monitoring sessions, heavy machinery was moving at the point and the road was busy with traffic.

Air quality monitoring tubes were also replaced at the point.

Figure 5-11 Point N3 KM 4.4 (NOx, SOx)

The monitoring point is located on the edge of the E-60 highway, where traffic is busy at almost all times of the day and both project and other vehicles are moving. Air quality monitoring tubes were installed on site. No work was ongoing at the point.

Figure 5-12 Point N4 KM 5.8 (NOx, SOx)

Air quality monitoring tubes were replaced at the point. While the monitoring team was on site, the works were in an active phase, rock crusher was working, and heavy machinery were often moving. Significant spread of dust was observed.

Figure 5-13 Point N5 Near Babukhadia house (Sox, NOx)

The monitoring point is located near the F-60 highway, next to the residential house and on the opposite side of the spoil disposal area. Air quality monitoring tubes were replaced at the point. During the monitoring group's stay on site, no work was carried out in the area.

Figure 5-14 Point N6 KM6.4 (Sox, NOx)

This monitoring point is located away from the road. Air quality monitoring tubes were replaced on site. While the monitoring team was on site, construction work was underway away from the point.

Figure 5-15 Point N7 Top of the Tunnel 5 (Noise, Vibration)

The monitoring purpose at this point was to measure the vibration and noise levels near the local residents' houses in the evening during the working process. During the monitoring session, active construction works were carried out away from the point, involving various types of heavy construction equipment.

Figure 5-16 Point N8 Tunnel 5 AT portal (NOx, SOx, noise, dust, vibration)

Monitoring works at this point were conducted in two sessions, working and non working hours. Vibration, noise and dust levels were measured, and air quality monitoring tubes were replaced. During the monitoring of the work process, active works were carried out on the site, heavy equipment was moving with medium frequency and the concrete and iron structures manufacturing facility was working. During the non-working monitoring session, the work continued at low intensity for the first few minutes and then stopped altogether.

Figure 5-17 Point 9 Near tunnel 5 AT portal (1) - Vibration

This point is located near the access road to tunnel 5 portal and Workers' Camp #3, near one of the local's houses. Vibration was measured at this point during both working and non-working hours. At the monitoring point, the level of vibration is affected not only by the ongoing works near the tunnel portal, but also by the heavy traffic on the highway, which is actively driven by cars, trucks and minibuses.

Figure 5-18 Point 10 Near Tunnel 5 AT portal (1) opposite Vibration

The point is located on the opposite side of the point N9 (Near tunnel 5 AT portal (1)), across the road, near a local resident's house. At this point, too, the level of vibration is affected not only by the ongoing work on the portal of tunnel 5, but also the heavy traffic on the road, which is actively used by cars, trucks, and minibuses. Vibration level was measured during both working and non-working hours.

Figure 5-19 Point 11 Near tunnel 5 AT portal (3) - Vibration

The point is located near the access road to Tunnel 5 portal and Workers' Camp N3, between two residential houses on the side of the road, so there is a large impact of traffic on the vibration level. In this case, too, the measurement was conducted during both working and non-working hours.

Figure 5-20 Point 12 Bridge 5 (vibration, Noise)

At this point the monitoring works were conducted based on the complaint of the local residents. Vibration and noise monitoring was carried out about 50 meters away from the working area, on the edge of the road between the locals' houses and the working area. Monitoring was carried out 3 times, 2 sessions were conducted during the day and one in the evening. During the first session, the construction work was in an active phase and several types of equipment were working on the construction site, including a concrete mixer, which was used to pour concrete into the bridge pier, in addition, an excavator and a drilling machine were working. During the non-working session, all work on the construction site was suspended. During the evening session, construction materials were sorted at the beginning of the monitoring at the construction site, and then the process was stopped completely.

Figure 5-21 Point 13 KM 12.6 AT (Sox, NOx)

The monitoring point is located near the ferroalloy plant, where the construction of the road interchange is planned. No construction works were carried out at the time of the group's stay on site. Air quality monitoring tubes were replaced at the point.

Figure 5-22 Point 14 KM12.6 TA (Sox, NOx)

The monitoring point is located near the rural road, in the vicinity of the ferroalloy plant. Air quality monitoring tubes were replaced at the monitoring point. There were no constuction works in progress during the team's stay on site.

Figure 5-23 Point 15 KM 13.3 (Sox, NOx)

Air quality monitoring tubes were replaced at this point. No work was carried out during the team's stay at the point.

6. Analytical results and conclusions

6.1. *Surface water monitoring*

The results of surface water monitoring are indicated in the tables below:

Table 6-1 Bridge N1 (Dzirula river) up and down stream monitoring results

Parameters	EIA Standards (National MAC)	Baseline results (March 2022)	Upstream	Downstream
pH	6.5-8.5	7.87	7.8	7.9
BOD	6mg/l	<3	<3	<3
COD	30mg/l	80	76	79
TSS	Increase no more than 0.75mg/l	12	48	42
Total N	N/A	1.5	1.3	1
Total P	2mg/l	0.28	0.21	0.3
Nitrates	40mg/l	<1	<1	<1
Phosphates	3.5mg/l	0.8	0.88	0.88
Oil and Grease	0.3mg/l	<0.3	<0.3	<0.3
Total Coliforms	400MPN	2400	75000	32000

According to analytical results, there was no significant fluctuation between up and down stream results.

Table 6-2 Bridge N2 (Dzirula river) up and down stream monitoring results

Parameters	EIA Standards (National MAC)	Baseline results (June 2021)	Upstream	Downstream
pH	6.5-8.5	8.12	7.85	7.9
BOD	6mg/l	<3	<3	<3
COD	30mg/l	28	78	82
TSS	Increase no more than 0.75mg/l	15	32	42
Total N	N/A	<0.5	1.1	1.2
Total P	2mg/l	0.083	0.28	0.25
Nitrates	40mg/l	2	<1	<1
Phosphates	3.5mg/l	0.25	0.87	0.85
Oil and Grease	0.3mg/l	<0.1	<0.3	<0.3
Total Coliforms	400MPN	ND	15000	25000

No significant increases were identified during laboratory analyses with exception of TSS and total coli form results. To take in consideration the nature of activities at the location (no activities have been observed in to the river bed), the Increased TSS level at the downstream, can be caused by increase water turbulence at the sampling location. There is no any sanitary discharge points from site in to the river. Therefore, the total coli forms increase is not caused by ongoing activities.

Table 6-3 Bridge N3 (Banimela River) up and down stream monitoring results

Parameters	EIA Standards (National MAC)	Baseline results (June 2021)	Upstream	Downstream
pH	6.5-8.5	8.16	7.8	7.79
BOD	6mg/l	<3	<3	<3
COD	30mg/l	32	82	84
TSS	Increase no more than 0.75mg/l	20	36	37
Total N	N/A	1.5	1	1.3
Total P	2mg/l	0.15	0.35	0.38
Nitrates	40mg/l	4	<1	<1
Phosphates	3.5mg/l	0.45	0.9	0.92
Oil and Grease	0.3mg/l	<0.1	<0.3	<0.3
Total Coliforms	400MPN	ND	22000	18000

Total N is slightly increased at the downstream monitoring location, but the number is still within the baseline monitoring result. No significant fluctuations of other monitored parameters have been observed between up and downstream results.

Table 6-4 Bridge N4 (Kvirila River) up and down stream monitoring results

Parameters	EIA Standards (National MAC)	Baseline results (June 2021)	Upstream	Downstream
pH	6.5-8.5	8.12	7.81	7.84
BOD	6mg/l	<3	<3	<3
COD	30mg/l	30	87	89
TSS	Increase no more than 0.75mg/l	2085	64	59
Total N	N/A	<0.5	1.2	1
Total P	2mg/l	0.092	0.29	0.31
Nitrates	40mg/l	2	<1	<1
Phosphates	3.5mg/l	0.28	0.87	0.88
Oil and Grease	0.3mg/l	<0.1	<0.3	<0.3
Total Coliforms	400MPN	250000	19000	21000

No significant changes have been observed during analyses of up and downstream samples.

6.2. *Dust and Air Quality Monitoring*

Dust monitoring

Dust Trak DRX Desktop aerosol monitor was used to monitor the dust concentrations in the ambient air. The device is specifically designed to perform dust monitoring and has own calibrator device, auto zero adjustment and all tools required by the standard document to undertake the measurement.

Dust concentrations in the air were measured only on the Tunnel 5 AT portal in two sessions during both working and non-working hours.

The results of the monitoring works are given below:

Table 6-5 The Results of Dust monitoring at Tunnel 5 AT portal (Microgram/m3 - µg/m3)

Session	PM_{10}			$PM_{2.5}$		
	30-minute average value	min	max	30-minute average value	min	max
Non-working	3	1	14	3	1	14
Working	8	5	24	8	5	24

Session	PM_{total}		
	30-minute average value	min	max
Non-working	3	1	14
Working	8	5	24

Table 6-6 The Results of Dust monitoring at Near Babukhadia house (Microgram/m3 - µg/m3)

PM_{10}			$PM_{2.5}$		
30-minute average value	min	max	30-minute average value	min	max
69	49	89	69	49	87
PM_{total}					
30-minute average value	min		max		
69	49		89		

According to Georgian legislation, the permissible limit of dust concentration is 150 micrograms. According to Table 6.5 the amount of dust in the air fully complies with the legal requirements.

Air Quality monitoring

In order to determine Nitrogen oxide and Sulphur Dioxide levels in ambient air, two passive sampler tubes from Gradko Environmental (England) were installed, One for NOx and one for SOx for long term monitoring, according to the ordinance N38/n of Minister of Labor, Health and Social Affairs of Georgia, which determined maximum permissible concentration levels.

The exact time is written when tubes are installed and after their removal. Total hours recorded are calculated as a result of these exact times. Table 6-7 shows the exposure time of the tubes, the maximum permissible concentration (MPC) according to the legislation of Georgia and the results of the analysis.

Table 6-7 Air Quality Monitoring Results

Monitoring Point	Exposure Time	*MPC – Average Daily for NO2- mg/m3	*MPC – Average Daily for SO2- mg/m3	Results of Measurements For NO2, mg/m3	Results of Measurements For SO2, mg/m3
BP1 AT	695.0	0.04	0.05	0.014	<0.02
BP1 TA	695.0	0.04	0.05	0.046	<0.02
KM 4.4	695.08	0.04	0.05	0.046	<0.02
KM 5.8	698.08	0.04	0.05	0.013	<0.02
Near Babukhadia house	696.05	0.04	0.05	0.020	<0.02
KM 6.4	697.80	0.04	0.05	0.010	<0.02
Tunnel 5 AT portal	695.58	0.04	0.05	0.012	<0.02
KM 12.6 AT	677.92	0.04	0.05	0.010	<0.02

KM 12.6 TA	67792	0.04	0.05	0.070	<0.02
KM 13.3	697.17	0.04	0.05	0.010	<0.02

*Maximum permissible concentrations (MPC) of atmospheric air pollutants in populated areas hygiene norms 2.1.6. 002 -01.

The laboratory test results show that the concentrations on NO2 and SO2 in atmosphere air is lower than maximum allowable limits.

6.3. *Noise Monitoring Results*

Noise monitoring works were carried out at four points, according to the client's request. These are: two sessions at Batch Plant 1 TA and Tunnel 5 AT portal, 3 sessions at Bridge 5 (including evening session), and at Top of tunnel 5 in the evening. The results obtained are given below, both in the form of graphs and in a table.

Table 6-8 Noise Monitoring Results

	BP1 TA non-working	BP1 TA working	Tunnel 5 AT portal - nonworking	Tunnel 5 AT portal - working	Bridge 5 – non-working	Bridge 5 - working	Bridge 5 – evening session	Top of tunnel 5 – evening session
LAeq	68.2	71.3	57.3	59.9	52.0	61.5	50.5	41.5
LAmax	88.6	97.4	80.4	82.6	71.3	74.9	70.9	69.9
LAmin	41.6	47.6	37.1	49.0	35.1	52.9	36.7	33.3
LA10	72.7	74.8	59.0	59.0	52.8	64.5	51.3	42.9
LA90	51.0	58.2	43.1	51.5	38.8	55.5	39.9	36.1

Batch Plant 1 TA: As mentioned above, measurements were carried out at this point during both nonworking and working hours. In both cases, the average noise level exceeds the established limit (55 dB), however, average level of noise measured during working hours is higher than the level measured during non-working hours. In addition, most of the indicators recorded during working hours, such as LAmax, LAmin and LA90, significantly exceed the same indicators for monitoring the non-working session, which allows us to conclude that the noise level measured during most of the working hour exceeded the established limit and most of the time of non-working session complies with the limit.

Tunnel 5 AT portal. As it was mentioned, noise level measurement was conducted twice, during working and non-working hours. Exceedance of noise level was observed during both sessions. However, during a non-working session, exceedance is not significant (2.3 dB). As the results show, the LA90 observed during both sessions complies with the established limit, moreover, it is much lower than the limit. This fact indicates that the noise level was within the limit for 90% of the measurement time.

Bridge 5. The noise was measured at this point during construction activities and during non-working time, when all types of equipment were stopped and only the background noise level was measured. In addition, special monitoring of noise level was conducted at the same point in the evening, at approximately 21:15,

based on complaints and requests from residents. As the locals noted, in most cases the construction works continue at night (from 20:00 to 22:00) and cause disturbance to the population. It should be noted, that during the first few minutes of the evening monitoring, only construction materials were being sorted on the construction site, while all other types of work were suspended. The measurement was conducted in the presence of several representatives of the locals.

According to the legislation of Georgia and the standards set for the project, the maximum permissible noise level (LAeq) is different for different parts of the day. During the day (08:00 - 19:00) the allowable limit is 55 dB. In the evening (19:00 - 23:00) the norm is 45 dB, and at night (23: 00 - 08:00) - 40 dB. Since 2 sessions were held during the day and one in the evening, we will compare the results with the relevant standard. During the work session, the permissible noise level was exceeded by 6.5 dB (standard - 55.0 dB). The average noise level measured during non-working hours complies with the established limit.

Exceedance of the permissible noise limit by 5.5 dB was observed during the evening session (standard - 45 dB). However, in contrast to the day's results, in this case the L90 value is low (39.9 dB). Accordingly, it can be concluded that the noise was not constant and for most of the time, its value was within the established limit.

Top of tunnel 5. Noise monitoring at this point was carried out in the evening at 22:10. During the monitoring, active construction works were carried out away from the monitoring point, involving various types of construction equipment.

As already mentioned, according to the legislation of Georgia and the standards set for the project, the maximum permissible noise level (LAeq) in the evening (19:00 - 23:00) is 45 dB. Since the monitoring session was held at 22:10 pm, the results obtained should be compared with the relevant standard - 45 dB.

As we can see in the results, the values of LAeq and L90 fully complies with the established limit, indicating that the probability of disturbance caused by noise is low.

At points where noise limits have been exceeded, it is important to plan and implement appropriate mitigation measures.

Noise measurement graphs are given below:

Figure 6-1 Batching Plant N1 TA - non working hours

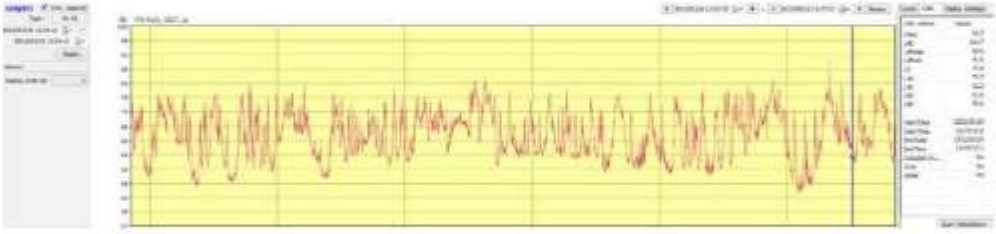


Figure 6-2 Batch Plant 1 TA- working hours

Figure 6-3 Top of the Tunnel 5 evening session

Figure 6-4 Tunnel 5 AT portal Non-working hours

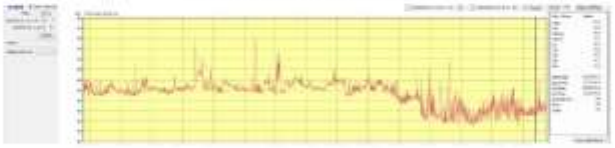


Figure 6-5 Tunnel 5 AT Portal working hours

Figure 6-6 Bridge 5 Non-working hours

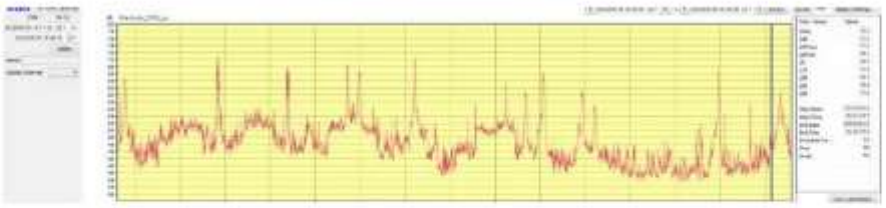
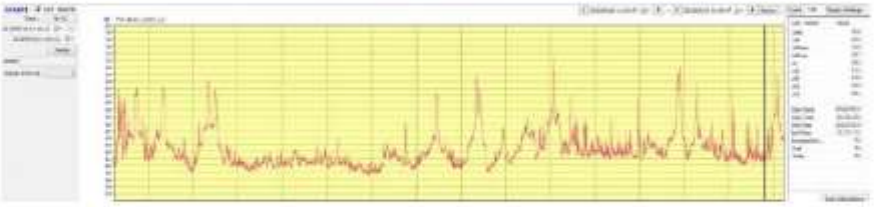


Figure 6-7 Bridge 5 working hours

Figure 6-8 Bridge 5 Evening session



6.4. *Vibration Monitoring Results*

The vibration was monitored at 6 points, most of them in 2 sessions to identify the background vibration level and compare it with the vibration levels observed during the works. In addition, at 2 points vibration was measured in the evening to identify vibration levels during construction works held in the evening. The monitoring points are: Top of tunnel 5 (evening session); Tunnel 5 AT portal, Near tunnel 5 AT portal (1), Near tunnel 5 AT portal (1)_opposite, Near tunnel 5 AT portal (3) (2 sessions); Bridge 5 (3 sessions, including working and non-working times and in the evening).

The results of vibration monitoring are given below in tables and figures.

Table 6-9 Vibration results Top of tunnel 5 – evening session

Geophone	Tran	Vert	Long	Unit
PPV	0.095	0.102	0.118	mm/s
ZC Freq	73	3.9	<1.0	Hz
Time (Rel. to Trig)	1.345	900.976	859.401	sec
Peak Acceleration	0.007	0.007	0.007	
Peak Displacement	0.108	0.117	0.641	
Sensor Check	Passed	Passed	Passed	
Frequency	7.3	7.5	7.3	Hz
Overswing Ratio	4.0	4.4	4.4	

Peak Vector Sum 0.153 mm/sec, at 859.401 sec.

Table 5-10 Vibration results at Tunnel 5 AT portal – non-working hour

Geophone	Tran	Vert	Long	Unit
PPV	0.394	0.339	0.638	mm/s
ZC Freq	>100	4.6	>100	Hz
Time (Rel. to Trig)	1030.375	1027.284	1027.291	sec
Peak Acceleration	0.028	0.016	0.057	g
Peak Displacement	5.605	5.855	0.937	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.3	7.5	7.3	Hz
Overswing Ratio	3.8	4.2	4.4	

Peak Vector Sum 0.668 mm/sec, at 1027.287 sec.

Table 5-11 Vibration results at Tunnel 5 AT portal - working hour

Geophone	Tran	Vert	Long	Unit
PPV	0.276	0.434	0.307	mm/s
ZC Freq	85	47	73	Hz
Time (Rel. to Trig)	1823.864	4.740	4.737	sec
Peak Acceleration	0.021	0.014	0.016	g
Peak Displacement	10.83	8.902	2.140	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.3	7.5	7.3	Hz
Overswing Ratio	3.8	4.3	4.5	

Peak Vector Sum 0.450 mm/sec, at 4.739 sec.

Table 6-12 Vibration results at Near tunnel 5 AT portal (1) - non-working hour

Geophone	Tran	Vert	Long	Unit
PPV	0.473	0.520	0.276	mm/s
ZC Freq	16	13	12	Hz
Time (Rel. to Trig)	165.004	887.956	888.290	sec
Peak Acceleration	0.010	0.009	0.007	
Peak Displacement	5.403	3.879	0.984	
Sensor Check	Passed	Passed	Passed	
Frequency	7.5	7.5	7.3	Hz
Overswing Ratio	3.7	4.2	4.5	

Peak Vector Sum 0.593 mm/sec, at 165.001 sec.

Table 6-13 Vibration results at Near tunnel 5 AT portal (1) opposite - working hours

Geophone	Tran	Vert	Long	Unit
PPV	0.410	0.765	0.583	mm/s
ZC Freq	17	20	19	Hz
Time (Rel. to Trig)	576.845	576.953	99.674	sec
Peak Acceleration	0.008	0.012	0.008	
Peak Displacement	0.697	0.599	0.231	
Sensor Check	Passed	Passed	Passed	
Frequency	7.5	7.5	7.3	Hz
Overswing Ratio	3.7	4.3	4.5	

Peak Vector Sum 0.773 mm/sec, at 99.665 sec

Table 6-14 Vibration results at Near tunnel 5 AT portal (1) opposite– Non-working hour

Geophone	Tran	Vert	Long	Unit
PPV	0.560	0.828	1.364	mm/s
ZC Freq	13	17	39	Hz
Time (Rel. to Trig)	674.009	538.989	813.049	sec
Peak Acceleration	0.035	0.040	0.055	
Peak Displacement	0.892	1.575	0.430	
Sensor Check	Passed	Passed	Passed	
Frequency	7.5	7.5	7.3	Hz
Overswing Ratio	3.8	4.3	4.5	

Peak Vector Sum 1.495 mm/sec, at 813.049 sec.

Table 6-15 Vibration results at Bridge 5

Geophone	Tran	Vert	Long	Unit
PPV	0.158	0.181	0.173	mm/s
ZC Freq	27	<1.0	<1.0	Hz
Time (Rel. to Trig)	10.479	1976.370	1975.687	sec
Peak Acceleration	0.007	0.007	0.012	g
Peak Displacement	14.68	9.444	2.135	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.3	7.5	7.3	Hz
Overswing Ratio	3.9	4.2	4.5	

Peak Vector Sum 0.217 mm/sec, at 1975.687 sec.

Table 6-16 Vibration results at Near tunnel 5 AT portal (1) opposite – working hours

Geophone	Tran	Vert	Long	Unit
PPV	0.812	1.963	0.725	mm/s
ZC Freq	18	21	22	Hz
Time (Rel. to Trig)	208.162	208.152	208.251	sec
Peak Acceleration	0.020	0.044	0.032	
Peak Displacement	0.361	0.788	0.273	
Sensor Check	Passed	Passed	Passed	
Frequency	7.3	7.5	7.5	Hz
Overswing Ratio	3.9	4.2	4.4	

Peak Vector Sum 2.010 mm/sec, at 208.152 sec

Table 6-17 Vibration results at Near tunnel 5 AT portal (3) – non-working hours

Geophone	Tran	Vert	Long	Unit
PPV	0.268	0.575	0.292	mm/s
ZC Freq	10	16	23	Hz
Time (Rel. to Trig)	971.110	787.954	971.756	sec
Peak Acceleration	0.009	0.008	0.009	g
Peak Displacement	3.500	1.948	0.925	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.3	7.5	7.5	Hz
Overswing Ratio	3.8	4.2	4.4	

Peak Vector Sum 0.606 mm/sec, at 787.954 sec.

Table 6-18 Vibration results at Near tunnel 5 AT portal (3) – working hours

Geophone	Tran	Vert	Long	Unit
PPV	0.315	0.520	0.457	mm/s
ZC Freq	16	17	11	Hz
Time (Rel. to Trig)	426.129	720.813	426.288	sec
Peak Acceleration	0.012	0.010	0.014	g
Peak Displacement	6.102	2.722	0.881	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.3	7.5	7.3	Hz
Overswing Ratio	3.8	4.2	4.4	

Peak Vector Sum 0.590 mm/sec, at 721.003 sec.

Table 6-19 Vibration results at Bridge 5 – non-working hours

Geophone	Tran	Vert	Long	Unit
PPV	0.126	0.166	0.126	mm/s
ZC Freq	<1.0	N/A	<1.0	Hz
Time (Rel. to Trig)	574.721	8.108	933.076	sec
Peak Acceleration	0.007	0.007	0.011	g
Peak Displacement	10.53	13.23	0.852	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.3	7.5	7.3	Hz
Overswing Ratio	3.8	4.1	4.4	

Peak Vector Sum 0.195 mm/sec, at 8.108 sec.

Table 6-20 Vibration results at Bridge 5 – working hours

Geophone	Tran	Vert	Long	Unit
PPV	0.292	0.252	0.331	mm/s
ZC Freq	19	1.6	22	Hz
Time (Rel. to Trig)	5.251	5.239	5.254	sec
Peak Acceleration	0.018	0.009	0.014	g
Peak Displacement	11.29	3.701	9.203	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.5	7.5	7.5	Hz
Overswing Ratio	3.8	4.2	4.3	

Peak Vector Sum 0.409 mm/sec, at 6.396 sec

Table 6-21 Vibration results at Bridge 5 – evening session

Geophone	Tran	Vert	Long	Unit
PPV	0.134	0.110	0.181	mm/s
ZC Freq	64	24	64	Hz
Time (Rel. to Trig)	857.938	827.541	826.411	sec
Peak Acceleration	0.008	0.008	0.014	g
Peak Displacement	0.110	0.081	0.378	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.3	7.5	7.3	Hz
Overswing Ratio	3.9	4.3	4.5	

Peak Vector Sum 0.224 mm/sec, at 827.541 sec

The Georgian legislation defines limits of peak vector values, which represent sum of vectors parallel to each axis. The device used for the survey provides data on maximum peak values measured for further analysis of findings of vibration measurements. During the survey standard project values were applied. The project standards define the following requirements:

The Georgian vibration standards are established on the basis of human comfort levels. The Georgian legislation does not provide standards that ensure avoidance of impacts on buildings. The standard establishes the permissible vibration levels in residential buildings, hospitals and holiday houses (ref: Sanitary norms and regulations- 2001).

Table 6.22 Permissible Vibration Levels According to the Georgian Legislation

Mean Geometric Frequencies of Octave Bands	Permissible Values			
	Vibration Acceleration		Vibration Speed	
	m/sec^2	dB	$m/sec\ 10^{-4}$	dB
2	4.0	72	3.2	76
4	4.5	73	1.8	71
8	5.6	75	1.1	67
16	11.0	81	1.1	67
31.5	22.0	87	1.1	67
63	45.0	93	1.1	67
Corrected and equivalently corrected values and levels	4.0	72	1.1	67

Source: EIA for Khevi-Vibisa and Shorapani-Argveta road sections

The data provided in the above-mentioned table shows that if vibration lasts for a specific period of time, permissible vibration levels can be exceeded by 5 dB. When vibration is not constant, exceedance by 10 dB is allowable; in this case the absolute vibration value is multiplied by coefficient of 0.32. Moreover, according to the regulation, permissible vibration levels in hospitals and other healthcare facilities should be reduced by 3dB.

The device used for monitoring of vibration levels measures vibration speed. Consequently, measured values are presented in m/sec not db. The formula below shows how to calculate measured values in dB:

Value of transverse vibration provided in dBV can be calculated on the basis of data on speed (mm/sec) using following formula:

Lv = 20 * lg(V/Vref)

Lv = speed levels in decibels, mm/sec (dBV)

V = rms speed amplitude

Vref = reference for speed amplitude, mm/sec (Vref=0.00005 mm/sec)

Results of measured vibration at construction area:

Table 6-23 Vibration measurement results and legislation limits

Point / session	Peak Vector Max Values		Legislation limits	
	mm/sec	db	mm/sec	db
Top of tunnel 5 – evening session	0.153	69.7	1.1	67 (+10)
Tunnel 5 AT portal – nonworking hour	0.668	82.5	1.1	67 (+10)
Tunnel 5 AT portal – working hour	0.450	79.1	1.1	67 (+10)
Near tunnel 5 AT portal (1) - non-working hour	0.593	81.5	1.1	67 (+10)
Near tunnel 5 AT portal (1) - working hour	0.773	83.8	1.1	67 (+10)
Near tunnel 5 AT portal (1)_opposite- non-working hour	1.495	89.5	1.1	67 (+10)
Point / session	Peak Vector Max Values		Legislation limits	
	mm/sec	db	mm/sec	db
Near tunnel 5 AT portal (1)_opposite- working hour	2.010	92.1	1.1	67 (+10)
Near tunnel 5 AT portal (3) - non-working hour	0.606	81.7	1.1	67 (+10)
Near tunnel 5 AT portal (3) - working hour	0.590	81.4	1.1	67 (+10)
Bridge 5 - non-working time	0.195	71.8	1.1	67 (+10)
Bridge 5 - working time	0.409	78.2	1.1	67 (+10)
Bridge 5 – evening session	0.224	73	1.1	67 (+10)

Table 6-24 British and German standards for Vibration

High risk of damage	PPV < 5 mm/s
Risk of cosmetic damage	PPV 5 to 15 mm/s
Risk of structural damage	PPV > 15 mm/s

source: British Standard BS 6472 and are German Standards DIN 4150-3:1999

The vibration results meet German and British standards. According to the Georgian legislation, excesses were observed at point Near Nebieridze house, during the second session. However, as already mentioned, the measurement was performed while simulating a busy workflow, therefore the actual result may be different.

Annex 4: Sample Attendance Sheet

貴州省公路工程集团有限公司 GUIZHOU HIGHWAY ENGINEERING GROUP CO., LTD.

CNTIC 中国技术进出口集团有限公司 CHINA NATIONAL TECHNICAL IMP. & EXP. CORP.

შრომის უსაფრთხოების და გარემოს დაცვის ტრენინგი

HSE DEPARTMENT TRAINING

职业安全与环境培训

ლოკაცია:LOCATION:位置 PK47+00

ტრენინგის თემა და ნომერი:
SUBJECT & REF No:
培训主题和编号 Topsoil striping and Stowage

ტრენინგის ტუტორი:
TRAINING TUTOR:
培训导师 David Kurdadze დავით ქურდაძე

თარიღი:DATE: 09.06.2022

	სახელი და გვარი NAME 名称	კომპანია NAME OF EMPLOYER 公司	ხელმოწერა Signature 签名	თარიღი Date 日期
1	[illegible]	GHEC	[signature]	9.06.2022
2	[illegible]	GHEC	[signature]	9.06.2022
3	[illegible]	GHEC	[signature]	9.06.2022
4	[illegible]	GHEC	[signature]	9.06.2022
5	[illegible]	GHEC	[signature]	9.06.2022
6	[illegible]	GHEC	[signature]	9.06.2022
7	[illegible]	GHEC	[signature]	9.06.2022
8	[illegible]	GHEC	[signature]	9.06.2022
9	[illegible]	GHEC	[signature]	9.06.2022
10	[illegible]	GHEC	[signature]	9.06.2022
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Guizhou Highway Engineering Group Co ltd and China National Technical Import & Export Corporation Joint

შრომის უსაფრთხოების და გარემოს დაცვის ტრენინგი

HSE DEPARTMENT TRAINING

职业安全与环境培训

ლოკაცია:LOCATION:位置 Interchange # 2 Hazardous Waste Area

ტრენინგის თემა და ნომერი: Hazardous Non-Hazardous Waste

SUBJECT & REF No: Segregation, Handling and storage

培训主题和编号

ტრენინგის ტუტორი: David Kurdadze დავით ქურდაძე

TRAINING TUTOR:

培训导师

თარიღი:DATE: 09.06.2022

	სახელი და გვარი NAME 名称	კომპანია NAME OF EMPLOYER 公司	ხელმოწერა Signature 签名	თარიღი Date 日期
1	[illegible]	GHEC	[signature]	9.06.2022
2	[illegible]	GHEC	[signature]	9.06.2022
3	[illegible]	GHEC	[signature]	9.06.2022
4	[illegible]	GHEC	[signature]	9.06.2022
5	[illegible]	GHEC	[signature]	9.06.2022
6	[illegible]	GHEC	[signature]	9.06.2022
7	[illegible]	GHEC	[signature]	9.06.2022
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贵州省公路工程集团有限公司
GUIZHOU HIGHWAY ENGINEERING GROUP CO., LTD.

CNTIC 中国技术进出口集团有限公司
CHINA NATIONAL TECHNICAL IMP. & EXP. CORP.

შრომის უსაფრთხოების და გარემოს დაცვის ტრენინგი

HSE DEPARTMENT TRAINING

职业安全与环境培训

ლოკაცია:LOCATION:位置 PK 21+00

ტრენინგის თემა და ნომერი:
SUBJECT & REF No:
培训主题和编号 Tree cutting Process

ტრენინგის ტუტორი:
TRAINING TUTOR:
培训导师 David Kurdadze დავით ქურდაძე

თარიღი:DATE: 09.06-2022.

	სახელი და გვარი NAME 名称	კომპანია NAME OF EMPLOYER 公司	ხელმოწერა Signature 签名	თარიღი Date 日期
1	[illegible]	GHEC	[signature]	9.06.2022
2	[illegible]	GHEC	[signature]	9.06.2022
3	[illegible]	GHEC	[signature]	9.06.2022
4	[illegible]	GHEC	[signature]	9.06.2022
5	[illegible]	GHEC	[signature]	9.06.2022
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შრომის უსაფრთხოების და გარემოს დაცვის ტრენინგი
HSE DEPARTMENT TRAINING
职业安全与环境培训

ლოკაცია:LOCATION:位置 Interchange N1 Batching Plant.
ტრენინგის თემა და ნომერი:
SUBJECT & REF No:
培训主题和编号 Concrete mixer trucks drivers training, usage of cisterns wash out pits.
ტრენინგის ტუტორი:
TRAINING TUTOR:
培训导师 David Kurdadze დავით ქურდაძე
თარიღი:DATE: 09.06.2022.

	სახელი და გვარი NAME 名称	კომპანია NAME OF EMPLOYER 公司	ხელმოწერა Signature 签名	თარიღი Date 日期
1	[illegible]	GHEC	[signature]	9.06.2022
2	[illegible]	GHEC	[signature]	9.06.2022
3	[illegible]	GHEC	[signature]	9.06.2022
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8	[illegible]	GHEC	[signature]	9.06.2022
9	[illegible]	GHEC	[signature]	9.06.2022
10	[illegible]	GHEC	[signature]	9.06.2022
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Annex 5: Complaints Log for Reporting Period

Project	Recipient	Date Received	Soc/ Env&HSE	Name & contact of Complainant	Complaint Category	Complaint Description	Resolution Description	Resolution	Resolution Date	Substantiated	Status	Days open	Comments
F4	RD	06.01.22	Social	Zurab Barbakadze P/N 01009007806 Mob N: Pk 109+00	Restriction or loss of access	In his opinion, the embankment arranged by the Contractor in the vicinity of his agricultural land plot (C/C 32.03.44.575 & C/C 32.03.44.649) causes the access problem for his agricultural land plot at the construction stage and at the operational stage.	On 06.01.2022 the Employer forwarded the local resident's application through the letter (N 2-08/133) and required to discuss the issue and inform him about the Engineer's position; On 07.03.2022 the Employer was informed with the Engineer's letter (1059-CSAE60F4-UBM-GE) as follows: *"---The site inspection implemented by the representative of the Engineer revealed that the Contactor has arranged 3-4 meters high embankment adjacent to the aforementioned agricultural land plot, within the RoW. The embankment doesn't block the access road for the agricultural land plot. ---Also, as you are aware, the Project envisages the construction of Village Road N6, which will provide access roads for the aforementioned agricultural land plot. ---The citizen Zurab Barbakadze was informed regarding the above-mentioned alternative access roads."*	Rejected	07.03.22	Unsubstantiated	Closed	**60**	
F4	RD	17.01.22	Env&HSE	Petre Gordeziani P/N 18001004864 Nana Mchedlidze P/N 56001018864 Mob N: 599459929 Pk 82+00	Damage to Infrastructure / Assets	They demanded a copy of data/documentation of the pre-construction technical survey of their residential houses (C/C 32.10.32.295). Also, they stated that the cracks are increased due to the Contractor's construction works.	On 17.01.2022 the Employer forwarded the APs' joint application with the letter N 2-08/691 to the Engineer and required to submit the Engineer's position and the required data/documentation; On 17.03.2022 the Employer was informed with the Engineer's letter (1087-CSAE60F4-UBM-GE) as follows: "---As you are aware, the technical condition of the aforementioned citizens' residential houses was surveyed on 15th and 16th May of 2021, by SDSC LTD (I/C 405335025) hired by the Contractor, about which the Engineer has submitted the survey data/documentation to the Employer with the letter 0450-CSAE60F4-UBM-GE. With the same letter 0450-CSAE60F4-UBM-GE, the Employer was informed regarding the Engineer's instruction to the Contractor to improve the survey methodology. ---Additionally, please be informed, that on 6th and 7th September of 2021, the same company marked some cracks of the walls of the mentioned residential houses, about which the Contractor hasn't officially submitted the necessary data/documentation to the Engineer yet. ---We would like to inform you, that the representative of the Engineer communicated with Mr. Petre Gordeziani and asked permission to check the plasters and tapes put across the cracks of the residential house. Mr. Petre Gordeziani demanded that he shall attend the house inspection process. However, he was not in Zestaponi. Hence, the Engineer was unable to inspect his residential house. ---The Engineer is in close communication with Mr. Petre Gordeziani, and as soon he will arrive in Zestaponi, the Engineer will inspect the residential house and will report the results to the Employer in writing. ---Please be informed, that on 10th March 2022, the Engineer inspected the tapes and the plasters put on the cracks of Ms. Nana Mchedlidze's residential house (C/C 32.10.32.295), provided by the SDSC LTD. ---As a result, it revealed that some tapes are snapped and some plasters are cracked. Please see attachment N2 for detailed information. ---It should be noted that the distance between Tunnel 4005 and Ms. Nana Mchedlidze's residential house is approximately 44 meters. In the case of Tunnel 4005 and Mr. Petre Gordeziani's residential house – 62 meters. Excavation of Tunnel 4005 is carried out with a hydraulic hammer from the western side. ---Considering the sub-section G.8.7 of the Environmental Impact Assessment and the distance between the Tunnel 4005 and the aforementioned residential houses, the vibration of Tunnel 4005 excavation with the hydraulic hammer should not have caused damage to the residential houses. ---Accordingly, the crack increase may have been caused: --•By the existing land creeping process; --•By the vibration of heavy vehicles' movement on the existing Gomi-Sachkhere-Chiatura-Zestaponi motorway road. ---(Note: The distance between Mr. Petre Gordeziani's residential house and the edge of the carriageway of the existing Gomi-Sachkhere-Chiatura-Zestaponi motorway road is about 10 meters. In the case of Nana Mchedlidze's residential house - 17 meters). ---However, in order to study the issue on a technical basis, the Contractor	Forwarded to CC		Pending	Open	**169**	

							was instructed with the letter (1086-CSAE60F4-UBM-GE), to carry out vibration instrumental monitoring in the vicinity of the above-mentioned residential houses during excavating Tunnel 4005-AT-A with a hydraulic hammer and report its result to the Engineer. ---Besides, with the letter (1086-CSAE60F4-UBM-GE), the Contractor was reminded to: --•Resubmit updated buildings/structures technical condition survey data/documentation of the above-mentioned residential houses with considering the Engineer's comments issued with the letters 0449-CSAE60F4-UBM-GE & 0991-CSAE60F4-UBM-GE; --•Deliver the copy of the buildings/structures technical condition survey data/documentation to Mr. Petre Gordeziani and Ms. Nana Mchedlidze with signing acceptance-delivery acts and report to the Engineer. ---After implementing actions to be taken by the Contractor, the Employer will be additionally informed in writing."					
F4	RD	20.01.22	Social	Joni Talakadze (P/N 60001015302) representative of Lela Managadze (P/N 55001005991) Mob N: Pk 41+00	Other	He required submission of information about the distances between Tunnel 4003 and one of the settlements of village Puti.	On 20.01.2022 the Employer forwarded the local resident's application to the Engineer and required submission of the required information (N 2-08/808); On 25.01.2022 with the letter N 2-08/1035 the Employer one again required submission of the above-required information; On 20.01.2022 the Contractor was instructed to prepare and submit the Cross-sections indicating the distances between Tunnel 4003 and the nearest settlement and buildings (0971-CSAE60F4-UBM-GE); On 25.01.2022 the Contractor was reminded to prepare and submit the Cross-sections indicating the distances between Tunnel 4003 and the nearest settlement and buildings (0983-CSAE60F4-UBM-GE); On 26.01.2022 the Contractor submitted the required cross-sections directly to the Employer and cc to the Engineer (20220126-0125-GHEC); On 20.02.2022 the Engineer reformatted and corrected the cross-sections provided by the Contractor and submit to the Employer with the letter 1017-CSAE60F4-UBM-GE;	Accepted	20.02.22	Substantiated	Closed	**31**	
F4	Government	20.12.22	Social	Tea Chichinadze P/N 18001002251 Mob N: 577388766 Pk 71+50	Inclusion in LARP	In her opinion, her agricultural land plot C/C 32.09.42.514 is useless as it is situated on the top of Tunnel 4005. Hence she demands inclusion in LAPR. Also, she demanded to properly arrange an access road for the agricultural land plot C/C 32.09.42.704);	On 20.01.2022 with the letter N 2-08/822 the Employer forwarded the local resident's application to the Engineer and required the Engineer's about the issue. Also, the Employer required submission information in the form of cross-section about the distance between the land plot C/C 32.09.42.514 and Tunnel 4005; On 18.04.2022 with the formal letter (20220418-0949-GHEC-UBM) the Contractor submitted the Lease Agreement of the Land Plot signed between the Contactor and the Tea Chichinadze's household. According to the signed agreement, the Contractor leased the land plot (C/C 32.09.42.704) till 17th Feb 2025. Hence, the access road issue for the mentioned land plot is resolved; On 19.04.2022 the Employer was informed with the Engineer's letter 1146-CSAE60F4-UBM-GE as follows: "--Please be informed that since the access road of the mentioned agricultural land plots crosses the construction site where active construction work is ongoing, it is not feasible to arrange an access road for the same agricultural land plots. --However, upon completion of construction, the above-mentioned agricultural plots will be provided with the access road via passing under the Reinforced Concrete Bridge (BRI 4.1.07). --It should be noted that on the basis of the contract signed on 5th April 2022, the Contractor leased Tea Chichinadze's agricultural land plot C/C 32.09.42.704. Thus, the access issue of the land plot C/C 32.09.42.704 during the construction stage is resolved. --Also, we would like to inform you, that: --•Approximately 455 sq.m of the land plot C/C 32.09.42.514 is located on the top of Tunnel 4005-TA-AT; --•Approximately 390 sq.m of the land plot C/C 32.09.42.514 is located between Tunnel 4005-TA and Tunnel 4005-AT." (Note: The Lease Agreement on the Land Plot was forwarded to the Employer);	Forwarded to RD		Pending	Open	**-168**	

F4	RD	20.01.22	Env&HSE	Ilia Saralidze P/N 18001062039 Mob N: Pk 82+00	Damage to Infrastructure / Assets	He demanded a copy of data/documentation of the pre-construction technical survey of his residential house (C/C 32.10.32.045). Also, he stated that the cracks are increased due to the Contractor's construction works.	On 20.01.2022 the Employer forwarded the local resident's application with the letter N 2-08/848 to the Engineer and required to submit the Engineer's position and the required data/documentation; On 17.03.2022 the Employer was replied with the Engineer's letter (1088-CSAE60F4-UBM-GE) as follows: *"---As you are aware, the technical condition of the aforementioned residential house was surveyed on 15th May 2021, by SDSC LTD (I/C 405335025) hired by the Contractor, about which the Engineer has submitted the survey data/documentation to the Employer with the letter (0450-CSAE60F4-UBM-GE). One of the cracks of the residential house wall is marked with paper tape. --With the letter (0449-CSAE60F4-UBM-GE) the Contractor was instructed about the necessary actions to improve the survey methodology. --Also, with the letters (0952-CSAE60F4-UBM-GE, 0991-CSAE60F4-UBM-GE & 1054-CSAE60F4-UBM-GE) the Contractor was reminded to conduct the survey per the Engineer's comments issued with the letter (0449-CSAE60F4-UBM-GE) and the Method Statement of Crack Monitoring Using Gyps Plaster. ---Please be informed, that on 9th March 2022, the Engineer and the Contractor checked the aforementioned residential house and revealed that the paper tape is not snapped. ---It should be noted that the distance between Tunnel 4005 and the residential house is approximately 77 meters. Excavation of Tunnel 4005 is carried out with a hydraulic hammer from the western side. ---However, in order to study the issue on a technical basis, the Contractor was instructed with the letter (1086-CSAE60F4-UBM-GE), to carry out vibration instrumental monitoring in the vicinity of the residential house during excavating Tunnel 4005-AT-A with a hydraulic hammer and report its result to the Engineer. ---Besides, with the letter (1086-CSAE60F4-UBM-GE), the Contractor was reminded to carry out the technical condition survey of the residential house per the Engineer's comments issued with the letters (0449-CSAE60F4-UBM-GE & 0991-CSAE60F4-UBM-GE) and Method Statement of Crack Monitoring Using Gyps Plaster and submit its data/documentation to the Engineer. ---After implementing actions to be taken by the Contractor, the Employer will be additionally informed in writing."* On 28.05.2022 the Contractor delivered the copy of buildings/structures technical survey data/documentation of the residential house to Ilia Saralidze's household (Link: https://mega.nz/folder/B9kBEZob#xVyBqdftnUcPnaNA0wJzJw);	Forwarded to CC		Pending	Open	**166**	
F4	RD	20.01.22	Social	Nino Robakidze P/N 18001018140 Mob N: 557375575 Pk 94+00	Inclusion in LARP	She stated that her residential house (C/C 32.10.33.239) will be isolated as there will be no access road and her neighbors will be resettled due to the planned design variation of Tunnel N6/open excavation. Hence she demands inclusion in LARP.	On 20.01.2022 with the letter N 2-08/849 the Employer forwarded the local resident's application to the Engineer and required the Engineer's position about the issue; On 07.03.2022 the Employer was informed with the Engineer's letter (1058-CSAE60F4-UBM-GE) as follows: *"--As you are well aware, instead of Tunnel 4006, it is planned to construct a highway by open excavation method (from Pk92+50 to Pk97+00). For this design variation, the Engineer and the Contractor work to properly prepare the necessary drawings/documentation to be submitted to the Employer. --Please be informed, that the existing access road of the aforementioned residential house is subject to be canceled due to Tunnel 6/Open-Cut Excavation Variation. However, alternative access road options are feasible. --According to the latest Tunnel 6/Open-Cut Excavation Variation documentation submitted by the Contractor with the letter (20220123-0768-GHEC-UBM), the Ground Road on the perimeter of the excavation (required by Employer and Engineer) is only indicated as a line on the layout plan and no drawings or details are given. --Therefore, the Contractor was instructed with the letter (1020-CSAE60F4-UBM-GE) to submit a detailed layout plan and detailed drawings of all secondary roads that need to be built as a result of the Tunnel 6-Open Cut variation. --After finalizing the Tunnel 6/Open-Cut Excavation Variation documentation, the Employer will be informed how Nino Robakidze's household will be able to access their residential house."*	Forwarded to CC		Pending	Open	**166**	

F4	RD	21.01.22	Social	Oleg Shvelidze P/N 01029002071 Mob N: 593951355 Pk 96+00	Restriction or loss of access	He stated the access road is restricted for his land plot C/C 32.03.43.438 due to the arranged embankment in adjacent to the same plot of land by the Contractor. Hence he asked to discuss the issue.	On 21.01.2022 with the letter N 2-08/879 the Employer forwarded the local resident's application to the Engineer. The Employer required the Engineer's position about the issue; On 20.02.2022 the Employer was informed with the letter 1016-CSAE60F4-UBM-GE as follows: *"We would like to inform to that on 2nd February 2022 the site inspection was implemented to study the issue. As a result, it revealed that the aforementioned land plot is located adjacent to citizen Oleg Shvelidze's homestead land plot (C/C 32.03.43.023). Accordingly, the access road for the land plot is provided with passing through the homestead land plot. ---Eventually, despite the fact that the Contractor placed the rocky soil on the territory adjacent to the land plot (C/C 32.03.43.438), this does not restrict the access road to the same plot of land (C/C 32.03.43.438).";*	Rejected	21.01.22	Unsubstantiated	Closed	**0**	
F4	RD	24.01.22	Env&HSE	Lika Kvizhashvili P/N Mob N: 598429534 Pk 59+00	HSE Concerns	She stated that a road safety barrier is fallen in her yard () due to a traffic accident. Hence, she demanded to restore the fallen road safety barrier.	On 24.01.2022 through the letter N 2-08/950 the Employer forwarded the local resident's application to the Engineer. The Employer required to discuss the issue and inform him about the Engineer position whether the household is in a safe condition;	Partially Acpt/Rjct		Pending	Open	**162**	
F4	RD	25.01.22	Env&HSE	Zeinab Machitidze P/N 56001004831 Mob N: 514406040 Pk 95+00	Disturbance : Noise / Vibration / Dust	She is concerned about the risk of adverse impact on her household due to the construction work and the close location between the Project road and her residential house (C/C 32.10.46.093). (**Note:** The distance between the top of the Project slope and the residential house is about 28 meters. Also, the residential house is located within 50 meters of the RoW.)	On 25.01.2022 with the letter N 2-08/991 the Employer forwarded the local resident's application to the Engineer and required submission of the Engineer's position about the issue; On 20.02.2022 the Contractor was instructed with the letter 1014-CSAE60F4-UBM-GE: --• To carry out the pre-construction technical condition survey of the residential house with considering the Engineer's comments issued with letters (0449-CSAE60F4-UBM-GE dated: 14.07.2021 & 0991-CSAE60F4-UBM-GE dated: 02.02.2022) and the **Method Statement of Crack Monitoring Using Gyps Plaster** and report it to the Engineer; ---•To carry out regular instrumental monitoring of the environment (air quality, vibration, noise) near the residential house, during active construction works in the vicinity of the mentioned house and report its results to the Engineer monthly; On 20.02.2022 the Employer was informed with the letter 1015-CSAE60F4-UBM-GE about the Engineer's above instruction on the Contractor. Also, the Employer was informed that the distance between the residential house and the edge of the carriageway of the Project highway is approximately 63 meters; On 28.02.2022 the Contractor submitted only the Building Examination Card of the residential house as evidence that he carried out the pre-construction technical condition survey. (Photos or videos were not submitted). Also, the Contract stated that he will carry out the necessary environmental instrumental monitoring during the construction activity on the construction site near Zeinab Machitidze's house and will report the Engineer monthly (20220228-0852-GHEC-UBM);	Forwarded to CC		Pending	Open	**161**	

F4	RD	07.02.22	Env&HSE	Aleksandre Burnadze P/N 18001005706 Levan Marakvelidze P/N 18001064369 Mob N: Pk 81+00	Damage to Infrastructure / Assets	They stated that the residential houses (C/C 32.10.04.206 & C/C 32.10.04.217) of their households time-to-time get damages due to the vibration of the ongoing Project construction works. They demanded the copy of the buildings/structures technical condition survey data/documentation for their households' residential houses.	On 07.02.2022 the Employer submitted the joint application of the local residents with the letter N 2-08/1863; On 09.03.2022 the representative of the Engineer communicated with Mr. Levan Marakvelidze and asked permission to check the residential house. However, Mr. Levan Marakvelidze and his household were not in Zestafoni. Hence, the Engineer was unable to inspect his residential house. (The representative of the Engineer is in close communication with Mr. Levan Marakvelidze and as soon the Engineer will be able to inspect the residential house, the results will be reported to the Employer.); On 09.03.2022 the Engineer and the Contractor inspected the tapes put on the cracks of Mr. Aleksandre Burnadze's residential house, provided by the SDSC LTD. As a result, it revealed that one of the tapes is snapped. --The residential house of Aleksandre Burnadze's household is located in about 72 meters from the Tunnel 4005-AT. Excavation of Tunnel 4005 is being implemented with on the methodology of hydraulic hammering from the western side; On 17.03.2022 the Contractor was instructed with the letter (1086-CSAE60F4-UBM-GE) to: --- Carry out vibration instrumental monitoring in the vicinity of the above-mentioned residential houses during excavating Tunnel 4005-AT-A with a hydraulic hammer, under the Engineer's inspection and report its result to the Engineer with the upcoming Environmental Monitoring Report of March 2022; --- Carry out the technical condition survey of the above-mentioned residential houses per the Engineer's comments issued with the formal letters (0449-CSAE60F4-UBM-GE & 0991-CSAE60F4-UBM-GE) and Method Statement of Crack Monitoring Using Gyps Plaster and submit its data/documentation to the Engineer. --- Deliver the copy of the buildings/structures technical condition survey data/documentation to the aforementioned house owners with signing acceptance-delivery acts and report to the Engineer; On 17.03.2022 the Employer was informed with the letter (1089-CSAE60F4-UBM-GE) about the aforementioned findings of the site inspection and the Engineer's instruction to the Contractor. Also, the Employer was informed as follows: *"Considering the sub-section G.8.7 of the Environmental Impact Assessment and the distance between the Tunnel 4005 and the residential house, the vibration of Tunnel 4005 excavation with the hydraulic hammer should not have caused damage to the mentioned residential house. Accordingly, the crack increase may have been caused by the vibration of heavy vehicles' movement on the existing Gomi-Sachkhere-Chiatura-Zestaponi motorway road. (**Note**: The distance between the residential house and the edge of the carriageway of the existing Gomi-Sachkhere-Chiatura-Zestaponi motorway road is about 15 meters.)*"; In May and June of 2022, the Contractor delivered the copy of buildings/structures technical survey data/documentation for the above-mentioned residential houses to the representatives of the households with signing the acceptance-delivery acts. (Links: https://mega.nz/folder/lpUnDJyA#MJWpYthVDgD7Gio2jd-Zvw; https://mega.nz/folder/Jp02mC7a#zbV9myKHP8_58YiPWrLplQ)	Forwarded to CC		Pending	Open	**148**	
F4	RD	08.02.22	Env&HSE	Pridon Turmanidze P/N 18001039586 Mob N: 557592411 Village Ilemi	Damage to Infrastructure / Assets	He stated that his residential house time-to-time gets damage due to the ongoing Project construction works.	On 08.02.2022 the Employer forwarded the local resident application to the Engineer with the formal letter N 2-08/1934; On 14.04.2022 the Employer was informed with the formal letter (1137-CSAE60F4-UBM-GE) as follows: *"-•The distance between the mentioned residential house and the closest Project tunnel (Tunnel 4001) is about 770 meters. (However, the blasting works of the Tunnel 4001 is not started yet); -•The distance between the residential house and Tunnel 4002 is about 800 meters; -•The distance between the residential house and Tunnel 4003 is about 2 kilometers and 700 meters. --As you are aware, as of today the Contractor is implementing blasting works for the construction of Tunnel 4002 and Tunnel 4003. --At the same time, blasting vibration instrumental monitoring of the Project tunnels is being carried out by the company Xi'an Jianzhukeda Engineering & Technology Co. LTD (Registration No. CNAS L7934), hired by the Contractor. The tunnel blasting vibration monitoring is being implemented for each blasting at the nearest buildings from the explosion points of the Project tunnels. --According to the blasting vibration reports, the maximum safety level (5 mm/s) specified within the Project is not exceeded. --Considering the blasting vibration monitoring results and the distances between the residential house and the Project*	Rejected	14.04.22	Unsubstantiated	Closed	**65**	

							tunnels, the implementation of the blasting works for constructing the Project tunnels doesn't possess a risk of damage to Pridon Turmanidze's residential house";					
F4	RD	11.02.22	Env&HSE	Zaza Tabatadze P/N 18001006091 Lasha Tabatadze P/N 18001048725 Mob N: 592104069, 579110272. Pk 83+00	Damage to Infrastructure / Assets	They stated that their residential house (C/C 32.10.32.010) time-to-time gets damages due to the vibration of the ongoing Project construction works. They demanded the copy of the buildings/structures technical condition survey data/documentation for their residential house.	On 11.02.2022 the Employer forwarded the joint statement of the APs with the formal letter N 2-08/2034; On 09.03.2022 the Engineer and the Contractor inspected the tapes put on the cracks of the residential house, provided by the SDSC LTD. As a result, it revealed that one of the tapes is snapped. --The distance between the residential house and Tunnel 4005-AT is about 59 meters. Excavation of Tunnel 4005 is being implemented with on the methodology of hydraulic hammering from the western side; On 17.03.2022 the Contractor was instructed with the letter (1086-CSAE60F4-UBM-GE) to: --- Carry out vibration instrumental monitoring in the vicinity of the above-mentioned residential house during excavating Tunnel 4005-AT-A with a hydraulic hammer, under the Engineer's inspection and report its result to the Engineer with the upcoming Environmental Monitoring Report of March 2022; --- Carry out the technical condition survey of the above-mentioned residential houses per the Engineer's comments issued with the formal letters (0449-CSAE60F4-UBM-GE & 0991-CSAE60F4-UBM-GE) and Method Statement of Crack Monitoring Using Gyps Plaster and submit its data/documentation to the Engineer. --- Deliver the copy of the buildings/structures technical condition survey data/documentation to the aforementioned house owners with signing acceptance-delivery acts and report to the Engineer; On 18.03.2022 the Employer was informed with the letter (1091-CSAE60F4-UBM-GE) about the aforementioned findings of the site inspection and the Engineer's instruction to the Contractor. Also, the Employer was informed as follows: *"Considering the sub-section G.8.7 of the Environmental Impact Assessment and the distance between the Tunnel 4005 and the residential house, the vibration of Tunnel 4005 excavation with the hydraulic hammer should not have caused damage to the mentioned residential house."*; On 26.05.2022 the Contractor delivered the copy of buildings/structures technical survey data/documentation for the above-mentioned residential house to the house owner with signing the acceptance-delivery act (Link: https://mega.nz/folder/QgUQSYIB#QxV6r6g0ZiLYtVAzqKdnqA);	Forwarded to CC		Pending	Open	**144**	

F4	RD	11.02.22	Social	Shavlegi Maglakelidze P/N 18001022797 Mob N: 555113937, 555225614 Pk 80+60	Inclusion in LARP	He stated that his residential house (C/C 32.10.31.477) time-to-time gets damages due to the vibration caused by the excavation of the Project tunnel. Also, he demanded information about the distance between his house and the Project tunnel. Finally, he demands inclusion in LARP as he thinks that the distance between the Project Tunnel and his residential house is less than 25 meters.	On 11.02.2022 and on 05.05.2022 the Employer forwarded the AP's application to the Engineer with the formal letters (N 2-08/2038 & N 2-08/6781); On 01.06.2022 the Employer was informed with the letter (1204-CSAE60F4-UBM-GE) as follows: *"--•The horizontal distance between Shavlegi Maglakelidze's residential house (C/C 32.10.31.477) and the Tunnel 4005-AT is approximately 1 meter. In the case of the grocery store located on the land plot C/C 32.10.31.477 – the distance is about 5 meters. Considering the elevations, the actual distance (in cross-section) between Tunnel 4005-AT and the residential house is about 25 meters. In the case of the grocery store – the distance is about 26 meters. Also, the part (approx. 330 m2) of the land plot C/C 32.10.31.477 is located within 25 meters of the top of Tunnel 4005-AT. --•As you are aware, the excavation of Tunnel 4005 from the Argveta side is being implemented with a hydraulic hammer. --As of 30th May 2022, 96 meters of Tunnel 4005-AT is excavated (up to Pk82+04) and 239 meters of Tunnel 4005-TA is expected (up to Pk79+91) from the Argveta side. --•On 15th April 2022, the Engineer checked the tapes and plasters put on the cracks of the residential house provided by the SDSC LTD (I/C 32.10.31.477). As a result, revealed that some tapes and plasters are damaged. --•The vibration instrumental monitoring results conducted in the vicinity of the above-mentioned residential house are indicated in the Environmental Monitoring Reports, which are submitted by the Contractor to the Engineer and the Employer with Ref (20210922-0493-GHEC-UBM, 20211021-0543-GHEC-UBM, 20211109-0573-GHEC-UBM, 20220113-0732-GHEC-UBM, 20220324-0902-GHEC-UBM & 20220523-1007-GHEC-UBM) letters. ---(Note: The monitoring points „Near BP2 (1)-opposite" and „Near tunnel 5 AT portal (1)_opposite" indicated in the Environmental Monitoring Reports refer to the closest monitoring points for the aforementioned residential house.) ---According to the Environmental Monitoring Reports, the results of the vibration instrumental monitoring conducted in the vicinity of the aforementioned residential house exceed the allowed norms established by the Georgian legislation. ---(Note: Vibration instrumental monitoring results meet German and British standards. However, it exceeds Georgian standards. The Georgian legislation does not provide standards that ensure avoidance of impact on buildings, but establishes human comfort levels in buildings.) ---In this regard, the monitoring company SDSC LTD notes in the reports that the result most likely reflects the existing environmental conditions rather than the impact of the Project, as the measurements were conducted in the vicinity of the existing Gomi-Sachkhere-Chiatura-Zestaponi motorway road, where vehicles frequently move. ---It should be noted, that Environmental Monitoring Reports do not include whether the vibration instrumental monitoring were conducted during the excavation of Tunnel 4005 with a hydraulic hammer. ---However, considering sub-section G.8.7 of the Project-defined Environmental Impact Assessment, the distance between Tunnel 4005 and the residential house of Shavlegi Maglakelidze, the vibration of Tunnel 4005 excavation with a hydraulic hammer should not have caused damage to the residential house. ---As the residential house is located at a close distance from the Tunnel 4005-AT, during the planned tunnel excavation work to be carried out between Pk81+10 and Pk80+50 of Tunnel 4005-AT, it is recommended to temporarily relocate Mr. Shavlegi Maglakelidze's household to and alternative residential place."*;	Forwarded to RD		Pending	Open	**144**	
F4	RD	21.02.22	Env&HSE	Rusiko Guruli P/N 18001039324 Rusudan Guruli P/N 18801074272 Mob N: 577975602 Pk 102+50	Damage to Infrastructure / Assets	They stated that the Contractor violates the boundaries of their own agricultural land plot (C/C 32.03.43.217) during the implementation of the Project construction works. Hence, they demand compensation for incurred losses.	On 21.02.2022 the Employer forwarded the application of the landowners with the formal letter N 2-08/2491; On 01.06.2022 the Engineer check the situation at the site and revealed that the Contractor had not damaged the boundaries of the above-mentioned agricultural land plot. THe Contractor operates within the RoW; On 03.06.2022 the Engineer informed the Employer about the findings of the aforementioned site inspection with the formal letter 1215-CSAE60F4-UBM-GE;	Rejected	03.06.22	Unsubstantiated	Closed	**102**	

F4	RD	01.03.22	Env&HSE	Aleksandre Saralidze P/N 18001018520 Mob N: 558141902 Pk 35+40	Damage to Infrastructure / Assets	He stated that the residential house of his household got new cracks due to the vibration of the explosion works implemented for the construction of the Project tunnel. Hence, he demanded to check the residential house and implement necessary measures.	On 01.03.2022 the Employer forwarded the local resident's concern to the Engineer with the formal letter (N 2-08/2986); On 19.04.2020 the Employer was informed with the letter (1148-CSAE60F4-UBM-GE) as follows: *"--We would like to inform you, that the distance between the residential house of Aleksandre Saralidze's household and Tunnel 4003 is approximately 370 meters. --As you are aware, blasting works for the construction of Tunnel 4003 are being carried out based on the Project documentation (Geological-Geotechnical Profiles) and permission of the Technical and Construction Supervision Agency. --At the same time, blasting vibration instrumental monitoring of the Project tunnels is being carried out by the company Xi'an Jianzhukeda Engineering & Technology Co. LTD (Registration No. CNAS L7934), hired by the Contractor. The tunnel blasting vibration monitoring is being implemented for each explosion at the nearest buildings from the explosion points of the Project tunnels. --With the letters (20220110-0722-GHEC-UBM, 20220113-0734-GHEC-UBM, 20220114-0740-GHEC-UBM, 20220115-0746-GHEC-UBM, 20220116-0750- GHEC-UBM, 20220119-0763-GHEC-UBM, 20220202-0793-GHEC-UBM, 20220302-0856-GHEC-UBM, 20220316-0890-GHEC-UBM, 20220326-0909-GHEC-UBM & 20220403-0916-GHEC-UBM), the Contractor has submitted the blasting vibration instrumental monitoring report of Tunnel 4003 to the Engineer and the Employer, covering the period between 31st January 2021 – 26th March 2022. --According to the report, the maximum safety level (5 mm/s) specified within the Project is not exceeded. --Considering the blasting vibration monitoring results and the distances between the aforementioned residential house and Tunnel 4003, the implementation of the blasting works for constructing Tunnel 4003 doesn't posses a risk of damage to the residential house of Aleksandre Saralidze's household."*;	Rejected	19.04.22	Unsubstantiated	Closed	**49**	
F4	RD	01.03.22	Env&HSE	Pridon Saralidze P/K 60002013785 Mob N: 558141902 Pk 35+20	Damage to Infrastructure / Assets	He stated that the residential house of his household got new cracks due to the vibration of the explosion works implemented for the construction of the Project tunnel. Hence, he demanded to check the residential house and implement necessary measures.	On 01.03.2022 the Employer forwarded the local resident's concern to the Engineer with the formal letter (N 2-08/2987); On 19.04.2020 the Employer was informed with the letter (1148-CSAE60F4-UBM-GE) as follows: *"--We would like to inform you, that the distance between the residential house of Pridon Saralidze's household and Tunnel 4003 is approximately 270 meters. --As you are aware, blasting works for the construction of Tunnel 4003 are being carried out based on the Project documentation (Geological-Geotechnical Profiles) and permission of the Technical and Construction Supervision Agency. --At the same time, blasting vibration instrumental monitoring of the Project tunnels is being carried out by the company Xi'an Jianzhukeda Engineering & Technology Co. LTD (Registration No. CNAS L7934), hired by the Contractor. The tunnel blasting vibration monitoring is being implemented for each explosion at the nearest buildings from the explosion points of the Project tunnels. --With the letters (20220110-0722-GHEC-UBM, 20220113-0734-GHEC-UBM, 20220114-0740-GHEC-UBM, 20220115-0746-GHEC-UBM, 20220116-0750- GHEC-UBM, 20220119-0763-GHEC-UBM, 20220202-0793-GHEC-UBM, 20220302-0856-GHEC-UBM, 20220316-0890-GHEC-UBM, 20220326-0909-GHEC-UBM & 20220403-0916-GHEC-UBM), the Contractor has submitted the blasting vibration instrumental monitoring report of Tunnel 4003 to the Engineer and the Employer, covering the period between 31st January 2021 – 26th March 2022. --According to the report, the maximum safety level (5 mm/s) specified within the Project is not exceeded. --Considering the blasting vibration monitoring results and the distances between the aforementioned residential house and Tunnel 4003, the implementation of the blasting works for constructing Tunnel 4003 doesn't posses a risk of damage to the residential house of Pridon Saralidze's household."*;	Rejected	19.04.22	Unsubstantiated	Closed	**49**	

F4	RD	14.03.22	Social	Zurab Barbakadze P/N 01009007806 Mob N: 593304451 Pk 110+50	Restriction or loss of access	He stated that the Project Local Road N6 provided in the design as the alternative of the existing village road longers the transportation distance. Hence, he demands to maintain the existing village road. Besides, he requested information on whether the embankment arranged by the Contractor in the vicinity of his agricultural land plots (C/C 32.03.44.575 & C/C 32.03.44.649) will be removed before the completion of the Project construction works.	On 14.03.2022 and on 15.03.2022 the Employer forwarded the local resident's application to the Engineer with the formal letter (N 2-06/3606 & N 2-08/3697); On 03.06.2022 the Contractor was instructed with the letter (1224-CSAE60F4-UBM-GE) to consider Mr. Zurab Barbakadze's request and inform the Engineer with a formal letter about the approximate date of removal of the above-mentioned embankment; On 05.06.2022 the Contractor replied to the Engineer with the letter (20220605-1038-GHEC-UBM) and stated that the embankment will be removed before the completion of the Project construction works; On 07.06.2022 the Engineer informed the Employer with the formal letter (1232-CSAE60F4-UBM-GE) as follows: *"--•As you are aware, the Project highway crosses the existing village road of Kveda Sakara, which will be permanently blocked at Pk 110+50. However, the Project envisages the arrangement of Village Road N6 as an alternative road, which will pass under the Project highway at Pk108+50. --•The distance between the blocking point of the existing village road (Pk110+50) and the passing point of the Project highway by the Village Road N6 (Pk108+50) is about 200 meters. Therefore, the distance of the village road of Kveda Sakara is not significantly increased due to the Project design. --•The Contractor has arranged the 3-4 meters high embankment in the vicinity of the agricultural land plots (C/C 32.03.44.575 and C/C 32.03.44.649) of citizen Zurab Barbakadze, within the RoW. However, the embankment doesn't restrict the access road for the above-mentioned land plots. --•Based on the applicant's request, with the letter (1224-CSAE60F4-UBM-GE), the Contractor was instructed to remove the embankment. Respectively, the Contractor confirmed with the letter (20220605-1038-GHEC-UBM), that he will remove the above-mentioned embankment before the completion of the Project construction works."*;	Partially Acpt/Rjct	07.06.22	Substantiated	Closed	**85**	
F4	Government	15.03.22	Social	Izolda Arabidze ID: 18001012445 Mob N: 558282341 Pk 71+00	Restriction or loss of access	She stated that the access road for her agricultural land plot (C/C 32.09.42.562) is restricted due to the ongoing Project construction works.	On 15.03.2022 the Employer forwarded the AP's application to the Engineer with the formal letter (N 2-08/3696); On 03.06.2022 the Contractor was informed with the Engineer's letter (1214-CSAE60F4-UBM-GE) as follows: *"--•The access road for the mentioned agricultural land plot crosses the construction site of the eastern portal of Tunnel 4005. Hence, the access to the land plot is deteriorated. --•However, the Contactor has arranged the temporary service road to access the construction site, which can be used also by citizen Izolda Arabidze in order to access her land plot till the completion of the Project construction. --•Since, Ms. Izolda Arabide and her household live in Melkadze St. #4 of Zestafoni, which is located in about 5 kilometers from the land plot. Hence, in the case of using the temporary service road by the household, the transportation distance is not significantly increased. (The distance is increased from 5km up to 5.9km); --•After the completion of the Project construction works, the aforementioned land plot will be provided with access via the Project Local Road N13."*;	Rejected	03.06.22	Unsubstantiated	Closed	**80**	
F4	Government	25.03.22	Env&HSE	Konstantine Kakheli P/N 18001019251 Irakli Tsertsvadze P/N 18001017744 Elza Tsertsvadze P/N 18001038702 Ioseb Labadze P/N 18001052010 Zestafoni, Batonishvili St Pk 66+00	Damage to Infrastructure / Assets	They stated that their residential houses (C/C 32.10.31.323 & C/C 32.10.31.639) time-to-time get damage due to the ongoing tunneling work with explosions.	On 25.03.2022 the Employer forwarded joint application of the APs to the Engineer with the letter N 2-08/4272; On 03.06.2022 the Engineer site inspection revealed that the horizontal distance between the residential house of Konstantine Kakheli and Tunnel 4004 is about 66 meters. In the case of Irakli Tsertsvadze's residential house and Tunnel 4004 - 166 meters. In the case of Elza Tsertsvadze's residential house and Tunnel 4004 - 207 meters and in the case of Ioseb Labadze's residential house and Tunnel 4004 - 599 meters. Also, it revealed that some of the plasters put on the cracks of the aforementioned residential houses provided by SDSC LTD were damaged; On 04.06.2022 the Employer was informed with the letter (1227-CSAE60F4-UBM-GE) about the above findings of the site inspection;	Forwarded to RD		Pending	Open	**102**	

F4	RD	28.03.22	Env&HSE	Manana Begadze P/N 18001037485 Mob N: 599454240 Pk 71+00	Damage to Infrastructure / Assets	She stated that her residential house get damages due to the ongoing explosion works for the construction of the Project tunnels. Hence, she requests necessary mitigation measures.	On 28.03.2022 the Employer forwarded the application of the AP to the Engineer with the letter N 2-08/4421; On 03.06.2022 the Engineer site inspection revealed that the horizontal distance between the residential house and Tunnel 4004 is about 900 meters. The same distance is between the residential house and Tunnel 4005. Also, some structural and cosmetic cracks have been observed on the residential house; On 03.06.2022 the Employer was informed with the letter (1218-CSAE60F4-UBM-GE) about the above-mentioned results and observations. Additionally, the Employer was informed that considering the distance between the Project tunnels and the residential house, the vibration caused due to the explosion works for the construction of the Project tunnels should not have caused damage to the mentioned residential house;	Rejected	03.06.22	Unsubstantiated	Closed	**67**	
F4	Government	28.03.22	Env&HSE	Nino Tsereteli P/N 54001005730 Mob N: 571448499 Pk 69+00	Damage to Infrastructure / Assets	She stated that her residential house is under risk of damage due to the vibration of the ongoing Project tunnel blasting works. According to her, the residential house time-to-time gets damages due to the existing land creeping process caused due to the underground water streams. In her opinion, reinforcement work is necessary for the residential house. Besides, she demanded the copy of buildings/structures technical condition survey data/documentation of her residential house.	On 28.03.2022 the Employer forwarded the application of the AP to the Engineer with the letter N 2-08/4422; On 16.04.2022 the Contractor delivered the copy of buildings/structures technical survey data/documentation of the residential house to Nino Tsereteli (Link: https://mega.nz/folder/tgkSXA7Q#xs9Kr14W1yh0idfyb88ExQ); On 03.06.2022 the Engineer site inspection revealed that the horizontal distance between the residential house and Tunnel 4004 is about 190 meters. Also, some structural and cosmetic cracks have been observed on the residential house; On 03.06.2022 the Contractor was instructed with the letter (1221-CSAE60F4-UBM-GE) to submit the report of blasting vibration instrumental monitoring implemented on 02.06.2022 near the residential house of Nino Tsereteli; On 03.06.2022 the Employer was informed with the letter (1222-CSAE60F4-UBM-GE) about the above-mentioned results and observations and the Engineer's instruction on the Contractor;	Forwarded to RD		Pending	Open	**99**	
F4	Government	29.03.22	Env&HSE	Akaki Lejava P/N 18001067106 Mob N: 555183884 Pk 14+50	Disturbance: Noise / Vibration / Dust	He stated that he is disturbed due to the noise of the ongoing Project construction works.	On 29.03.2022 the Employer forwarded the application of the AP to the Engineer with the letter N 2-08/4519; On 02.06.2022 the Employer was informed with the letter (1210-CSAE60F4-UBM-GE) as follow: *"The upper mentioned residential house is located near the PK 14+050, where there have been continuous construction works ongoing. The works include the filling of the highway embankment and its compaction of it. The house is located approximately in 110m from the highway embankment edge. --The Engineer has met with the citizen, and the conversation with him has revealed that the main complaint is the noise made by the backup beeper of the compactor. The contractor at this section is operating the compactor during the day during regular work hours. The noise created by the compactor while backing up is unavoidable. The backup beeper is a required safety device for all heavy machinery especially the construction machinery.";*	Rejected	02.06.22	Unsubstantiated	Closed	**65**	

F4	RD	30.03.22	Social	Marina Getsadze P/N 18001021527 Anzor Kudziashvili P/N 18001018125 Mob N: 598562120, 577752223 Pk 75+00	Inclusion in LARP	They stated that the residential houses (C/C 32.09.42.314 & 32.10.31.166) of their households get damages due to the ongoing explosion works for the construction of the Project tunnels. Also, in their opinion, the explosion works are being implemented without permission. They demanded to stop explosion and excavation works of the Project tunnels. Besides, they demanded a seismological and geological investigation to study the existing situation. Finally, they demanded inclusion in LARP.	On 30.03.2022 the Employer forwarded the joint application of the APs to the Engineer with the letter N 2-08/4538; On 15.04.2022 the Employer was replied with the Engineer's formal letter (1139-CSAE60F4-UBM-GE) as follows: *"As you are aware, the explosive works for the construction of Tunnel 4005 are being carried out based on the permission of the Technical and Construction Supervision Agency. --At the same time, blasting vibration instrumental monitoring of the Project tunnels is being carried out by the company Xi'an Jianzhukeda Engineering & Technology Co. LTD (Registration No. CNAS L7934), hired by the Contractor. The tunnel blasting vibration monitoring is being implemented for each explosion at the nearest buildings from the explosion points of the Project tunnels. --The blastings of Tunnel 4005 were carried out only during the day period between 09:20 - 13:30, maximum twice a day. --With the letters (20220318-0900-GHEC-UBM & 20220403-0916-GHEC-UBM), the Contractor has submitted the blasting vibration instrumental monitoring report of Tunnel 4005 to the Engineer and the Employer, covering the period between 14th March 2022 – 31st March 2022. According to the report, the maximum safety level (5 mm/s) specified within the Project is not exceeded. --On 4th June and 14th June of 2021, the pre-construction technical condition of Marina Getsadze's and Anzor Kudziashvili's households' residential houses and auxiliary buildings (C/C 32.09.42.314 & C/C 32.10.31.166) were surveyed by the company SDSC LTD (I/C 405335025), hired by the Contractor. The cracks of the aforementioned buildings were marked with the tapes. The pre-construction technical survey data/documentation of the above-mentioned buildings were submitted to the Employer with the letter (0450-CSAE60F4-UBM-GE). --Also, on 20th February 2022, the SDSC LTD additionally marked the cracks of the above-mentioned households' buildings with plasters, about which the Contractor has not formally submitted the necessary data/documentation to the Engineer yet. In particular, 2 (two) plasters are put across the cracks of Marina Getsadze's household's residential house and 11 (eleven) plasters are put across the cracks of Anzor Kudziashvili's household's residential house and auxiliary buildings. --It should be noted that on 14th March 2022 the Contractor started the blasting of Tunnel 4005. On 15th March 2022 at approximately 16:25, an earthquake occurred in Zestaponi.* *On 16th Match 2022 at 11:54 the explosion was implemented for the construction of Tunnel 4005. On 16th Match 2022 at approximately 12 o'clock the Engineer and the Contractor received information about damage to the residential houses of Marina Getsadze's and Anzor Kudziashvili's households due to the explosion. --On the same day, the representatives of the Contractor and the Engineer, in the presence of citizens Marina Getsadze and Anzor Kudziashvili, inspected the tapes and plaster put across the wall cracks of the above-mentioned residential houses. --In particular, two plasters (Plaster # 146/1 & # 146/2) and two tapes were inspected in the residential house owned by Marina Getsadze's household. Whereas, in the residential house owned by Anzor Kudziashvili's household - only one plaster (Plaster # 234/11) and one tape. --As a result, revealed that both tapes attached to the cracks of the residential house owned by Marina Getsadze's household were damaged. Whereas, Plaster #234/11 attached to the wall crack of Anzor Kudziashvili's household was partially removed from the wall. --Also, on 9th April 11th April 2022, the Engineer additionally inspected the plasters and tapes attached to the above-mentioned residential houses and auxiliary buildings, as a result of which it was additionally revealed that: --•Plaster # 146/1 was cracked in the middle, one part of which was fallen from the wall, and the other part was still attached to the wall; --•Plaster # 146/2 was fallen from the wall; --•Plaster #234/2 was cracked; --•Plaster #234/7 was partially removed from the wall. Whereas, Tape #7 was snapped, which may have been caused by a human unintentionally; --•Plaster # 234/9 was fallen from the wall; --•Plaster #234/11 was almost removed from the wall and its initial position was changed. --It should be noted that: --•Both tapes attached to the cracks in the wall of a residential house owned by Marina Getsadze's household were presumably damaged by a human to create an imitation of a crack increase. This assumption is based on the difference between the forms of the snapped tapes attached to the cracks of the walls of Marina Getsadze's household and other residential houses. --•Due to the above circumstances,*	Forwarded to RD		Pending	Open	**97**	

							the cause of damage of Plaster # 146/1 and Plaster # 146/2 attached to the walls of the residential house owned by Marina Getsadze's household is also questioned. --In view of all the above, as vibration is not observed according to the blasting vibration monitoring results of Tunnel 4005, accordingly the damage to the plaster and the tapes is not caused by the explosion works of Tunnel 4005. --It should be noted that the explosion of the tunnel is characterized by the effect of airflow instant acceleration, which does not create the risk of damage to the walls of buildings, but creates the risk of cracking windows of buildings. In order to protect the windows from cracking, the aforementioned citizens were verbally recommended to open the windows before occurring a planned explosion for the construction of Tunnel 4005. --Should be noted that the area where the above-mentioned residential houses are located had been creeping due to the wetness of the soil and gravity. This creeping process time-to-time damages nearby residential houses (including the residential houses of the applicants' households). --Therefore, in order to monitor the creeping process and analyze the impact of the Project construction on it, it is necessary that several landmarks (monitoring points) be installed and periodically monitored by a third-party authorized organization, during the construction of Tunnel 4005 and after completion of construction works of Tunnel 4005 for a certain period of time. --Finally, a comparison should be made between: --•The land creeping results during excavating the section (approx. PK74+00 PK76+00) of Tunnel 4005 and the existing situation. (The existing land creeping process should be measured as soon as possible); --•The land creeping results during excavating the section (approx. PK74+00 PK76+00) of Tunnel 4005 and the results obtained after the completion of construction of Tunnel 4005." (**Note**: The permission for use of industrial explosives issued by the Technical and Construction Supervision Agency was submitted to the Employer.);					
F4	Government	31.03.22	Social	Davit Khijakadze P/N 18001050397 Mob N: 593315572 Pk 93+00	Inclusion in LARP	He stated that the retaining wall of his yard (C/C 32.10.33.709) is damaged due to the ongoing Project construction works. In his opinion, the ongoing Project construction works pose risks for his household. Eventually, he demands inclusion in LAPR.	On 31.03.2022 the Employer forwarded the application of the AP to the Engineer with the letter N 2-08/4652; On 03.06.2022 the Employer was informed with the letter (1217-CSAE60F4-UBM-GE) about the following: --•The horizontal distance between the residential house and the edge of the Project highway is about 60 meters. In the case of the residential house and the top of the closest Project slope is about 37 meters. --•Considering the above distances and the planned or ongoing Project construction works near the residential house, at this stage, there is no risk of damage for the residential house and the retaining wall. --•The retaining wall is constructed with violation of the construction norms. In particular, it is not reinforced and the quality of the concrete is low. --•The retaining wall is damaged due to the impact of groundwater over time;	Forwarded to RD		Pending	Open	**96**	
F4	Government	31.03.22	Env&HSE	Revazi Kurtanidze P/N 18001025638 Mob N: 593906640 Pk 71+00	Damage to Infrastructure / Assets	He stated that his residential house (C/C 32.10.31.474) gets damages due to the ongoing explosion works for the construction of the Project tunnels. According to the statement, the technical condition of his residential house has not been surveyed. Finally, he demands that the residential house shall be examined in detail.	On 31.03.2022 the Employer forwarded the AP's application to the Engineer with the letter N 2-08/4655; On 03.06.2022 the Employer was informed with the letter (1223-CSAE60F4-UBM-GE) about the following: The horizontal distance between the residential house and Tunnel 4005 is about 370 meters. Hence, the pre-construction condition of the residential house has not been surveyed. As a result of the Engineer's inspection, cosmetic and structural damages have been observed on the residential house;	Forwarded to RD		Pending	Open	**96**	

F4	Government	01.04.22	Env&HSE	Murman Pkhaladze P/N 18001047402 Mob N: 595115351 Pk 36+50	Damage to Infrastructure / Assets	He stated that his residential house (C/C 32.18.31.033) got damages due to the implemented explosion works of the Project tunnel.	On 01.04.2022 the Employer forwarded the AP's application to the Engineer with the letter N 2-08/4737; On 02.06.2022 the Employer was informed with the Engineer's letter (1209-CSAE60F4-UBM-GE) as follows: "--•On 29th March and 17th May of 2022, the Engineer checked the tapes and plasters put on the cracks of the above-mentioned residential house and the auxiliary building provided by the SDSC LTD (I/C 405335025). As a result, revealed that some plasters are damaged. --•The horizontal distance between the residential house co-owned by Murman Pkhaladze and Tunnel 4003-TA is approximately 151 meters. In the case of the auxiliary building and Tunnel 4003-TA – the distance is about 137 meters. --•As you are aware, the excavation of Tunnel 4003 from the Tbilisi side is being implemented with blasting methodology. --As of 31st May 2022, 278 meters of Tunnel 4003-AT is excavated (up to Pk37+60) and 234 meters of Tunnel 4003-TA is expected (up to Pk37+39) from the Tbilisi side. --•Explosive works for the construction of Tunnel 4003 are being carried out based on the Project documentation (Geological-Geotechnical Profiles) and permission of the Technical and Construction Supervision Agency. --At the same time, blasting vibration instrumental monitoring of the Project tunnels is being carried out by the company Xi'an Jianzhukeda Engineering & Technology Co. LTD (Registration No. CNAS L7934), hired by the Contractor. The tunnel blasting vibration monitoring is being implemented for each explosion at the nearest buildings from the explosion points of the Project tunnels. --With the letters (20220110-0722-GHEC-UBM, 20220113-0734-GHEC-UBM, 20220114-0740-GHEC-UBM, 20220115-0746-GHEC-UBM, 20220116-0750-GHEC-UBM, 20220119-0763-GHEC-UBM, 20220202-0793-GHEC-UBM, 20220302-0856-GHEC-UBM, 20220316-0890-GHEC-UBM, 20220326-0909-GHEC-UBM, 20220403-0916-GHEC-UBM & 20220602-1027-GHEC-UBM), the Contractor has submitted the blasting vibration instrumental monitoring report of Tunnel 4003 to the Engineer and to the Employer, which covers the period between 31st December 2021 – 31st May 2022. According to the report, no exceedance of the maximum safety level (5 mm/s) specified within the Project is observed. --Considering the tunnel blasting vibration instrumental monitoring reports, the implemented explosion works for the construction of Tunnel 4003 should not have caused damage to the residential house and the auxiliary building co-owned by citizen Murman Pkhaladze."; On 21.04.2022 and on 20.05.2022 the Employer forwarded the AP's applications to the Engineer with the letters N 2-08/6230 & N 2-08/7520;	Forwarded to RD		Pending	Open	**95**	
F4	Government	21.04.22	Env&HSE	Maka Abuladze P/N 18001022592 Mob N: 555225614 Pk 77+50	Damage to Infrastructure / Assets	She stated that her residential house (C/C 32.09.42.334) got damages and her groundwater well is dried up due to the ongoing explosion works for the construction of the Project tunnel and the movement of heavy equipment on the temporary access road arranged by the Contractor. Besides, she stated that her fence and perennial trees (C/C 32.09.42.155) are damaged by the Contractor during the construction of the temporary access road.	On 03.06.2022 the Engineer's site inspection revealed: --•The horizontal distance between the residential house and Tunnel 4005-TA is about 424 meters. In the case of the residential house and the temporary access road arranged by the Contractor - 57 meters. Therefore, the pre-construction condition of the residential house has not been surveyed. --•The groundwater well is dried up and the residential house has numerous cosmetic and structural damages. --•According to Maka Abuladze's household, the groundwater well started drying up from the summer of 2021, when the Contractor was carrying out construction of the temporary access road. --•The temporary access road is arranged along the boundary of the Maka Abuladze's land plot (C/C 32.09.42.155). The Contractor has arranged the temporary access road using rocky stones, which is partially fallen on the side of the temporary access road where the mentioned land plot is located. Respectively, some perennial trees and the fence is damaged; On 04.06.2022 the Contractor was instructed with the Engineer's letter (1228-CSAE60F4-UBM-GE) to negotiate Maka Abuladze's household about the damaged fence and perennial trees, sign a consensual agreement, and submit it to the Engineer; On 04.06.2022 the Employer was informed with the letter (1129-CSAE60F4-UBM-GE) about the above-mentioned results of the site inspection and the Engineer's instruction on the Contractor. Also, the Employer was informed about the following: --•The explosive works for the construction of Tunnel 4005 are being carried out based on the permission of the Technical and Construction Supervision Agency. --At the same time, blasting vibration instrumental monitoring of the Project tunnels is being carried out by the company Xi'an Jianzhukeda Engineering & Technology Co. LTD (Registration No. CNAS L7934), hired by the Contractor. The	Forwarded to CC		Pending	Open	**75**	

							tunnel blasting vibration monitoring is being implemented for each explosion at the nearest buildings from the explosion points of the Project tunnels. The blastings of Tunnel 4005 were carried out only during the day period. With the letters (20220318-0900-GHEC-UBM, 20220403-0916-GHEC-UBM, 20220503-0968-GHEC-UBM & 20220602-1027-GHEC-UBM), the Contractor has submitted the blasting vibration instrumental monitoring report of Tunnel 4005 to the Engineer and the Employer, covering the period between 14th March 2022 – 31st May 2022. -- •Considering sub-section G.8.7 of EIA (especially Table 91: Criteria for Structural Damage Due to Vibration and Table 92: Approximate Vibration Levels for Carious Sources) and the distance between the residential house and the temporary access road, the damage to the residential house should be caused neither the during the construction of the temporary access road nor during movement of heavy equipment on the temporary access road.;					