

SEMI-ANNUAL ENVIRONMENTAL MONITORING REPORT

#13 Semi-annual Report

(Reporting Period: July-December 2023)

Project Number: 43405-028

**GEORGIA: URBAN SERVICES IMPROVEMENT INVESTMENT PROGRAM
(TRANCHE 6)**

(FINANCED BY THE ASIAN DEVELOPMENT BANK)

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For: The Ministry of Regional Development and Infrastructure of Georgia and the Asian Development Bank

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ABBREVIATIONS

ADB	Asian Development Bank
CC	Construction Company
CCTV	Closed-Circuit Television Video
CAP	Corrective Action Plan
DC	Design Consultant
DPEPSA	Department of Permits, Environmental Protection and Social Affairs
DFPMD	Donors Funded Project Management Department
EA	Executing Agency
EARF	Environmental Assessment and Review Framework
EHS	Environmental Health & Safety
EIA	Environmental Impact Assessment
EIP	Environmental Impact Permit
EMP/ SSEMP	Environmental Management Plan/ Site-Specific Environmental Management Plan
ERP	Emergency Response Plan
ES/ SES	Environmental Specialist/ Senior Environmental Specialist
GoG	Government of Georgia
GRC	Grievance Redress Committee
GRM	Grievance Redress Mechanism
IA	Implementing Agency
IPMO	Investment Program Management Office
IEE	Initial Environmental Examination
LLC	Limited Liability Company
MFF	Multi-tranche Financing Facility
MEPA	Ministry of Environmental Protection and Agriculture
MRDI	Ministry of Regional Development & Infrastructure
NEA	National Environmental Agency
NCN	Non-compliance Notice
OJSC	Open Joint Stock Company
SAEMR	Semi-Annual Environmental Monitoring Report
SC	Supervision Consultant
USIIP	Urban Sector Improvement Investment Program
UWSCG	United Water Supply Company of Georgia
WHO	World Health Organization
WS	Water Supply
WSS	Water Supply & Sewerage
WWTP	Waste Water Treatment Plant

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I. INTRODUCTION

1.1 Preamble

1. This report represents the Semi-annual Environmental Monitoring Review (SAEMR) for the Urban Services Improvement Investment Program, Tranche 6 and describes the period of July-December 2023.
2. This report is the 13th Environmental Monitoring Review (EMR) of USIIP/Tranche 6.

1.2 Headline Information

3. During the reporting period construction activities under USIIP/T6 were carried out under MAR-01 (Construction of Water Supply and Waste Water Systems in Marneuli and Construction of Waste Water System and Collector in Bolnisi) and MAR-02 (Construction of WWTP in Marneuli) sub-projects and therefore only activities under these sub-projects are reported.

2. PROJECT DESCRIPTION AND CURRENT ACTIVITIES

2.1 Project Description

4. The Urban Services Improvement Investment Program was developed as the Government's response to the lack of adequate and/or safe water supply, sewerage and sanitation in urban areas of Georgia. This is intended to optimize social and economic development in selected urban areas through improved urban water and sanitation services, and is financed by the ADB through its Multi-tranche Financing Facility. The Ministry of Regional Development and Infrastructure is the Executing Agency and the "United Water Supply Company of Georgia", LLC is the Implementing Agency of the Investment Program. UWSCG is a 100% state-owned company.
5. The Investment Program improves infrastructure through the development, design and implementation of a series of subprojects, each providing improvements in a particular sector (water supply and/or sanitation) in one town. Sub-projects rehabilitate existing infrastructure and/or create new and expanded infrastructure to meet the present and future demand. Water supply improvements include source augmentation and head works, pumping systems, treatment facilities, transmission and distribution network; and, sewerage improvement works include sewer network, pumping stations, main collectors and waste water treatment plants.
6. **Tranche 6 of the Investment Program includes:**
 - Construction of Water Supply and Waste Water Systems in Marneuli and Construction of Waste Water System and Collector in Bolnisi (MAR-01);
 - Construction of Waste Water Treatment Plant for Marneuli and Bolnisi in Marneuli (MAR-02);
 - Construction of Water Supply System in Chiatura (CHI-01).

The following projects are financed under Tranche 6:

7. **Construction of Water Supply and Waste Water Systems in Marneuli and Construction of Waste Water System and Collector in Bolnisi (MAR-01 - LOT-01; LOT-02; LOT-03 and LOT-06):** The contract for the implementation of the Lot-01, Lot-02, Lot-03 and Lot-06 under MAR-01 has been awarded to China Geo-engineering Corporation (CGC) (Peoples Republic of China) in September 2022. Project completion date is March 2024. Brief Description of LOT-01; LOT-02; LOT-03 and LOT-06 and scope of works are presented below:
Lot 1: Marneuli city is divided in 6 zones. Zone 1 under LOT-01 mainly includes remaining house connection work. The components of the subproject that will involve civil works under LOT-01 are as follows:
 - Construction of new distribution water system 63 mm PE 100 pipes (4.6 km),
 - Commission new distribution 39.5 KM laid earlier
 - Approximately 44,1km road reinstatement works¹

¹ Is it simple overlay of the road no new road will be constructed

Lot 2: The geographical boundary for Lot 2 covers zone 2, 3 & 6 of Marneuli. It provides for both water supply & sewerage lines. It is in Northeast directions. Sewer pipeline and water supply pipeline are to be laid. In parallel with the construction works, testing will be carried out on the previously laid water supply and sewage lines by AKELIK GROUP OJSC to ensure its commissioning. The civil works under LOT-02 comprise mainly the following items:

- New distribution water system 40,16 km
- New sewers lines 34,5 km
- Rehabilitation of existing sewers 3.9 km
- New sewage pumping stations 2

Lot 3: The geographical boundary for Lot 3 covers zone 4 & 5 of Marneuli. It covers both water supply & sewerage lines. It is in West direction. Sewer pipe and water supply pipes are to be laid. In parallel with the construction works, testing will be carried out on the previously laid water supply and sewage lines by AKELIK GROUP OJSC to ensure its commissioning. The civil works under LOT-03 comprise mainly the following items:

- New distribution water system (44,3 km)
- Construction of new sewer lines (49,0 km)
- Construction of new sewage pumping stations (3 no.)

Lot 6: It includes Conclusion of new pumping station at Kolagiri and one booster station at Jandhari with mechanical, electrical and SCADA works; Rehabilitation of bore wells at Kolagiri; Finalization of new Reservoir at Jandhari and construction of city reservoir; Transmission line DCI pipes 700 mm, 600 mm & 400 mm pipes from Kolagiri to City reservoir and city reservoir to Jandhari. Also, a chlorination facility is to be installed near Jandhari reservoir. The works under LOT-06 comprise mainly the following items:

- Three new transmission mains DCI pipes 250 mm to 700 mm (total length almost 15.9 km)

8. Post Construction Environmental Audit Report under MAR-01 (LOT-01, LOT-02, LOT-03 and LOT-06) sub-project will be prepared in March 2024 by the Supervision Consultant – HILL and submitted to UWSCG for approval.

9. **Construction of Water Supply and Sewerage System in Marneuli and Sewerage System and Collector in Bolnisi, Lot 4 and lot 5.** The contract for the implementation of Lot-04 and Lot-05 under MAR-01 sub-project has been awarded to POLAT Yol Yapı Sanayi ve Ticaret Anonim Şirketi (Turkey). Physical works has started in lot 4 and lot 5 in October 2022. Project completion date is March 2024. Brief Description of LOT-04; LOT-05 and scope of works are presented below:

Lot 4: It covers sewer network in Bolnisi city. Bolnisi is distinctly separate habitation and is about 22 km from Marneuli. new sewer lines are to be laid under LOT-04. Earlier laid sewer lines by AKELIK GROUP OJSC would also need to be tested and commissioned. The components of the subproject that will involve civil works under LOT-04 are as follows:

- Construction of new sewer lines (28,6 km)
- Rehabilitation of existing sewer lines (7,5 km)

Lot 5: Sewerage Interceptor (Collector) from Bolnisi to Marneuli. It includes one sewage pumping station to be laid. Earlier laid sewer lines by AKELIK GROUP OJSC would also need to be tested and commissioned. The works under LOT-05 comprise mainly the following items:

- Construction of new sewerage lines (15, 8 km).
 - Rehabilitation of earlier laid sewers (7,9 km)
10. Post Construction Environmental Audit Report under MAR-01 (LOT-04 and LOT-05) sub-project will be prepared in March 2024 by the SC – HILL and submitted to the UWSCG for its approval.
 11. **Construction of Waste Water Treatment Plant for the Cities of Marneuli and Bolnisi** in Marneuli (MAR-02). The project comprises of the construction of new Wastewater Treatment Plant in Marneuli with the capacity of 9,931 m³/day.
 12. The contract No UWSCG-ICB-MAR-02-2019 was signed in October 18, 2019 with Joint venture of Toshiba Water Solutions Pvt. Ltd and IN-SI LLC (JV partner) (India/Georgia). The scheduled completion date was May 2021, Completion date has been proposed to be extended by SC. Revised completion date is March 2024.
 13. Post Construction Environmental Audit Report under MAR-02 sub-project will be prepared in April 2024 by the SC – HILL and submitted to the UWSCG for its approval.
 14. **Construction of Water Supply System in Chiatura (CHI-01)**. The work under the CHI-01 project comprises the rehabilitation and construction of the water supply network, transmission pipeline and Reservoirs. In particular, Chi-01 project consists of the following works: the rehabilitation of the existing WS system by replacing the old pipework, rehabilitation of existing reservoirs and pumping stations; construction of 2 new reservoirs and pump houses; construction of 7 new borewells in Sachkhere and connect these to Bisi reservoir; laying of new transmission mains.
 15. The contract No P43405-ICB-CHI-01 was signed on August 21, 2017 with “Akkord Industry Construction Investment Corporation” OJSC” (Azerbaijan), the initial completion date was April 15, 2019. The original date for the defect notification was April 14, 2020, which has been extended to April 2021. However, the pace of work dropped to very low levels and works were abandoned from June 2021. The contractor restarted the remaining works from 30 May 2022, but very slowly and not working for rectification of defects. The works were again stopped and abandoned from 1 March 2023. Revised End of Defects Notification Period was December 2023 which was extended until the March 2024, therefore the Likely completion date for CHI-01 sib-project is March 2024.
 16. Post Construction Environmental Audit Report under CHI-01 sub-project will be prepared in March 2024 by the SC – HILL and approved by the UWSCG.

2.2 Project Contracts and Management

17. The main institutions that are involved in implementation of the IEE/EMP under USIIP/T6 are UWSCG executing agency (EA), Supervision Consultant (SC) the Construction Company (CC) and to a lesser extent the Ministry of Environmental Protection and Agriculture of Georgia (MoEPA).
18. The Investment Program Management Office (IPMO) under UWSCG, is the Donors Funded Project Management Department, which is responsible for the day-to-day management of the project, including the implementation of the EMP. IPMO has an Environmental Specialist Ms. Kate Chomakhidze who is responsible for managing the environmental aspects of the USIIP. The head of the department is Ms. Irina Chikhladze.
19. The IPMO Environmental Specialist’s responsibilities in respect of implementation of the EMP are as follows:

- (i) Approve the Site Specific Environmental Management Plan (SSEMP) before Contractor takes possession of construction site;
- (ii) Monitor implementation of EMP and ensure the environmental safeguards compliance;
- (iii) Review the updated IEE and/or SEMP and send it for clearance to ADB;
- (iv) Ensure that contractors have access to the EMP and IEE report;
- (v) Develop SAEMRs (and Final EMRs upon project completion), send it to ADB and address potential ADB's comments until SAEMR disclosure; Provide ENG and summary of GEO final versions of SAEMRs to be uploaded on UWSCG website;
- (vi) Review and approve the Corrective Action Plan and provide to ADB for review and comments if any;
- (vii) Participate in public consultations during project implementation;
- (viii) In case of need assist IPMO Social/Resettlement Consultant in resolving process of environmental safeguards related complaints;
- (ix) Assist in organizing trainings for the Contractors in coordination with ADB/RETA consultant;
- (x) Participate in external trainings in environmental management and environmental auditing

20. The SC/HILL hires a full time Environmental Specialist, Mr.Nikoloz Neparidze to assist the IPMO oversee day-to-day implementation of EMPs by contractors under USIIP/T6, including compliance with all government rules and regulations; Support IPMO in the review and endorsement of contractor's SSEMP; Conduct inspections on contractor's implementation of SSEMP and compliance with government rules and regulations; Ensure contractors comply with health and safety requirements per approved SSEMP's Health and Safety Management Plan; Conduct investigations on grievances/complaints, incidents and accidents; Assist IPMO in addressing any grievances in a timely manner as per the GRM; Issue non-compliance notifications to CC; Monitor corrective actions as required in CAPs, and ensure non-compliances are resolved immediately and are not occurring repeatedly; Prepare recommendations for contractors repeated non-compliances on safeguards and EHS requirements; Submit monthly and quarterly environmental monitoring reports to IPMO.

21. The Construction Companies also appointed a full time Environmental specialists under MAR-01 and MAR-02 sub-project. Mr.Guram Tandilashvili is the Environmental Specialist of the construction management team under MAR-02 sub-project, Mr.Sandro Abzianidze is the ESH&S specialist of MAR-01 (LOT-04 and LOT-05) sub-project, Mr.Ievan Inashvili is the Environmental Specialist and Mr. Aleksandre Chitadze is the H&S Specialist of MAR-01 (LOT-01, LOT-02, LOT-03 and LOT-06) sub-project, for more detailed information, please see Table 2 below. The contractor's Environmental Specialists have a university degree (at Masters level) in Environmental Science and have at least 5 years work experience in environmental management of infrastructure project. Environmental Specialists of CCs are responsible for preparing the Specific Environmental Management Plan (SSEMP) for endorsement by Supervision Consultant and approval by the UWSCG prior to the Contractor taking possession of the construction site and provide pre-works photo documentation; Ensuring the SSEMP is implemented effectively throughout the construction period; Establish and maintain site records of weekly site inspections using checklists based on SSEMP; Establish and maintain environmental accidents/incidents including resolution activities and environmental monitoring data; Developing Corrective action plans in response to non-compliance notices issued by the SC and UWSCG; Conduct Community relations activities including maintaining complaints register; Routine reporting of SSEMP compliance and community liaison activities; Implement Occupational Health and safety requirements. Implement site clean-up measures after civil works finalization.

22. Department of Permits, Environmental Protection and Social Affairs of the UWSCG is working alongside IPMO to address the environmental and social issues of USIIP. The head of the

department is Ms. Maka Goderdzishvili. The Department of Environmental Protection consists of two divisions, the Division of Permits and the Division of Environmental Protection and Social Affairs. Ms. Salome Mosidze is the Head of the Division of Environmental protection and Social Affairs. More detailed description of implementation arrangements; responsibilities and staffing are provided in the Table 1 below.

Table 1: Institutionnel Arrangement, Responsabilités and Staffing

#	Millstones/Actions	Contractor (Environmental Specialist)	Construction Supervision Consultant (Environmental Specialist)	IPMO (Environmental Specialist)	Department of Permits, Environmental Protection and Social Affairs (Environmental Specialist)
1	Environmental planning and management Contractors Environmental Management Plan (site-specific EMP)	Prepare Specific EMP (SEMP) with supplemented Topic Specific EMPs at pre-construction stage based on IEE/EMP Implement SEMPs approved by IPMO.	Review and endorse the SEMPs; Monitor implementation of SEMPs on daily basis; Monitor monthly environmental monitoring reports or results prepared by the Contractor and report to IPMO.	Review and approve the SEMPs; Monitor implementation of EMP and ensure the environmental safeguards compliance.	Work together with IPMO on addressing the environmental non-compliance issues, if any.
2	Changes in design	Provide details of design changes to CSC required to update IEE/EIA, or SEMPs; Implement updated SEMPs.	Approve the design change to be submitted to IPMO; Make environmental assessment of the change and update the IEE and/or SEMPs.	Review the updated IEE and/or SEMPs and send it for clearance to ADB	Liaise with CSC in preparing updated IEE and/or SEMPs; Upload the approved IEE/SEMP provided by IPMO to UWSCG website for Public Disclosure.
3	Unanticipated impacts	Inform CSC about unanticipated impact and follow the instructions received from IPMO.	Make environmental assessment of the unanticipated impact and update the IEE and/or SEMPs	Review the updated IEE and/or SEMPs and send it for clearance to ADB	Liaise with CSC in preparing updated IEE and/or SEMPs

#	Millstones/Actions	Contractor (Environmental Specialist)	Construction Supervision Consultant (Environmental Specialist)	IPMO (Environmental Specialist)	Department of Permits, Environmental Protection and Social Affairs (Environmental Specialist)
4	Reporting	Prepare monthly environmental monitoring reports and send it to CSC and IPMO	<ol style="list-style-type: none"> 1. Prepare inputs to environmental part of quarterly construction progress reports; 2. Prepare inputs to semi-annual environmental monitoring report (SAEMR) to be submitted to IPMO for further review, comments and improvement. 3. Conduct Post-Construction Final Environmental Audit and prepare final environmental audit report. 	<ol style="list-style-type: none"> 1. Prepare SAEMRs (and Final EMRs upon project completion), send it to ADB and address potential ADB's comments until SAEMR disclosure; 2. Provide ENG and GEO final versions of SAEMRs to be uploaded on UWSCG website. 	Upload the approved reports (ENG and GEO) provided by IPMO to UWSCG website for Public Disclosure
5	Permits and clearances	NA	NA	NA	Obtaining environmental permits and clearances
6	Non-compliances	Prepare a corrective action plan (CAP)	Assist contractor in preparing the CAP.	Review and approve the CAP and provide to ADB for review and comments if any.	
7	Public consultations	Participate in public consultations during project implementation	Organize public consultations: inform people about activities and prepare the record of consultations.	Participate in public consultations during project implementation	UWSCG & IPMO host PCs, CSC will present the topics related to environmental issues

#	Millstones/Actions	Contractor (Environmental Specialist)	Construction Supervision Consultant (Environmental Specialist)	IPMO (Environmental Specialist)	Department of Permits, Environmental Protection and Social Affairs (Environmental Specialist)
8	Grievance Redress Mechanism	Project site Focal person to record environmental grievances in the logbook and follow up with UWSCG established practice for grievance redress	<ol style="list-style-type: none"> 1. Ensure that grievances, if any, are being properly documented and addressed timely and effectively. 2. Assist IPMO to develop consolidated GRM database and consolidation of GRM cases both for ENV and Social safeguards 	In case of need assist IPMO Social/Resettlement Consultant in resolving process of environmental safeguards related complaints; Assist IPMO Social/Resettlement Consultant in GRM database consolidation and data analysis.	UWSCG maintains GRM applicable to all projects. UWSCG will ensure IPMO information on grievances is consolidated into the UWSCG grievances (both - environmental and social) without duplication.
9	Trainings	Attend on-site trainings organized by IPMO and ADB/RETA Consultant	Assist the IPMO in organization of trainings for the Contractors on environmental safeguards requirements.	Organize trainings for the Contractors in coordination with ADB/RETA consultant. Participate in external trainings in environmental management and environmental auditing	Participate in external trainings in environmental management and environmental auditing

23. Main organizations involved in the project and related to environmental safeguard are presented in the Table 2 below:

Table 2: List of Main Organizations under USIIP/T6

Type of project participant	Name of Agency/Company	Environmental Staff	Name and contact details
Lender	Asian Development Bank	Country Environmental Focal	Ninette R. Pajarillaga E-mail: npajarillaga@adb.org
		Associate Safeguards Officer Georgia Resident Mission Asian Development Bank	Nino Nadashvili Tel: +995 595 070442 E-mail: nnadashvili@adb.org
		ADB RETA, Environmental Consultant	George Kobaladze Tel: +995 599 689834 E-mail gkobaladze.consultant@adb.org, me
Borrower	UWSCG	UWSCG, Department of Environmental Protection and Permits, Head	Ms. Maka Goderdzishvili Tel: +995 599 229925 E-mail: m.goderdzishvili@water.gov.ge
		UWSCG/IPMO the Donor Funded Project Management Department, Acting Head	Ms. Irine Chikhladze Tel: +995 598 179898 E-mail: ana.onashvili@water.gov.ge
Borrower	UWSCG/USIIP/T6	Environmental Specialist	Ms. Ketevan Chomakhidze Tel: +995 577 380309 E-mail: Chomakhidzek@yahoo.com
Supervision Consultant	Supervision Consultant: Hill International	Environmental Specialist	Mr. Nikoloz Neparidze Tel: 599 346 821

Type of project participant	Name of Agency/Company	Environmental Staff	Name and contact details
	N.V. (Netherlands)		E-mail: nikonep7@outlook.com
Contractor CHI-01	“Akkord Industry Construction Investment Corporation” OJSC (Azerbaijan)	EH&S Specialist	Environmental Specialist of CC: Name: Mr. Teodor Kalmakhelidze Tel: +995 598 977 977 E-mail: kalmakhelidzetedore@gmail.com
Contractor MAR-01 Lot-01 Lot-02 Lot-03 Lot-06	China Geo-engineering Corporation (CGC) (Peoples Republic of China)	Environmental Specialist	Mr. Levan Inashvili Tel: +995 591 199 991 E-mail:
		H&S	Mr. Aleksandre Chitadze Tel:+995 577 969 736
Contractor MAR-01 Lot-04 Lot-05	POLAT Yol Yapi Sanayi ve Ticaret Anonim Sirkei (Turkey).	Environmental, H&S Specialist	Mr.Sandro Abzianidze Tel: +995 599 45 29 02 E-mail: sandroabzianidze@gmail.com
Contractor MAR-02	Toshiba Water Solutions Pvt. Ltd and IN-SI LLC (JV partner) (India/Georgia)	Environmental H&S Specialist	Mr. Guram Tandilashvili E-Mail: guram.tandilashvili@gmail.com Mob: +995 577 36 37 29

2.3 Project Activities during Current Reporting Period

2.3.1 Construction Progress under CHI-01 Sub-project, Construction of Water Supply System in Chiatura

24. The physical progress for section of CHI-01 sub-project is 99.7% and for section 2 it is 52.89%. The aggregate progress for all works (section 1 and section 2) is 96.16%. However, actual physical progress for Avarioni works & other miscellaneous works is detailed below.

Table 3: Physical Progress of Works under CHI-01 sub-project

Item No	Description	Unit	Quantity Project	Quantity Completed as of 31.12.2023	Percentage
Works related to Avarioni Water Supply					
1	HDPE Pipes installation including fittings and end cups as required.	M	7,384.00	6052	81.96%
2	Cleaning, flushing and disinfection with chlorine of installed pipelines, including supply and disposal of water	m	7384	0	0.00%
3	Trenches for pipe installation	m3	5,320.00	4845.15	84.75%
4	Valves		44.00	16.00	36.36%
5	House connections implementation and administrative requirements	n	340.00	187.00	55.00%
6	Hydraulic Chambers	n	12.00	10.00	83.33%
7	New Reservoir 500 m3	n	1.00	93.00%	88.65%
8	Reservoir Mechanical Installation	ls	1.00	25.00%	25.00%
9	Pumping Station Mechanical Installation	ls	1.00	-	0.00%
10	Electrical Equipment	ls	1.00	-	0.00%
11	Instruments and SCADA system	ls	1.00	-	0.00%
12	New Pumping Station Construction	ls	1.00	-	0.00%
13	Construction of New PS building in front of Bisi Reservoir	ls	1.00	65.00%	65.00%
B: Miscellaneous Works					
1	Installation of Generators	ls	1.00	0	0.00%
2	Installation of Boosters in Navradzeti area	ls	1.00	0	0.00%
3	Installation of Boosters in Memorial Area	ls	1.00	85.00%	85.00%

25. The physical progress concerning the main contract is given in the Table 4 below.

Table 4: Progress Concerning the Main Contract

Pipeline	Unit	Quantity	Executed up to May 2022	Executed in year 2022 & 2023	Total executed up to Dec 2023	% Progress
Main Transmission Line	m	16.038	16038	0	16038	100.00%
Distribution Network	m	68.391	68.391	0	68.391	100.00%
DN355 Bisi-CPS Transmission	m	745	745	0	745	100.00%
DN160 CPS-Lezhubani	m	2,165	2165	0	2165	100.00%
DN160 CPS-Perevisi	m	1,810	1810	0	1810	100.00%
DN225 CPS-Rustaveli	m	1,264	1264	0	1264	100.00%
DN225 Lezhubani Res to PS	m	341	341	0	341	100.00%
Q200 ST Lezhubani PS - Memorial Res	m	2025	2025	0	2025	100.00%
Q100 ST Perevisi PS - Tekhisa	m	2053	2053	0	2053	100.00%
DN160 Memorial-Navardzeti	m	1,470	1470	0	1470	100.00%
Giorgadze area	m	1,540	1450	0	1450	100.00%
Total Laid Pipe	m	97,306	97,306	0	97,306	100.00%
House Connection	n	8,457	8,457	0	8,457	100%
Crossings	n	10	0	0	0	100%
Hydraulic Chambers	m3	1,219	1219	0	1219	100%
Hydrants	n	205	205	0	205	100%
Reinstatement of Asphalt	m2	50000	37,595	0	37,595	75%
Reinstatement of Concrete Pavement	m2	4,600	275	0	275	6%

26. The Cumulative Progress of Structures Chiatura is given in the Table 5 below.

Table 5: Cumulative Progress of Structures Chiatura

Cumulative Progress	Up to Previous Month				Up to 31 Dec 2023			
	Civil	Mech	Elec	SCADA	Civil	Mech	Elec	SCADA
Wellfield	100%	100%	100%	100%	100%	100%	100%	100%
Sachkhere Reservoir	100%	100%	100%	100%	100%	100%	100%	100%
Bisi - New Reservoir	98%	100%	100%	100%	100%	100%	100%	100%
Bisi - Old Reservoir	100%	100%	100%	100%	100%	100%	100%	100%

Cumulative Progress	Up to Previous Month				Up to 31 Dec 2023			
CPS	95%	100%	100%	100%	100%	100%	100%	100%
Lezhubani Reservoir	100%	100%	100%	100%	100%	100%	100%	100%
Perevisi Reservoir	100%	100%	100%	100%	100%	100%	100%	100%
Rustaveli Reservoir	100%	100%	100%	100%	100%	100%	100%	100%
Tekhisa Reservoir	100%	100%	100%	100%	100%	100%	100%	100%
Memorial Reservoir	100%	100%	100%	100%	100%	100%	100%	100%
Perevisi PS	100%	100%	100%	100%	100%	100%	100%	100%
Lezhubani PS	100%	100%	100%	100%	100%	100%	100%	100%
Memorial PS	100%	100%	100%	100%	100%	100%	100%	100%
New Memorial PS	100%	100%	100%	100%	100%	100%	100%	100%

27. The cumulative total physical progress is given in the Table 6 below.

Table 6: Cumulative Total Physical Progress under CHI-01 sub-project

Location	Previous Month	Current Month
Wellfield	100%	100%
Sachkhere Reservoir	100%	100%
Bisi – New Reservoir	99%	100%
CPS	99%	100%
Lezhubani Reservoir	100%	100%
Perevisi Reservoir	100%	100%
Tekhisa Reservoir	100%	100%
Memorial Reservoir	100%	100%

2.3.2 Construction progress under MAR-01 project, Construction of Water Supply and Waste Water Systems in Marneuli and Construction of Collector in Bolnisi (MAR-01/LOT-01/LOT-02/LOT-03/LOT-06)

28. The physical progress of construction activities under MAR-01 sub-project as done by China Geo-engineering Corporation (CGC) is presented in the Table 7 below.

Table 7: Physical Progress by December 2023

#	Contract	As per contractor forecast by December 31 2023		Executed by December 31, 2023		Delay
		Amount	Percentage %	0	Percentage %	
Lot 1	1,706,254.79	1,706,254.79	100.00%	1,696,388.71	99.42%	0.58%
Lot 2	13,411,604.13	13,411,604.53	100.00%	2,974,456.02	22.18%	77.82%

#	Contract	As per contractor forecast by December 31 2023		Executed by December 31, 2023		
Lot 3	11,762,518.74	11,762,518.74	100.00%	5,077,277.00	43.16%	57.84%
Lot 6	12,298,261.90	11,056,375.91	89.90%	9,843,604.40	80.04%	9.86%

29. Progress under different lots is given below.

Table 8: Physical progress of Lot 1

MAJOR ITEMS	PROGRESS				
	As per BOQ	this period	to date	% executed	Remaining
PE pipes supply & install, m	6068	1845	5575	91.88%	493
Fire hydrant, Nos	186	1	9	4.84%	177
Valves, Nos	119	3	20	16.81%	99
House connections, Nos	1705	131	1436	84.22%	269
Pressure testing meter length	4558	783	35906	787.76%	-31348
Flushing in meters	39469	18147	21000	53.21%	18469

Table 9: Physical progress of Lot 2

MAJOR ITEMS	PROGRESS				
	As per BOQ	this period	to date	% executed	Remaining
Provide and lay HDPE sewer pipes	34609	951	11155	32.23%	23454
Provide and lay water supply pipes, m	43213	691	11427	26.44%	31786
Valves	343	0	76	22.16%	267
Manhole	1005	0	219	21.79%	786
Inspection shafts	1005	22	487	48.46%	518
House connection	4027	0	405	10.06%	3622

MAJOR ITEMS	PROGRESS				
	As per BOQ	this period	to date	% executed	Remaining
water meter in apartment blocks, Nos	320	0	0	0.00%	320
Pressure testing meter length	40163	0	0	0.00%	40163
Pumping station	2	0	0	0.00%	2
Crossings	56	0	0	0.00%	56
Sewer pipes CCTV	40163	0	45953	114.42%	-5790
cleaning of sewer pipes	40163	0	45953	114.42%	-5790

Table 10: Physical progress of Lot 3

MAJOR ITEMS	PROGRESS				
	As per BOQ	this period	to date	% executed	Remaining
Provide and lay HDPE sewer pipes	49642	1091	15325	30.87%	34317
Provide and lay water supply pipes, m	46360	898	15278	32.96%	31082
Fire Hydrant	295	1	40	13.56%	255
Valves	230	2	45	19.57%	185
Manhole	1200	5	342	28.50%	858
Inspection shafts	1428	5	289	20.24%	1139
House connection	2010	5	195	9.70%	1815
water meter in apartment blocks, Nos	320	0	0	0.00%	320
Pumping station	1	0	0	0.00%	1
Crossings	12	0	0	0.00%	12
Sewer pipes CCTV	59206	0	5700.08	9.63%	53505.92

MAJOR ITEMS	PROGRESS				
	As per BOQ	this period	to date	% executed	Remaining
cleaning of sewer pipes	59206	0	5700.08	9.63%	53505.92

Table 11: Physical progress of Lot 6

Major Items	PROGRESS				
	As per BOQ	this period	to date	% executed	Remaining
Transmission Lines DCI pipe, m	18513	100.83	15327	82.79%	3186
Crossings	8	0	2	25.00%	6
City Reservoir C30/37 concrete civil works, cum	2612	0	2654	101.61%	-42
Jandhary Reservoir C30/37 Concrete civil, cum	468	0	26	5.56%	442
Kolagiri Pump house civil	100%	15%	55%	55.00%	45%
Mechanical works		0%			
Kolagiri	100%	10%	75%	75.00%	25%
City Reservoir	100%	30%	30%	30.00%	70%
Jandhary Reservoir	100%	40%	60%	60.00%	40%
Electrical		0%			
City Reservoir	100%	0%	0%	0.00%	100%
Jandhary Reservoir	100%	0%	0%	0.00%	100%
Kolagiri Pump house	100%	0%	0%	0.00%	100%
Kolagiri wellfield	100%	5%	10%	10.00%	90%
SCADA	100%	0%	0%	0.00%	100%

Table 12: Month wise Pipes laid, and house connections done under Lot 1,2,3,6

Month	WS Pipes laid in M	WS House connection done	Sewer Pipes laid	Sewer connections
Oct-22	0	0	0	0
Nov-22	0	0	0	0
Dec-22	146	60	0	0
Jan-23	1020	15	404	0
Feb-23	1566	857	349	56
Mar-23	975	116	1221	67
Apr-23	1996	19	1014	24
May-23	3273	174	1400	8
Jun-23	3335	129	828	71
Jul-23	6890	231	1187	56
Aug-23	5267	60	3201	57
Sep-23	4624	0	2511	33
Oct-23	4867	0	1503	0
Nov-23	17720.17	361	12323	441
Dec-23	1689.83	5	2042	27
Total	53369	2027	27983	840

2.3.3 Construction progress under MAR-01 project, Construction of Water Supply and Waste Water Systems in Marneuli and Construction of Collector in Bolnisi (MAR-01/LOT-04/LOT-05)

30. The progress of construction works under MAR-01/LOT-04/LOT-05 sub-project is given in table 13 below.

Table 13: Physical & Financial Progress of Lot 4 and Lot 5

Lot 4

Overall Progress	Contract Amount	Amount in US \$		% of contract amount	
		Current Month	Cumulative	Current Month	Cumulative
Physical	4,669,179.63	413,222.40	2,846,455.12	8.85	60.96
Financial		227,272.32	2,966,304.20*	4.87	63.53

Lot 5

Overall Progress	Contract Amount	Amount in US \$		% of contract amount	
		Current Month	Cumulative	Current Month	Cumulative
Physical	3,155,432.74	1,126,456.30	2,915,503.66	35.70	92.40
Financial		693,347.42	2,623,953.30*	21.97	83.16

Table 14: Physical progress of Lot 4 and Lot 5

MAJOR ITEMS	CUMULATIVE TOTAL PROGRESS						
	As per BoQ	THIS PERIOD		TO DATE		REMAINING	
		Qty	%	Qty	%	Qty	%
Lot 4							
Pipeline laying 150 mm	5466	0	0.00%	7927	145.02%	-2461	-45.02%
Pipeline laying 200 mm	20500	6	0.03%	10563	51.53%	9937	48.47%
Pipeline laying 400 mm	0	0		196			
Manholes Lot 4	508	0	0.00%	299	58.86%	209	41.14%
Inspection Shafts	850	0	0.00%	1155	135.88%	-305	-35.88%
CCTV inspection	38140	746	1.96%	19589	51.36%	18552	48.64%
Lot 5							
Pipeline laying 300 mm	719	0	0.00%	271	37.70%	448	62.30%
Pipeline laying 315 mm	0	10		2758			
Pipeline laying 400 mm	13168	513	3.90%	11087	84.20%	2080	15.80%
Manholes Lot 5	316	8	2.53%	279	88.29%	37	11.71%
CCTV inspection	28217	10023	35.52%	26406	93.58%	1811	6.42%
Total Lot 4 & 5							
Total Pipe Laying	39853	529	1.33%	32803	82.31%	7050	17.69%
Total manholes	824	8	0.97%	578	70.15%	246	29.85%
Total CCTV	66358	10769	16.23%	45995	69.31%	20363	30.69%

Table 15: Monthly Progress for Lot 4 and Lot 5

Month	Lot 4			Lot 5		Lot 4 & 5		
	Pipes laid in m	House connection	Manholes	Pipes laid in m	Manholes	Pipes laid in m	House connection	Manholes
Oct-22	177	0	2	304	0	481	0	2
Nov-22	1201	0	13	422	15	1623	0	28
Dec-22	1167	91	11	609	10	1776	91	21
Jan-23	1702.1	246	25	461.9	13	2164	246	38
Feb-23	2204.6	38	54	541.2	16	2745.8	38	70
Mar-23	1752.4	147	23	957.5	22	2709.9	147	45
Apr-23	2331.1	171	36	354.9	7	2686	171	43
May-23	2405.6	97	50	699.4	18	3105	97	68
Jun-23	1379.7	115	21	1212.5	26	2592.2	115	47
Jul-23	1290.7	85	21	2760.6	70	4051.3	85	91
Aug-23	1578.6	95	26	2012.1	5	3590.7	95	31
Sep-23	887.6	35	8	1442.3	17	2329.9	35	25
Oct-23	286.6	29	6	1254.8	39	1541.4	29	45

Nov-23	120.3	6	3	561.6	13	681.9	6	16
Dec-23	6	0	0	523.2	8	529.2	0	8
Total	18490.3	1155	299	14116.9	279	32607.2	1155	578

Overall Progress	Amount in Euro		% of contract amount	
	Current Month	Cumulative	Current Month	Cumulative
Physical	219,941.31	7,697,085.88	2.50	86.35
Financial	863,090.87*	7,135,193.52	9.70	81.41*

2.3.4 Construction progress under MAR-02 sub-project, Construction of Wastewater Treatment Plant in Marneuli (MAR-02)

31. The progress of construction works under MAR-02 sub-project is given table 16.

Table 16: Cumulative Schedule wise Progress under MAR-02 Sub-project, up to Dec 2023

Cumulative Total Progress				
Schedule	Particulars	Up to Previous Month	Current Month	Total
(I)	Site Mobilization	99,23%	0%	99,23%
(II)	Excavation work	93,92%	0,53%	94,45%
(III)	Installation Civil work	95,85%	0,15%	96,00%
(III-1)	Installation Architectural work	36,18%	1,98%	38,16%
(IV)	Supply of Equipments	74,96%	3,17%	78,13%
(V)	Installation Mechanical	76,00%	9,00%	85,00%
(VI)	Installation Electrical	13,23%	11,77%	25,00%
(VII)	Overall piping	56,00%	19,50%	75,50%
(VIII)	Algeti 35kv Power Line relocation (change order 1)	100,00%	0%	100,00%

32. Structure wise progress under MAR-02 Sub-project is presented in Table 17 below.

Table 17: Structure wise Progress under MAR-02 sub-project

Cumulative Physical Progress	Up to Previous Month %				Current Month %				Total %			
	Civil	Mech.	Elec	Arch.	Civil	Mech	Elec	Arch.	Civil	Mech	Elec	Arch.
Structures												
Site mobilization & Soil Investigations	99,23	No	No	No	0,0	No	No	No	99,23	No	No	No
Permanent Fence	0,0	No	No	No	0,0	No	No	No	0,0	No	No	No
RC Wall	98,12	No	No	No	0,85	No	No	No	98,97	No	No	No
Coarse screen	100,0	90,0	0,00	36,35	0,0	0,00	45,0	1,15	100,0	90,0	45,0	37,50
Inlet PS	100,0	50,0	0,00	36,35	0,0	0,00	45,0	1,15	100,0	50,0	45,0	37,50
Fine screen	100,0	90,0	0,00	36,35	0,0	0,00	45,0	1,15	100,0	90,0	45,0	37,50
Aerated grit chamber	100,0	90,0	100,0	No	0,0	0,0	0,0	No	100,0	90,0	100,0	No
Primary sed. Tanks	100,0	100,0	100,0	No	0,0	0,00	0,0	No	100,0	100,0	100,0	No
Aeration tank	100,0	80,0	50,0	No	0,0	0,00	0,0	No	100,0	80,0	50,0	No
Aeration tank distribution chamber	100,0	0,00	0,00	No	0,0	50,0	50,0	No	100,0	50,0	50,0	No
Blower Building	100,0	100,0	50,0	23,25	0,0	0,0	0,0	13,15	100,0	100,0	50,0	36,40
Final sed. Tanks	100,0	100,0	70,0	No	0,0	0,0	0,0	No	100,0	100,0	70,0	No
Final sed. Tanks distribution chamber	100,0	0,00	0,00	No	0,0	50,0	50,0	No	100,0	50,0	50,0	No
Sludge sump cum PS	100,0	92,00	30,0	No	0,0	0,0	0,0	No	100,0	92,0	30,0	No
Digester+thick.sludge pit	100,0	97,00	0,00	No	0,0	0,0	0,00	No	100,0	97,00	0,00	No
Biogas utilization building	100,0	100,0	0,00	21,95	0,0	0,0	0,00	13,15	100,0	100,00	0,00	35,10
Primary sludge thickener & Digested sludge pump	100,0	95,00	0,0	0,00	0,0	5,0	45,0	0,00	100,0	100,00	45,0	0,00
Mechanical Pre thickening building	100,0	99,00	0,00	34,60	0,00	0,0	45,0	8,90	100,0	99,00	45,0	43.50
Emergency sludge storage place	100,0	0,00	0,00	0,00	0,0	0,00	0,00	0,00	100,0	0,00	0,00	0,00
Sludge dewatering building	100,0	81,0	0,0	34,60	0,0	18,0	45,0	8,90	100,0	99,0	45,0	43,50
Outflow Measurement Chamber	100,0	0,00	0,00	0,00	0,0	0,00	0,00	0,00	100,0	0,00	0,00	0,00
Gas holder	100,0	0,00	0,00	0,00	0,0	0,00	0,00	0,00	100,0	0,00	0,00	0,00

Gas torch	0,00	0,00	0,00	0,00	75,0	0,00	0,00	0,00	75,0	0,00	0,00	0,00
Fec13 dosing system	100,0	0,00	0,00	0,00	0,0	0,00	0,00	0,00	100,0	0,00	0,00	0,00
Administration building	100,0	0,0	0,0	37,90	0,0	0,0	0,0	0,0	100,0	0,0	0,0	37,90
Garage & workshop	100,0	0,0	0,0	45,90	0,0	0,0	0,0	0,00	100,0	0,0	0,0	45,90
Scrubber area & CHP	100,0	100,0	0,0	0,00	0,0	0,0	0,00	0,00	100,0	100,0	0,00	0,00
diesel tank area	100,0	100,0	0,00	0,00	0,0	0,0	0,00	0,00	100,0	100,00	0,00	0,00
substation building-MCC 2	100,0	0,0	30,0	43,50	0,0	0,0	10,0	0,0	100,0	0,0	40,0	43,50
control room - operation build.	100,0	0,0	0,0	42,00	0,0	0,0	0,0	0,00	100,0	0,0	0,0	42,00
MCC-1	100,0	0,00	30,0	21,50	0,0	0,00	10,0	0,0	100,0	0,00	40,0	21,50
MCC-3	100,0	0,0	30,0	48,05	0,0	0,0	10,0	0,0	100,0	0,0	40,0	48,05
Inter connection pipes including champers & manholes for drainage, pipe work, air piping system, potable. water and technical water, fire-fighting system.	56,00	No	No	No	19,50	No	No	No	75,50	No	No	No
Roads & Landscaping	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Commissioning of WWTP	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00

3. ENVIRONMENTAL SAFEGUARD ACTIVITIES

3.1 General Description of Environmental Safeguard Activities

33. A total of nine site visits were conducted during the reporting period (July-December 2023), under the USIIP/T6. 59 non-compliances were identified during the site visits mentioned above and 8 non-compliance notices were issued to the contractor by the ESs of SC and UWSCG/USIIP. 18 non-compliances were identified under the MAR-02 subproject and 3 non-compliance notices were issued to the contractor. During the reporting period, 41 non-compliances were identified and 6 non-compliance notices were issued to the contractor under the USIIP/T6 MAR-01 subproject (see Table 18 and Annex C).
34. During the reporting period, a tragic incident occurred at the Mar-01/ LOT-01/ LOT-02/ LOT-03/LOT-06 sub-project on October 17, 2023, where a contractor's worker tragically lost his life due to soil collapse in the trench. A brief description of the accident is provided in para 35-36 below and a more detailed report is attached to this SAEMR (please see Annex E).
35. **Accident Report:** Daily construction activities under MAR-01/LOT-06 sub-project on October 17, 2023 began around 09:00 a.m. and about 30 minutes later the scheduled excavation of the trench was completed, with an approximate length of 10 m and a depth of 3 m. At this time shuttering was installed, at this time the victim, Mr.Elbay Mekhtiev, entered the trench, together with him Mr.Suleiman Mamedov, who was working in the trench box area, also entered the trench. At around 09:40 am part of the trench wall collapsed, completely covering the victim Elbay Mekhtiev and hitting Suleiman Mamedov in his left arm.
36. The other colleagues of the victim immediately called the emergency services, 112, and at the same time entered the trench and tried to dig out the victim. The emergency services arrived 10-15 minutes later and they completed the rescue works, whereas the victim was no longer alive.
37. On November 13 2023, following a tragic incident of 17 October 2023 at the Mar-01 sub-project, the ADB's team, Mr.Jesper Klindt Petersen - Regional Head, Operations Coordination CWRD and Nino Nadashvili – Associate Safeguards Officer Georgia Resident Mission of ADB visited the MAR-01 sub-project and the above mentioned construction site. The purpose of the visit was to inspect the location of the incident, gather updates on the investigation and understand the measures implemented by the project team to prevent future occurrences.
38. During the reporting period, July-December 2023, ADB's Mission conducted a loan review for the Urban Services Improvement Investment Program (USIIP), Tranches 6 twice on 7 July and 12 December.
39. Individual and joint on-site monitoring activities were conducted by Environmental Specialists of SC Mr. Nikoloz Neparidze and UWSCG/USIIP Ms.Kate Chomakhidze during the reporting period on a regular basis as well.

Citizen's complaint related to river flooding.

40. Residents of the Sabirkendi administrative unit in Marneuli municipality have raised concerns that the construction of the wastewater treatment plant wall across the river has heightened the risk of flooding, threatening their vegetable crops and fruit orchards.

41. In response to these concerns, a social safeguards specialist Ms.Gvantsa Lukava visited the site to evaluate the situation. The specialist conducted a thorough review of the Initial Environmental Examination, related documents, and the existing hydrological study to assess the wall's impact on the lands across the river. However, it was determined that to accurately gauge the wall's influence on the river's flow levels, an additional hydrological study focusing on the wall and its potential effects on flooding is necessary in January 2024. Photos of the site of potential flooding is provided below. The results of the contractor's hydrological study and the status of the resolved complaint will be presented in the next environmental monitoring report in April 2024.

Photo N1: Photos of Site after the Construction of Wall



3.2 Site inspections/monitoring

42. Environmental, H&S Specialist, Mr. Guram Tandilashvili hired by Contractor under the MAR-02 sub-project conducted the day-to-day monitoring of the Marneuli WWTP construction site and developed monthly monitoring reports and represented to SC / Hill.
43. Environmental Specialist, Mr. Levan Inashvili hired by Contractor under the MAR-01/LOT-01/LOT-02/LOT-03/LOT-6 sub-project conducted the day-to-day monitoring of the Marneuli water supply and waste water systems construction sub-project and developed monthly monitoring reports and represented to SC / Hill.
44. Environmental, H&S Specialist, Mr. Sandro Abzianidze hired by Contractor under the MAR-01/LOT-04/LOT-05 sub-project conducted the day-to-day monitoring of the Marneuli water supply and waste water systems construction site and developed monthly monitoring reports and represented to SC / Hill.
45. During the reporting period Environmental Specialist (ES) Mr. Nikoloz Neparidze hired by SC/HILL for the implementation of the IEE/EMP/SEMPs requirements under USIIP/T6 develops quarterly monitoring reports for UWSCG/USIIP based on the monthly reports submitted by Contractor.
46. Environmental Specialist of UWSCG/USIIP, Ms. Ketevan (Kate) Chomakhidze performed monitoring of contractor's performance with the approved EMPs and SSEMPs, environmental standards and other environmental commitments of the contractor. ES of USIIP develops Semi-annual Environmental Monitoring Reports (SAEMR) for USIIP/T6 and submits to ADB based on the quarterly reports prepared by SC and monitoring results of construction sites.
47. The schedule of Joint inspection and summary of inspections/monitoring carried out under sub-projects during the reporting period July-December 2023 are provided in the Table 18 below. It should be noted also that the majority of non-compliances are improved by contractor during the reporting period, issues pending and need further improvement is presented in the paragraph 51 and 52 below.

Table 18. Summary of site inspections/monitoring for MAR-01 and MAR-02 sub-projects.

Date of Visit	Name of Company Name of Contract	Auditors Name	Purpose of audit	Summary of any Significant Findings	Implemented Actions	² Implementation Status
Continuously during reporting period (July-December 2023) GPC Coordinates: X 44.840296 Y 41.465192	Toshiba Water Solutions Pvt. Ltd and IN-SI LLC MAR-02	Environmental, H&S Specialist of Contractor Mr. Guram Tandilashvili	Day to day monitoring of sites Compliance with Environmental and HES requirements	Environmental and Health and Safety issues on construction sites. Workers always should use complete set of PPE.	Prepare Monthly Environmental Monitoring Reports and send to SC	Completed
7 July 2023		Ms. Nino Nadashvili, Associate Safeguard Officer Georgia Resident Mission Asian Development Bank Environmental	ADB's loan review Mission for the Urban Services Improvement Investment Program	Workers without PPE, Photo N1 	Verbal instruction was given to contractor to immediately improve the situation.	Completed, Mid. July 2023

² The USIIP/T6/MAR-01 subproject has several pending non-compliance, which are described in the subsection entitled: Pending issues under MAR-01 and MAR-02 sub-projects and Implemented Measures.

Date of Visit	Name of Company Name of Contract	Auditors Name	Purpose of audit	Summary of any Significant Findings	Implemented Actions	Implementation Status
		Specialist of UWSCG/USIIP Ms.Kate Chomakhidze Environmental Specialist of Supervision Consultant HILL Mr.Nikoloz Neparidze				
23 September 2023		Environmental Specialist of UWSCG/USIIP Ms.Kate Chomakhidze Environmental Specialist of Supervision Consultant HILL Mr.Nikoloz Neparidze	Regular monitoring of construction sites	The construction materials should be stored properly, Photo N1  The working tools & equipment should be stored properly The waste should be	Verbal instruction was given to contractor to immediately improve the situation. Non-Compliance Notice was issued and is presented in Annex C of this report. (Photo-documentations are presented in Annex C, non-compliance note,)	Completed, end September 2023, Photo N1  Completed, end September 2023 Completed, all waste are removed

Date of Visit	Name of Company Name of Contract	Auditors Name	Purpose of audit	Summary of any Significant Findings	Implemented Actions	² Implementation Status
				<p>segregated, Photo N2</p>  <p>The waste bins and places should be labelled for identification</p> <p>The construction site should be cleaned regularly, Photo N3</p>		<p>from the construction territory in accordance with the required regulations end September 2023, Photo N2</p>  <p>Completed, end September 2023</p> <p>Completed, end September 2023, Photo N3</p>

Date of Visit	Name of Company Name of Contract	Auditors Name	Purpose of audit	Summary of any Significant Findings	Implemented Actions	² Implementation Status
				 <p>The workers must use PPE (helmet, gloves, special shoes and safety belt while working on height.</p>		 <p>Completed, end September 2023</p>
25 October 2023		<p>Environmental Specialist of UWSCG/USIIP Ms.Kate Chomakhidze</p> <p>Environmental Specialist of Supervision Consultant HILL Mr.Nikoloz Neparidze</p>	Regular monitoring of construction sites	<p>Waste Water Treatment Plant</p> <p>Site internally should be arranged properly and cleaned regularly, including construction materials segregation, Photo N1</p>	<p>Verbal instruction was given to contractor to immediately improve the situation.</p> <p>Non-Compliance Notice was issued and is presented in Annex C of this report.</p> <p>(Photo-documentations are presented in Annex C, non-compliance</p>	Completed by the mid of November 2023, all garbage is removed from the construction territory, Photo N1

Date of Visit	Name of Company Name of Contract	Auditors Name	Purpose of audit	Summary of any Significant Findings	Implemented Actions	Implementation Status
				 <p>Construction chemicals should be managed properly</p> <p>The contractor is required to instruct and train their workforce in the storage and handling of materials and chemicals that can potentially cause soil contamination</p> <p>Storage of all hazardous material to be safe, under strict control and clearly labelling all dangerous products</p> <p>There should be a special designated area for municipal and hazardous</p>	<p>note,)</p> <p>Corrective Action Plan has been developed by contractor and sent to SC and UWSCG</p>	 <p>Completed by the mid of October 2023</p> <p>Completed by the mid of October 2023</p> <p>Completed by the mid of October 2023</p> <p>Completed by the mid of October 2023, Photo N2</p>

Date of Visit	Name of Company Name of Contract	Auditors Name	Purpose of audit	Summary of any Significant Findings	Implemented Actions	Implementation Status
				<p>waste with concrete base and roofing, Photo N2</p>  <p>No poultry are allowed on the construction site, Photo N3</p>  <p>Workers on height are working without safety and health regulations</p> <p>Without life belts and safety equipment</p> <p>The stair steps should also</p>		 <p>Completed by the mid of October 2023</p> <p>Partially Completed, despite regular site instructions on ESHS, issuance of notices of non-compliance,</p>

Date of Visit	Name of Company Name of Contract	Auditors Name	Purpose of audit	Summary of any Significant Findings	Implemented Actions	Implementation Status
				<p>be installed with proper regulations physical barriers or life ropes. Photo N3</p>  <p>There are open, deep, unprotected trenches on the construction sites that impede the movement of personnel and pose a particular danger at night time, Photo #4</p>		<p>meetings and discussions with SC and CC representatives on HS safety issues, some construction sites, including trenches, require improvements from the contractor to comply with safety requirements</p> <p>Completed Mid, October 2023, the open trench was immediately backfilled</p>

Date of Visit	Name of Company Name of Contract	Auditors Name	Purpose of audit	Summary of any Significant Findings	Implemented Actions	² Implementation Status
						
13 November 2023		<p>Environmental Specialist of UWSCG/USIIP Ms.Kate Chomakhidze</p> <p>Environmental Specialist of Supervision Consultant HILL Mr.Nikoloz Neparidze</p>	Regular monitoring of construction sites	<p>Construction materials should be stored adequately, Photo N1</p> 	<p>Verbal instruction was given to contractor to immediately improve the situation.</p> <p>Non-Compliance Notice was issued and is presented in Annex C of this report.</p>	<p>Completed by the end of March 2023, Photo N1</p> 
Continuously during reporting period (July-	POLAT Yol Yapi Sanayi ve Ticaret Anonim Sirkei	Environmental, H&S Specialist of Contractor Mr. Sandro	Day to day monitoring of sites Compliance with	Day to day monitoring of sites Compliance with Environmental and HES	Prepare Monthly Environmental Monitoring Reports and send to SC	Performed monthly during the reporting period

Date of Visit	Name of Company Name of Contract	Auditors Name	Purpose of audit	Summary of any Significant Findings	Implemented Actions	Implementation Status
December 2023)	(Turkey). MAR-01	Abzianidze	Environmental and HES requirements	requirements		
18 November 2023	LOT-04, LOT-05			<p>Surplus soil should be removed from the street and stored adequately, Photo N1</p>  <p>Warning signs should be placed on both sides of the street, Photo N2</p>  <p>The ground left on the street should be fenced off with</p>	<p>Verbal instruction was given to contractor to immediately improve the situation.</p> <p>Non-Compliance Notice was issued and is presented in Annex C of this report.</p> <p>(Photo-documentations are presented in Annex C, non-compliance note,)</p> <p>Corrective Action Plan has been developed by contractor and sent to SC and UWSCG</p>	<p>Completed, Photo N1</p>  <p>Completed, Photo N2</p>  <p>Completed, Photo</p>

Date of Visit	Name of Company Name of Contract	Auditors Name	Purpose of audit	Summary of any Significant Findings	Implemented Actions	Implementation Status
				tape and warning signs		N3 
Continuously during reporting period (July-December 2023)	China Geo-engineering Corporation (CGC) (Peoples Republic of China)	Environmental, H&S Specialist of Contractor Mr. Levan Inashvili	Regular Environmental monitoring of sites	Day to day monitoring of sites Compliance with Environmental and HES requirements	Prepare Monthly Environmental Monitoring Reports and send to SC	Performed monthly during the reporting period
11 October 2023	MAR-01 LOT-01, LOT-02, LOT-03 and LOT-06	Environmental Specialist of UWSCG/USIIP Ms.Kate Chomakhidze Environmental Specialist of Supervision Consultant HILL Mr.Nikoloz	Regular Environmental monitoring of sites	The informational/warning signs are not installed, Photo N1	Verbal instruction was given to contractor to immediately improve the situation.	Was not completed, The above monitoring was carried out before the tragic incident occurred on October 17, 2023. After the incident, the situation has improved, but the contractor does not comply with the

Date of Visit	Name of Company Name of Contract	Auditors Name	Purpose of audit	Summary of any Significant Findings	Implemented Actions	Implementation Status
		Neparidze		 <p>The trenches are open and there is no shielding</p>		rules on a permanent basis.
25 October 2023		<p>Environmental Specialist of UWSCG/USIIP Ms.Kate Chomakhidze</p> <p>Environmental Specialist of Supervision Consultant HILL Mr.Nikoloz Neparidze</p>	Regular monitoring of construction sites	<p>Construction of Jandari Reservoir in Marneuli</p> <p>Construction site should be properly fenced from all sides and equipped with lockable gate, Photo N1</p>  <p>Proper warning and</p>	<p>Verbal instruction was given to contractor to immediately improve the situation.</p> <p>Non-Compliance Notice was issued and is presented in Annex C of this report.</p> <p>(Photo-documentations are presented in Annex C, non-compliance note,)</p>	<p>Partially Completed, the adequate fence will be installed after the completion of Construction activities in February 2024</p> <p>Completed,</p>

Date of Visit	Name of Company Name of Contract	Auditors Name	Purpose of audit	Summary of any Significant Findings	Implemented Actions	² Implementation Status
				<p>information signs should be arranged at the entrance and perimeter of the site</p> <p>High visible safety signs/tapes and trench side barriers around of deep open excavation should be installed from all sides to avoid accidents of local population, Photo N2</p>  <p>Workers always should use complete PPE and Safety norms during working at height should be provided</p> <p>Construction waste should be timely removed from the construction site and disposed properly, Photo N3</p>	<p>Corrective Action Plan has been developed by contractor and sent to SC and UWSCG</p>	<p>December 2023</p> <p>Completed, December 2023</p> <p>Completed, December 2023, All construction waste is removed from the Jandari Reservoir site</p>

Date of Visit	Name of Company Name of Contract	Auditors Name	Purpose of audit	Summary of any Significant Findings	Implemented Actions	² Implementation Status
				 <p>All construction materials should be properly segregated and stored adequately</p> <p>Proper waste containers should be installed and labeled (Household waste and Hazardous waste)</p> <p>Waste should be placed only at the proper waste container and discharged timely</p> <p>Site internally should be arranged properly and cleaned regularly</p> <p>Electric cables must be arranged in accordance with standards, so that they do not pose any danger to the workers, Photo N4</p>		<p>Completed, December 2023</p>

Date of Visit	Name of Company Name of Contract	Auditors Name	Purpose of audit	Summary of any Significant Findings	Implemented Actions	² Implementation Status
				 <p>Construction waste must be stored in such a way that it does not pose a threat to the health of workers, in particular, nails must be removed from the boards or stored adequately</p> <p>Construction of water supply and sewerage system in Marenuli</p> <p>Adequate and sufficient quantity of Safety/warning signs/tapes and trench side barriers around of deep open trenches should be installed to avoid accident, Photo N5</p>		<p>Completed, December 2023</p> <p>Completed, end of October 2023, Photo N1</p>

Date of Visit	Name of Company Name of Contract	Auditors Name	Purpose of audit	Summary of any Significant Findings	Implemented Actions	Implementation Status
				 <p>Walls of the deep trenches (>1.5m) should be strengthened by adequate and sufficient quantity of boards to avoid landfall of the soil and accidents (workers damage), Photo N6</p> 		 <p>Completed, end of October 2023, Photo N2</p> 

Date of Visit	Name of Company Name of Contract	Auditors Name	Purpose of audit	Summary of any Significant Findings	Implemented Actions	² Implementation Status
				<p>Construction activities information signs should be installed at each construction segment;</p> <p>Trench construction shall be taken up in small segments, so that work (excavation, pipe laying and refilling) in each segment is completed in a day. No trenches shall be kept open in the night/after work hours</p> <p>Informing all residents and businesses about the nature and duration of any work well in advance so that they can make necessary preparations if needed;</p> <p>Providing wooden walkways/planks across the deep and open trenches for pedestrians and metal sheets where vehicle access is required;</p> <p>Increasing workforce to complete the work in minimum time;</p>		<p>Completed, end of October 2023</p> <p>Completed, end of October 2023</p> <p>Completed, end of October 2023</p> <p>Completed, end of October 2023, Photo N3</p> 

Date of Visit	Name of Company Name of Contract	Auditors Name	Purpose of audit	Summary of any Significant Findings	Implemented Actions	² Implementation Status
				<p>The contractor shall control traffic movement on the narrow and graveled streets of Marenuli:</p> <p>Stop, slow, and safely traffic through work or construction sites ;</p> <p>Protect local community in the construction zone by regulating traffic flow;</p> <p>Give traffic control directions and signals clearly and precisely so that motorists understand their meaning</p>		<p>Completed, end of October 2023</p>

Date of Visit	Name of Company Name of Contract	Auditors Name	Purpose of audit	Summary of any Significant Findings	Implemented Actions	Implementation Status
13 November 2023	MAR-01, LOT-04, LOT-05	Environmental Specialist of UWSCG/USIIP Ms.Kate Chomakhidze	Regular monitoring of construction sites	Proper warning and information signs should be arranged at the entrance and perimeter of the sites;	Verbal instruction was given to contractor to immediately improve the situation.	Completed, November 2023
		Environmental Specialist of Supervision Consultant HILL Mr.Nikoloz Neparidze		High visible safety signs/tapes and trench side barriers around of deep open excavation should be installed from all sides to avoid accidents of local population;	Non-Compliance Notice was issued and is presented in Annex C of this report. (Photo-documentations are presented in Annex C, non-compliance note,)	Completed, November 2023, please see photo N1
				Proper walkways/planks across the deep and open trenches should be provided for pedestrians to have access to their residential houses and businesses;	Corrective Action Plan has been developed by contractor and sent to SC and UWSCG	Completed by the end of March 2023
				Adequate and sufficient quantity of trench side barriers around of deep open trenches should be installed to avoid accident;		Partially Completed
				Walls of the deep trenches		



Date of Visit	Name of Company Name of Contract	Auditors Name	Purpose of audit	Summary of any Significant Findings	Implemented Actions	² Implementation Status
				<p>(>1.5m) should be strengthened by adequate and sufficient quantity of boards to avoid landfall of the soil and accidents (workers damage), Photo N1</p>  <p>Construction activities information signs should be installed at each construction segment</p> <p>Trench construction shall be taken up in small segments not more than 30m (please see relevant EMP and SEMP requirements), so that work (excavation, pipe laying and refilling) in each segment is completed in a day. No trenches shall be kept open</p>		<p>Completed by the end of November 2023, please see Photo N2 below</p>  <p>Completed, Mid-November 2023</p> <p>Completed, Mid-November 2023, Photo N3</p>

Date of Visit	Name of Company Name of Contract	Auditors Name	Purpose of audit	Summary of any Significant Findings	Implemented Actions	² Implementation Status
				<p>in the night/after work hours, Photo N3</p>  <p>Increasing workforce to complete the work in minimum time;</p> <p>There is no Excavator Bucket Control on the construction sites this needs specific training of the workers or permanent control of the excavation movement at sites.</p>		 <p>Completed, Mid-November 2023</p> <p>Completed, Mid-November 2023</p>
12 December 2023	MAR-01, LOT-6	Ms. Nino Nadashvili, Associate Safeguard Officer Georgia Resident Mission Asian	A loan review Mission for the Urban Services Improvement Investment	<p>Photos of Kolagiri Well Fields</p> <p>Adequate and sufficient quantity of Safety/warning signs/tapes and trench side barriers around of deep open trenches should be installed</p>	Verbal instruction was given to contractor to immediately improve the situation.	Completed by the 20 December 2023,

Date of Visit	Name of Company Name of Contract	Auditors Name	Purpose of audit	Summary of any Significant Findings	Implemented Actions	Implementation Status
		Development Bank Specialist of UWSCG/USIIP Ms.Kate Chomakhidze Environmental Specialist of Supervision Consultant HILL Mr.Nikoloz Neparidze	Program (USIIP)	to avoid accident of workers on construction site, Photo N1  Site internally should be arranged properly and cleaned regularly, waste should be placed only at the proper waste container, Construction waste should be timely removed from the construction site and disposed properly, Photo N2 	Non-Compliance Notice was issued and is presented in Annex C of this report. (Photo-documentations are presented in Annex C, non-compliance note,) Corrective Action Plan has been developed by contractor and sent to SC and UWSCG	Photo N1  Completed by the Mid. December 2023, Photo N2, 

Date of Visit	Name of Company Name of Contract	Auditors Name	Purpose of audit	Summary of any Significant Findings	Implemented Actions	Implementation Status
				<p>All construction materials should be properly segregated and stored adequately, Photo N3</p>  <p>The use of integral drip trays for generators and tanks is mandatory throughout the project for all construction sites, Photo N4</p>  <p>Electric cables must be</p>		<p>Completed by the end of December 2023, all construction materials are removed from the territory, Photo N3</p>  <p>Completed the generator is removed from the construction site</p>

Date of Visit	Name of Company Name of Contract	Auditors Name	Purpose of audit	Summary of any Significant Findings	Implemented Actions	² Implementation Status
				<p>arranged in accordance with standards, so that they do not pose any danger to the workers, Photo N5</p> 		<p>Completed, Mid-December 2023, Photo N4</p> 

3.3 Issues Tracking (Based on Non-Conformance Notices)

48. A total 9 site visits were carried out during the reporting period, 59 Non-compliances were identified and 8 non-compliance notices were issued to contractor by the ESs of SC and UWSCG/USIIP. During the reporting period under USIIP/T6 MAR-02 sub-project 18 non-compliances were identified and 3 Non-compliances Notice have been Issued to contractor (Please see Table 18 and Annex C). During the reporting period 41 non-compliances were revealed and 6 Non-compliances Notice have been Issued to contractor (Please see Table 18 above and Annex C).
49. The contractors were always informed on the detected non-conformances and were demanded to improve on the deadline set and send photos of improvements. Environmental team of HILL and UWSCG/USIIP monitored the improvements during the next monitoring visits. Corrective action plans were developed by contractors and improved photos of sites were send to SC and UWSCG.
50. A summary of the identified environmental issues for July-December 2023 under MAR-01 (LOT-04 and LOT-05) sub-project is presented in Table 19 below. There are no open issues under MAR-01 sub-project all non-compliances were corrected by contractor within the indicated deadlines.

Table 19: Summary of Issues Tracking Activity for Current Period MAR-01 (LOT-04, LOT-05)

Total Number of Issues for Project	3
Issues Opened This Reporting Period	0
Issues Closed This Reporting Period	3
Percentage Closed	100%

51. A summary of the identified environmental issues for July-December 2023 under MAR-01 (LOT-01, LOT-02, LOT-03 and LOT-06) sub-project is presented in Table 19 below. There are two open issues under MAR-01 sub-project: (i) Adequate and sufficient quantity of trench side barriers around of deep open trenches to be installed to avoid accident; Walls of the deep trenches (>1.5m) should be strengthened by adequate and sufficient quantity of boards to avoid landfall of the soil and accidents (workers damage) (ii) Adequate fencing should be installed on Jandari Reservoir site.

Table 20: Summary of Issues Tracking Activity for Current Period MAR-01 (LOT-01, LOT-02, LOT-03 and LOT-06)

Total Number of Issues for Project	38
Issues Opened This Reporting Period	2
Issues Closed This Reporting Period	36
Percentage Closed	95%

52. A summary of the identified environmental issues for July-December 2023 under MAR-02 sub-project is presented in Table 20 below. There is one open issues under MAR-02 sub-project: (i) Workers on height should be better protected with life belts and safety equipment to avoid accident (workers damage).

Table 21: Summary of Issues Tracking Activity for Current Period MAR-02

Total Number of Issues for Project	18
Issues Opened This Reporting Period	1
Issues Closed This Reporting Period	17
Percentage Closed	94%

3.4 Trends

53. Information from reports for the previous period and for the current period is used to determine trends in environmental issues opened and closed under the USIIP/T6 sub-projects. The status of the main issues for the previous and current reporting periods is presented in table 22 below.
54. Although the total number of non-compliance notices decreased from 102 to 59 during the reporting period, July-December 2023, the number of outstanding issues including both projects (MAR-01 and MAR-02) increased from 3% to 4% (Please see table 21 below).
55. There are some outstanding issues that still need to be resolved under Mar-01 and MAR-02 sub-projects, including adequate and enough side barriers (trench box or shields) around deep open trenches around of deep open trenches, walls of the deep trenches (>1.5m) to be strengthened by adequate and sufficient quantity of boards to avoid landfall of the soil and accidents, as well as workers on height to be supported by the proper safety equipment.
56. A summary of identified trends for the MAR-01 and MAR-02 sub-projects for the reporting period January-June 2023 compared to July-December 2023 is presented in Table 22 below.

Table 22: Summary of identified trends in environmental issues

Semi-Annual EMR No	Total No of Issues	% issues Closed	% issues closed late
January-June 2023	102	97%	3%
July-December 2023	59	96	4%

3.5 Unanticipated Environmental Impacts or Risks

57. There were no unanticipated Environmental Impacts and risks under USIIP/T6 during the reporting period.

4. RESULTS OF ENVIRONMENTAL MONITORING

4.1 Overview of Monitoring Conducted during Current Period

58. During the reporting period Environmental measurements of Noise level and ambient air Quality were carried out by contractor under MAR-02 sub-project.

59. Noise standards defined by IFC/WHO 1999, are presented in the Table 23 below.

Table 23: Noise Level Guidelines

Noise	dBA		dBA	
	National Regulations		WHO	
Receptor	Daytime 07:00 - 22:00	Nighttime 22:00 - 07:00	Daytime 07:00- 22:00	Nighttime 22:00- 07:00
Residential; institutional; educational	55	45	55	45
Industrial; commercial	70	70	70	70

60. Air pollution standards by IFC/WHO 1999, are presented in the Table 24 below.

Table 24: Air pollution Guidelines

Contaminants	IFC/WHO Guideline Value (Limit mg/m ³)
1	2
Inorganic dust	(*IFC does not have a standard for "inorganic dust". Instead IFC applies standards for PM2.5 and PM10). PM10 – 0,02/1 Year 0,05/24 Hour PM2,5-0,01/1 Year 0,025/24 Hour
Carbonic monoxide	n/a
Nitrogen dioxide (NO ₂)	0,2/ 1 Hour 0,04/1 Year

Contaminants	IFC/WHO Guideline Value (Limit mg/m ³)
1	2
Aldehyde	n/a

61. Georgian Standards for noise level is presented in the table 25 below.

Table 25: Georgian Standards for Noise Levels

Purpose/use of area and premises	Allowable limits (A-Weighted Decibels (dBA))		
	L _{day}		23:00 – 08:00 L _{night} , Night
	08:00 - 19:00, Day	Evening 19:00- 23:00	
Educational facilities and library halls	35	35	35
Medical facilities/chambers of medical institutions	40	40	40
Living quarters and dormitories	35	30	30
Hospital chambers	35	30	30
Hotel/motel rooms	40	35	35
Trading halls and reception facilities	55	55	55
Restaurant, bar, cafe halls	50	50	50
Theatre/concert halls and sacred premises	30	30	30
Sport halls and pools	55	55	55
Small offices (≤100m ³) – working rooms and premises without office equipment	40	40	40
Small offices (≤100m ³) – working rooms and premises without office equipment	40	40	40
Conference halls /meeting rooms	35	35	35
Areas bordering with houses residential, medical establishments, social service, and children's facilities (>6 story buildings)	55	50	45
The areas bordering with hotels, trade, service, sport, and public organizations	60	55	50

Note: in case noise generated by indoor or outdoor sources is impulse or tonal, the limit must be 5dBA less than indicated in the Table.

62. Table 26 shows the threshold values of the major air pollutants as defined by the GEO, IFC and EU legislation.

Table 26: Ambient Air Quality Standards

Parameter	Averaging Period	Limit (µg/m ³)		
		Maximum Permissible Concentration (MPC) in Georgia	IFC Guideline Value	EU Ambient Air Quality Guidelines
Nitrogen Dioxide (NO ₂)	30 minutes	200	-	-
	1 Hour	-	200	200
	24 Hours	40	-	-

Parameter	Averaging Period	Limit ($\mu\text{g}/\text{m}^3$)		
		Maximum Permissible Concentration (MPC) in Georgia	IFC Guideline Value	EU Ambient Air Quality Guidelines
	1 Year	-	40	40
Sulphur Dioxide (SO_2)	10 minutes	-	500	-
	30 minutes	500	-	-
	1 Hour	-	-	350
	24 Hours	50	20	125
Carbon Monoxide (CO)	30 minutes	5,000	-	-
	24 Hours	3,000	-	-
Total Suspended Particulates (TSP) / Dust	24 Hours	150	-	-
	30 minutes	500	-	-
PM10	1 year	40	20	40
	24 hours	50	50	50
PM2.5	1 year	25	10	25
	24 hours	-	25	-
Ozone	8-hour daily max.	120	100	120

63. The Georgian Standards for vibration are designed for human comfort. These are shown in Table 27 below. Note that no standards for building damage exist.

Table 27: Georgian vibration values

Average Geometric Frequencies of Octave Zones (Hz)	Allowable Values X0, Y0, Z0			
	Vibro-acceleration		Vibro-speed	
	m/sec^2	dB	$\text{m}/\text{sec } 10^{-4}$	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

Note: It is allowable to exceed vibration normative values during daytime by 5 dB during daytime. In this table of inconstant vibrations, a correction for the allowable level values is 10dB, while the absolute values are multiplied by 0.32. The allowable levels of vibration for hospitals and rest houses have to be reduced by 3dB.

64. Due to the fact that no construction works were carried out within the framework of the CHI-01 sub-project during the reporting period, no environmental quality measurements were carried out.

Environmental Quality Measurement (noise, air, vibration) under MAR-02 Sub-project, 29 November 2023

65. Environmental quality measurements of ambient air quality, noise and vibration within the framework of the MAR-02 subproject were carried out by the Ltd. "ECO-Spectri" in 29 November 2023, for more detailed information please see Annex A to this report. The results

of the measurement are presented in the Tables 27 and 28 below. All measurements were carried out from 15:10AM to 17:10 PM period.

66. The basic measurement was carried out in Marneuli, at the WWTP construction site and the nearest residential house, which is located at 50m distance.

Noise

67. During the measurement, construction works were being carried out with high intensity. As can be seen from the obtained data, the noise level at point N1 is lower than the permissible norm of "NIOSH" (85 dBA) and is 64.4 dBA. The recorded noise level at point N2 (near the house) slightly exceeds the permissible noise norm established by the Georgian legislation and amounts to 56.6 dBA (55dBA). As mentioned, during the measurement, construction works were being carried out with high intensity. During the measurement period, a self-propelled truck, a crane, a bulldozer and an excavator moved to the construction site.
68. According to the results of 5-minute intervals of noise measurement at measurement location N2 (near the residential house), noise exceeding the permissible norm was recorded fourteen times (fourteen times in a five-minute interval).
69. At point N2 (near the residential building), the peak noise level was recorded in the five-minute interval from 16:05 to 16:10, which was 62.7 dBA. The nearest residential house was located approximately 50m from the construction site and therefore appropriate noise abatement measures were immediately taken, resulting in noise levels returning to normal levels of 55 dBA. Mitigation measures to reduce noise propagation are presented in the table 48 below. IFC/WHO and national standards for Noise are presented in the Tables 25 above. It should also be noted that measurements carried out at construction sites, were temporary and conducted during the daytime and no complaints were received from the local population about the noise during the reporting period.

Table 28: Noise Measurement Results, N1

Measurement N1		
DAte	Location	Distance from the noise source
29.11.2023	Construction Site	10m
N1 Measurement results		
Average	11:00 – 13:00	
	64,4 dBA	
5 minutes average		
1	29.11.2023 15:15	68,3
2	29.11.2023 15:20	75,1
3	29.11.2023 15:25	75,1

4	29.11.2023 15:30	78,2
5	29.11.2023 15:35	63,1
6	29.11.2023 15:40	69,7
7	29.11.2023 15:45	65,5
8	29.11.2023 15:50	62,8
9	29.11.2023 15:55	62,9
10	29.11.2023 16:00	65,5
11	29.11.2023 16:05	70,8
12	29.11.2023 16:10	59,7
13	29.11.2023 16:15	59,7
14	29.11.2023 16:20	65,6
15	29.11.2023 16:25	59,6
16	29.11.2023 16:30	59,8
17	29.11.2023 16:35	57,4
18	29.11.2023 16:40	60,0
19	29.11.2023 16:45	58,8
20	29.11.2023 16:50	58,6
21	29.11.2023 16:55	60,6
22	29.11.2023 17:00	61,9
23	29.11.2023 17:05	65,9
24	29.11.2023 17:10	60,8
Measurement N2		
Date	Location	Distance from the noise source
29.11.2023	Yard of a residential house	50m

Table 29: Noise Measurement Results, N2

N2 Measurement results		
Average	15:10 - 17:10	
	56,6 dBA	
5 minutes average		
1	29.11.2023 15:15	54,6
2	29.11.2023 15:20	56,0
3	29.11.2023 15:25	58,5
4	29.11.2023 15:30	55,2
5	29.11.2023 15:35	53,5
6	29.11.2023 15:40	53,2
7	29.11.2023 15:45	55,6

8	29.11.2023 15:50	52,9
9	29.11.2023 15:55	52,3
10	29.11.2023 16:00	54,8
11	29.11.2023 16:05	62,0
12	29.11.2023 16:10	62,7
13	29.11.2023 16:15	61,0
14	29.11.2023 16:20	58,5
15	29.11.2023 16:25	54,9
16	29.11.2023 16:30	56,3
17	29.11.2023 16:35	55,3
18	29.11.2023 16:40	59,3
19	29.11.2023 16:45	60,5
20	29.11.2023 16:50	59,8
21	29.11.2023 16:55	56,3
22	29.11.2023 17:00	55,0
23	29.11.2023 17:05	57,7
24	29.11.2023 17:10	53,4

Vibration

70. During the measurement on November 29 2023 the vibration level was much lower (about 20 times lower) than the benchmarks of the DIN 4150-3 standard. When measured, the highest vibration result was recorded at 0.26 mm/s. It should be noted that in the building where the vibration measurement was taking place, people were moving, which significantly affected the vibration level. Nevertheless, during the measurement period, there was no exceedance of the reference indicators of the DIN 4150-3 standard. For more detailed measurement data please see Annex A to this report.

Air Pollution

71. As can be seen from the measurement results (please see Table 30 below), the level of concentrations of particulate matter in the ambient air is lower than the norm established by the legislation of Georgia (please see Table 24 above) and the norm/recommendation of the World Health Organization (WHO) and therefore additional mitigation measures are not required.

72. In the 20-minute measurement interval, the highest level of particulate matter was recorded as PM_{2.5} - 14 (µg/m³), and PM₁₀ - 28 (µg/m³);

73. The highest concentration of particulate matter was observed in the sample taken at 15:28, which amounted to PM_{2.5} - 30 (µg/m³), and PM₁₀ - 203 (µg/m³). The mentioned sharp increase was due to the dust caused by the passage of the construction vehicle.

Table 30: Results of measurements of major air pollutants

Index	Date Time	Monitor ID	Location ID	PM10 (µg/m3)	PM2,5 (µg/m3)
1	29 Nov 2023 15:13	1	1	23	20
2	29 Nov 2023 15:14	1	1	15	12
3	29 Nov 2023 15:15	1	1	23	14
4	29 Nov 2023 15:16	1	1	21	16
5	29 Nov 2023 15:17	1	1	24	16
6	29 Nov 2023 15:18	1	1	16	9
7	29 Nov 2023 15:19	1	1	14	9
8	29 Nov 2023 15:20	1	1	23	13
9	29 Nov 2023 15:21	1	1	29	12
10	29 Nov 2023 15:22	1	1	26	15
11	29 Nov 2023 15:23	1	1	12	9
12	29 Nov 2023 15:24	1	1	11	8
13	29 Nov 2023 15:25	1	1	11	9
14	29 Nov 2023 15:26	1	1	12	8
15	29 Nov 2023 15:27	1	1	13	8
16	29 Nov 2023 15:28	1	1	203	30
17	29 Nov 2023 15:29	1	1	52	15
18	29 Nov 2023 15:30	1	1	12	10
19	29 Nov 2023 15:31	1	1	12	9
20	29 Nov 2023 15:32	1	1	14	10
20 min. Average				28	13
21	29 Nov 2023 15:33	1	1	28	9
22	29 Nov 2023 15:34	1	1	18	18
23	29 Nov 2023 15:35	1	1	30	18
24	29 Nov 2023 15:36	1	1	27	15
25	29 Nov 2023 15:37	1	1	20	18
26	29 Nov 2023 15:38	1	1	20	16

Index	Date Time	Monitor ID	Location ID	PM10 (µg/m3)	PM2,5 (µg/m3)
27	29 Nov 2023 15:39	1	1	22	14
28	29 Nov 2023 15:40	1	1	27	18
29	29 Nov 2023 15:41	1	1	30	9
30	29 Nov 2023 15:42	1	1	26	9
31	29 Nov 2023 15:43	1	1	19	9
32	29 Nov 2023 15:44	1	1	21	19
33	29 Nov 2023 15:45	1	1	18	10
34	29 Nov 2023 15:46	1	1	16	15
35	29 Nov 2023 15:47	1	1	18	13
36	29 Nov 2023 15:48	1	1	27	12
37	29 Nov 2023 15:49	1	1	27	10
38	29 Nov 2023 15:50	1	1	15	17
39	29 Nov 2023 15:51	1	1	22	12
40	29 Nov 2023 15:52	1	1	26	15
20 min. Average				23	14
41	29 Nov 2023 15:53	1	1	25	9
42	29 Nov 2023 15:54	1	1	18	10
43	29 Nov 2023 15:55	1	1	17	10
44	29 Nov 2023 15:56	1	1	29	15
45	29 Nov 2023 15:57	1	1	18	12
46	29 Nov 2023 15:58	1	1	25	10
47	29 Nov 2023 15:59	1	1	25	19
48	29 Nov 2023 16:00	1	1	28	18
49	29 Nov 2023 16:01	1	1	17	13
50	29 Nov 2023 16:02	1	1	30	17
51	29 Nov 2023 16:03	1	1	29	17
52	29 Nov 2023 16:04	1	1	22	19

Index	Date Time	Monitor ID	Location ID	PM10 (µg/m3)	PM2,5 (µg/m3)
53	29 Nov 2023 16:05	1	1	25	13
54	29 Nov 2023 16:06	1	1	19	17
55	29 Nov 2023 16:07	1	1	17	9
56	29 Nov 2023 16:08	1	1	20	18
57	29 Nov 2023 16:09	1	1	20	10
58	29 Nov 2023 16:10	1	1	16	17
59	29 Nov 2023 16:11	1	1	16	17
60	29 Nov 2023 16:12	1	1	23	14
20 min. Average				22	14
61	29 Nov 2023 16:13	1	1	20	13
62	29 Nov 2023 16:14	1	1	15	16
63	29 Nov 2023 16:15	1	1	18	10
64	29 Nov 2023 16:16	1	1	28	13
65	29 Nov 2023 16:17	1	1	23	13
66	29 Nov 2023 16:18	1	1	22	10
67	29 Nov 2023 16:19	1	1	28	10
68	29 Nov 2023 16:20	1	1	26	12
69	29 Nov 2023 16:21	1	1	22	12
70	29 Nov 2023 16:22	1	1	30	18
71	29 Nov 2023 16:23	1	1	22	19
72	29 Nov 2023 16:24	1	1	26	12
73	29 Nov 2023 16:25	1	1	26	12
74	29 Nov 2023 16:26	1	1	26	16
75	29 Nov 2023 16:27	1	1	18	16
76	29 Nov 2023 16:28	1	1	30	19
77	29 Nov 2023 16:29	1	1	29	15
78	29 Nov 2023 16:30	1	1	20	18

Index	Date Time	Monitor ID	Location ID	PM10 (µg/m3)	PM2,5 (µg/m3)
79	29 Nov 2023 16:31	1	1	21	12
80	29 Nov 2023 16:32	1	1	26	19
20 min. Average				24	14
81	29 Nov 2023 16:33	1	1	20	16
82	29 Nov 2023 16:34	1	1	25	12
83	29 Nov 2023 16:35	1	1	16	9
84	29 Nov 2023 16:36	1	1	30	11
85	29 Nov 2023 16:37	1	1	29	10
86	29 Nov 2023 16:38	1	1	29	10
87	29 Nov 2023 16:39	1	1	22	11
88	29 Nov 2023 16:40	1	1	28	15
89	29 Nov 2023 16:41	1	1	24	18
90	29 Nov 2023 16:42	1	1	24	19
91	29 Nov 2023 16:43	1	1	30	9
92	29 Nov 2023 16:44	1	1	20	11
93	29 Nov 2023 16:45	1	1	18	10
94	29 Nov 2023 16:46	1	1	21	16
95	29 Nov 2023 16:47	1	1	27	19
96	29 Nov 2023 16:48	1	1	16	18
97	29 Nov 2023 16:49	1	1	22	12
98	29 Nov 2023 16:50	1	1	23	9
99	29 Nov 2023 16:51	1	1	28	17
100	29 Nov 2023 16:52	1	1	29	10
20 min. Average				24	13
101	29 Nov 2023 16:53	1	1	20	13
102	29 Nov 2023 16:54	1	1	20	11
103	29 Nov 2023 16:55	1	1	28	11

Index	Date Time	Monitor ID	Location ID	PM10 (µg/m3)	PM2,5 (µg/m3)
104	29 Nov 2023 16:56	1	1	28	12
105	29 Nov 2023 16:57	1	1	25	12
106	29 Nov 2023 16:58	1	1	22	10
107	29 Nov 2023 16:59	1	1	25	12
108	29 Nov 2023 17:00	1	1	18	18
109	29 Nov 2023 17:01	1	1	25	10
110	29 Nov 2023 17:02	1	1	25	17
111	29 Nov 2023 17:03	1	1	20	15
112	29 Nov 2023 17:04	1	1	18	13
113	29 Nov 2023 17:05	1	1	16	19
114	29 Nov 2023 17:06	1	1	20	18
115	29 Nov 2023 17:07	1	1	28	14
116	29 Nov 2023 17:08	1	1	19	15
117	29 Nov 2023 17:09	1	1	30	12
118	29 Nov 2023 17:10	1	1	18	11
119	29 Nov 2023 17:11	1	1	28	11
120	29 Nov 2023 17:12	1	1	17	16
20 min. Average				23	14
2 Hour Average				24	14

Environmental Quality Measurement (noise, air, vibration) under MAR-01 Sub-project

74. Environmental Quality Measurements of ambient air quality, noise and vibration within the framework of the MAR-01 (LOT-01, LOT-02, LOT-03 and LOT-06) sub-project were carried out by the "DG Consulting" in 30 November 2023, for more detailed information please see Annex A to this report. All measurements were carried out from 11:00AM to 13:00PM period.

75. Noise monitoring was carried out at all selected points near the sensitive receptors of the construction sites. The measurement included 15-minute sessions. During the monitoring process, the weather was windless, therefore, favorable for the conducted work.

76. The noise measurement results are provided in the Table below.

Table 31: Noise measurement results

Parameter	NVD 1 (dB)	NVD 2 (dB)	NVD 3 (dB)	NVD 4 (dB)	NVD 5 (dB)
LAe	49.	60.7	59.8	55.9	59.2
LAm_{ax}	67.	73.7	82.2	73.0	72.8
LAm_{in}	46.	55.8	37.0	38.4	51.8
	49.	62.2	49.5	59.1	61.3
L₉	47.	57.6	42.5	44.5	53.7

77. Insignificant exceeding the permissible noise level - 73.1 dBA instead of 70dBA (please see para. 65 above) was observed at all monitoring points except NVD 1. Overshoots were: NVD 2 – 5.7dB, NVD 3 – 4.8dB, NVD 4 – 0.9dB and NVD 5 – 4.2dB and therefore additional mitigation measures are requested from the contractor which are presented in the table 48 below.

78. It should be noted that, except for NVD 2, the high level of noise at other points was of a non-constant nature, as indicated by the L90 indicator, which averages the noise level observed during 90% of the session time. There were no populated areas in the vicinity of NVD 3, respectively no nuisance of local residents is expected due to exceedance of noise level. There were no residences and other sensitive receptors observed in the direct vicinities of NVD 4 and NVD 5 points, as the actual activities on David Agmashenebeli street were being conducted in the industrial area.

Vibration

79. As mentioned, background vibration was monitored at 2 points. The session on all of them lasted for 15 minutes. The vibration measurement results are given in the tables below.

Table 32: Vibration monitoring results, NVD 1

Geopho	Tran	Vert	Lon	Unit
PPV	0.583	0.284	0.583	mm/s
ZC Freq	20	34	39	Hz
Time (Rel. to Trig)	1286.265	31.267	1286.724	sec
Peak Acceleration	0.021	0.011	0.017	g
Peak Displacement	0.014	0.008	0.011	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.3	7.5	7.3	Hz
Overswing Ratio	4.0	4.4	4.7	

Peak Vector Sum: 0.702 mm/s, recorded at 1286.724 sec.

Table 33: Vibration monitoring results, NVD 2

Geopho	Tran	Vert	Lon	Unit
PPV	0.355	0.347	0.378	mm/s
ZC Freq	43	11	>100	Hz
Time (Rel. to Trig)	23.502	608.416	23.958	sec

Geopho	Tran	Vert	Lon	Unit
Peak Acceleration	0.010	0.014	0.021	g
Peak Displacement	0.018	0.005	0.007	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.3	7.5	7.3	Hz
Overswing Ratio	4.0	4.4	4.7	

Peak Vector Sum: 0.424 mm/s, recorded at 23.958 sec.

80. Limits of peak vector values are defined by the Georgian legislation, 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:

Table 34: Permissible Vibration Levels According to the Georgian Legislation

Mean Geometric Frequencies of Octave Bands	Permissible			
	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	4.0	72	1.1	67

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

81. The data provided in the above-mentioned table shows that the vibration results are much lower than the established standards.

Dust

82. Dust concentration in ambient air was measured at the same points, same time as the noise and vibration measurements.
83. The average concentration levels are below the limits set by the Georgian legislation, which is 0.150 mg/m³ (150 microgram (µg)). The results of dust monitoring are given in the form of both tables and graphs.

Table 35: Dust concentration measurement results – NVD 1

Monitoring point	PM ₁₀			PM _{2.5}		
	15-minute average	min	max	15-minute average	min	max

	value			value		
NVD 1	20	8	35	8	2	17
Monitoring point	PM _{total}					
	15-minute average value	min			max	
NVD 1	98	54			185	

Table 36: Dust concentration measurement results – NVD 2

Monitoring point	PM ₁₀			PM _{2.5}		
	15-minute average value	min	max	15-minute average value	min	max
NVD 2	51	25	117	21	8	55
Monitoring point	PM _{total}					
	15-minute average value	min			max	
NVD 2	51	25			117	

84. The monitoring results show that at both NVD points, the dust concentration in the air is low and falls within the established limits.

Environmental Quality Monitoring under MAR- 01/LOT-04/LOT-05 sub-projects

- 85.** Environmental quality measurements of noise, vibration and air pollution under MAR-01/LOT-04/LOT-05 were carried out 18 October 2023 and 5 December 2023 by the Ltd “NaSeTo Group”.
- 86.** According to the measurements results Noise level during the measurement as well as air pollution doesn’t exceeded the existing Georgian and IFC/WHO standards of and therefore no additional actions are required.
- 87.** Results of Noise and Vibration measurements on 18 October 2023 is presented in the table below:

Table 37: Noise level measured on 18 October 2023

N	Measurements Point	Measurements Results
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N	Measurements Point			Measurements Results			
	Location	Coordinates	Noise A Max/min dBA	Vibro Speed		Vibro Acceleration	
				Mm/s	dB	m/s ²	dB
1	Bolnisi, near Gorgasali 53, LOT 4	0461386 4589304	71,4	<0.1	<66	<0.1	<100
2	Bolnisi, K.Gamsakhurdia 2, LOT 5	1. 0463464 4587951	74,6	<0.1	<66	0.1	100

88. Results of Noise and Vibration measurements on 05 December 2023 (14:00-14:55) is presented in the table below:

Table 38: Noise level measured on 5 December 2023

N	Measurements Point			Measurements Results			
	Location	Coordinates	Noise A Max/min dBA	Vibro Speed		Vibro Acceleration	
				Mm/s	dBA	m/s ²	dBA
1	Bolnisi, LOT 4	0460078 4588334	68,3	<0.1	<66	<0.1	<100
2	Bolnisi, LOT 5	0461855 4588250	71,5	<0.1	<66	0.1	100

89. Results of Measurements of Air Pollution with Nitrogen Dioxide, Carbon Monoxide and dust on 18 October (10:20 – 11:30) is presented below:

Table 39: Noise level measured on 18 October 2023

N	Measurements Point			Measurements Results Mg/m ³	
	Location	Coordinates	Nitrogen Dioxide	Carbon Monoxide	Dust
1	Bolnisi, near Gorgasali 53,	0461386	0.019	0.21	0.056

	LOT 4	4589304			
2	Bolnisi, K.Gamsakhurdia 2, LOT 5	2. 0463464 4587951	0.016	0.13	0.013

90. Results of Measurements of Air Pollution with Nitrogen Dioxide, Carbon Monoxide and dust on 05 December 2023 (14:00-14:55) is presented below:

Table 40: Noise level measured on 5 December 2023

N	Measurements Point			Measurements Results Mg/m³	
	Location	Coordinates	Nitrogen Dioxide	Carbon Monoxide	Dust
1	Bolnisi, LOT 4	0460078 4588334	0.006	0.54	0.041
2	Bolnisi, LOT 5	0461855 4588250	0.011	0.72	0.034

Used Measuring Device Noise, vibration, Air Pollution under MAR-02 sub-project

Noise

91. The Ltd "Eco-Spectri" used the equipment of the Polish company "SVANTEK", "SVAN 971" series for measuring noise (Figure 1, Figure 2).
92. SVAN 971 series Sound Level Meters by Polish Svantek are appliances with Class 1 IEC 61672-1:2013 accuracy, capable of storing up to 100000 records. SVAN 971 offers a wide range of results in all needed weighting filters (A, C, Z), as well as 1/1 and 1/3 Octave spectra. SVAN 971 Sound Level Meter allows gaining most resultant noise units: Lpeak, Lmax, Lmin, L, Leq, LE, Lden, LEPd, Ltm3, Ltm5, Leq statistics (Ln), expected Leq value (EX), standard Leq deviation (SD), measurement time and overload time % (OVL), etc. SVAN 971 software allows developing graphical, table or text results of the accomplished measurements. The noise meter can store the received signals in internal memory and describe each signal according to level and date stamp. The device has a wind protective cap reducing the impact of environmental conditions (wind, temperature) during recording). As per the International Finance Corporation, the noise level must be measured by using the 1st or 2nd class noise meter meeting the requirements of the guideline of the "International Electrotechnical Committee". As per the same guideline, the noise monitoring is possible to provide with the aim to identify the existing background noise level of the environment adjacent to the design or existing facility or to examine the noise level in the operation phase.

Figure 1: “REED” R8080 Sound Level Meter



Figure 2: Organization-owned noise meter



- 93.** Noise meter configurations during the study were:
- Noise measurement range: 30-130 dB;
 - Noise meter response speed: Slow (1 second);
 - Frequency weight: A.
 - Type of microphone: 0.5" (12.7 mm.) el. Condensator.

Vibration

- 94.** The VM40 is designed for measuring vibration in buildings, bridges, towers, pipelines and various other large structures. The measurements serve to prevent possible structural damage or disturbance to people. The VM40 contains a sensor, recording and evaluation electronics and an accumulator in its robust casing. It is especially suitable for autonomous operation over longer periods of time e.g. on construction sites.

Figure 3: Triaxial Vibration Monitor VM40A/B



95. The instrument contains three highly sensitive piezoelectric systems for vibration measurement of all three special dimensions. The signal processing is controlled by a microprocessor. The VM40 is operated via its seven keypad buttons and illuminated LCD display. The measurement data can be transferred to a PC via the USB interface. The instrument also has a port for connecting a charger and a relay output for the external signaling of vibration occurrences.

Air Measuring Device

96. The New Zealand based “Aeroqual Series 500 Portable Air Quality Monitor” is used to measure air. The air quality meter allows real-time monitoring of air pollutants. The device measures the concentrations of the following major pollutants in the air:
- Particulate Matters 10 μ m and 2.5 μ m (PM10, PM2.5);
 - Nitrogen Dioxide (NO₂);
 - Carbon Monoxide (CO);
 - Ozone (O₃);
 - Volatile Organic Compounds (VOC).
97. The Figure 4 and Figure 5 - below shows the “Aeroqual Series 500 Portable Air Quality Monitor”.

Figure 4: “Aeroqual Series 500 Portable Air Quality Monitor”

Figure 5.: “Aeroqual Series 500 Portable Air Quality Monitor”



98. The device has different sensors for each type of harmful substance. The device has the following types of sensors:
- Gas sensitive semi-conductor sensor (GSS);
 - Gas sensitive electrochemical sensor (GSE);
 - Laser Particle Counter (LPC);
 - Photo Ionization Detector (PID).
99. During performing the measurement, the device records the average minute data of the obtained samples. Measurements was made within 20 minutes.
100. Figure 6 and Figure 7 below show the measurement points, project zone and measurement location.

Figure N6: Project Zone



Figure N7: Measurement Locations



Used Measuring Device Noise, vibration, Air Pollution under MAR-01 sub-project

Noise Level Measurements

- 101.** 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.
- 102.** The monitoring points were selected, to represent the impact of the construction on local population as realistically as possible.

Noise Measurement Equipment

- 103.** 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;



Noise measuring device



Windscreen WS-16

4.2 Trends

104. During the reporting period Contractor always implemented Corrective Action Plans based on the Non-compliance Notices issued by UWSCG/USIIP and SC in accordance with the IEE/EMP, SEMP's requirements under MAR-01 and MAR-02 sub-projects, but still within these subprojects some additional mitigation measures are required which are presented in Table 48 below.

4.3 Summary of Monitoring outcomes

105. Noise, vibration and dust level during the construction period under MAR-01 (LOT-01 – LOT-06) and MAR-02 sub-project in some points exceeded the existing standards of IFC/WHO as it was revealed during the reporting period, appropriate measures were immediately taken, by contractor resulting in noise and vibration levels and ambient air pollution returning to normal levels. All Mitigation measures to reduce noise propagation vibration and air pollution are presented in the table 48 below. IFC/WHO and national standards for Noise are presented in the Tables 23-27 above. It should also be noted that measurements carried out at construction sites, were temporary and conducted during the daytime and no complaints were received from the local community during the reporting period.

4.4 Material resources Utilization

4.4.1 Current Period

106. As for December 2023, following materials were mobilized on site by the Contractor under MAR-01(LOT-04 and LOT-05) sub-project, please see Table 41 below:

Table 41: Materials mobilize under MAR-01 (LOT-04 and LOT-05) during the Reporting Period

Item	Quantity
Water	1030 m ³
Electricity	2300kW

Gas	950
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107. As for December 2023, following construction materials were mobilized on site by the Contractor under MAR-01(LOT-04 and LOT-05) sub-project, please see Table 42 below:

Table 42: Construction Materials mobilize under MAR-01 (LOT-04 and LOT-05) during the Reporting Period

No.	Material	Quantity	Unit
1	Cement	6.0	t
2	Sand	548	m ³
3	Gravel (Quarry Kariani)	750	m ³

108. During the reporting period, July-December 2023, following materials were mobilized on site by the Contractor under MAR-02 sub-project, please see Table 43 below:

Table 43: Quantity of Materials Received on MAR 02

No.	Material	Quantity	Unit
1	Cement	4.0	t
2	Sand	428	m ³
3	Gravel (Quarry Kariani)	670	m ³

4.4.1 Cumulative Resources Utilization

109. Cumulative resources utilization of electricity, water and fuel for whole project life under MAR-01/LOT-04/LOT-05 is presented in the Table below.

Table 44: Cumulative Resources Utilization under MAR-01/LOT-04/LOT-05 Sub-project

N	Utilized Resources	Monthly	Measurement
January-June 2023			
1	Consumption of Water	4020	M3
2	Electricity	9600	kwt
3	Gus	1467	L
July-December 2023			
1	Consumption of Water	1030	M3
2	Electricity	2300	kwt
3	Gus	950	L

N	Utilized Resources	Monthly	Measurement
Total Whole Project Life			
1	Consumption of Water	5050	M3
2	Electricity	11900	kwt
3	Gus	2417	L

4.5 Waste Management

4.5.1 Current Period

MAR-01 (LOT-04 and LOT-05)

- 110.** CC for MAR-01 and MAR-02 sub-projects developed a Waste Management Plans and agreed with the MoEPA. The Contractor has signed an agreement with the Marneuli Municipality regarding provision of the waste containers, collection and transportation of household waste. In addition to that the contractor has signed an agreement with the licensed company „Sanitary” Ltd for collection, transportation and treatment of the hazardous waste. Temporary hazardous waste storage area has been arranged at the WWTP construction site. Different types of hazardous waste are kept in the restricted area (fenced and roofed) before transporting by the licensed waste transportation/treatment company. Information regarding the generation of waste during reporting period under the MAR-01 sub-project is given in the Table 45 below, relevant agreements are provided in Annex D to this report.

Table 45: Waste generated under the MAR-01 sub-project during the reporting period, July-December 2023

#	Domestic, hazardous Waste & Sewage	Estimated Volume	Storage Area	Licensed Company
1.	Household waste	8M ³	Bolnisi Municipality household	Bolnisi Municipality Cleaning
2	Printer toner	0.5 Kg	Final storage will be at private Company „Sanitary” Ltd but temporary they will be stored in temporary hazardous	Private Company „Sanitary” Ltd

#	Domestic, hazardous Waste & Sewage	Estimated Volume	Storage Area	Licensed Company
3	Medical Wastes	0,10 kg/Liter	Final storage will be at private Company „Sanitary” Ltd but temporary they will be stored in temporary hazardous	Private Company „Sanitary” Ltd

MAR-02

111. Information regarding the generation of waste during reporting period under the MAR-02 sub-project is given in the Table 46 below:

Table 46: Waste generated under the MAR-02 sub-project during the reporting period, July-December 2023

Information about waste generated & disposed under MAR 02 Contract for the period January-June 2023				
#	Domestic/Hazardous Waste & Sewage	Estimated Volume	Storage Area	Name of Licensed Company
1	Household waste	15m ³	WWTP construction sites	Marneuli Municipality
	Hazardous Waste	37m ³	WWTP construction sites	Private Company „Sanitary” Ltd
3	Used tires	A negligible amount	Temporary waste storage area at the Workshop	
4	Hydraulic and used oil	A negligible amount	Temporary waste storage area at the Workshop	
5	Oil drums	A negligible amount	Temporary waste storage area at the Workshop	

Information about waste generated & disposed under MAR 02 Contract for the period January-June 2023

6	Printer tonner	A negligible amount	Temporary waste storage area at the Workshop	
7	Medical Waste	A negligible amount	Temporary waste storage area at the Workshop	

4.5.2 Cumulative Waste Generation

112. Cumulative waste generation under the MAR-02 project for whole project life is provided in the Table below.

Table 47: Cumulative Waste generated under the MAR-02 sub-project

January-June 2023			
#	Domestic/Hazardous Waste	Estimated Volume	Unit
1	Household waste	35	m ³
2	Hazardous Waste	70	m ³
July-December 2022			
1	Household waste	30	m ³
2	Hazardous Waste	15	m ³
January-June 2022			
1	Household waste	15	m ³
2	Hazardous Waste	8	m ³
July-December 2021			
1	Household waste	10	m ³
2	Hazardous Waste	3	m ³
July-December 2023			
1	Household waste	15	m ³
2	Hazardous Waste	37	m ³
Total			
1	Household waste	105	m ³
2	Hazardous Waste	133	m ³

4.6 Health and Safety

4.6.1 Community Health and Safety

113. No community incidents have been reported by SC during reporting period under MAR-01 and MAR-02 sub-projects.

4.6.2 Worker Health and Safety

MAR-01 - LOT-04 and LOT-05

114. Environmental H&S specialist of contractor under MAR-01 (LOT-04 and LOT-05) sub-project Mr. Sandro Abzianidze was performing day-to-day monitoring of Health & Safety on the Sites and press the Contractor to improve the provision of trench barriers in roads and to provide suitable work boots for the labour force.
115. Health & safety and environment issues which were covered during the reporting period are as follows:
- Excavation of trenches;
 - Ground works;
 - PPE;
116. There were no Workers Health and Safety problems identified during the site visits under MAR-01 (LOT-04 and LOT-05) sub-project by UWSCG/IPMO/USIIP and SC during the reporting period:

MAR-01/LOT-01, LOT-02, LOT-03 and LOT-06

117. Environmental Specialist of contractor under MAR-01 sub-project Mr. Levan Inashvili and H&S specialist Mr. Aleksandre Chitadze were performing day-to-day monitoring of ESHS on the Sites and press the Contractor to improve the provision of trench barriers in roads and to provide suitable work boots for the labour force.
118. Health & safety and environment issues which were covered during the reporting period are as follows:
- Excavation of trenches;
 - PPE;
119. The Following Workers Health and Safety problems were identified during the site visits under MAR-01 (LOT-01, LOT-02, LOT-03 and LOT-06) sub-project by UWSCG/IPMO/USIIP and SC during the reporting period:
- The walls of the deep trenches (>1.5m) by boards should be strengthened
 - workers always should use complete set of PPEs
 - Workers at high altitudes on the reservoir do not wear safety helmets or safety belts
120. During the reporting period, a tragic incident occurred at the Mar-01 subproject on October 17, 2023, where a contractor's worker tragically lost his life due to soil collapse in the trench. A brief description of the accident is provided in the para 34-36 above and more detailed report is attached to this SAEMR (see Annex E).

4.6.3 Community Health and Safety

MAR-01 and MAR-02 sub-projects

121. The Following Community Health and Safety problems were identified during the site visits under MAR-01 and MAR-02 sub-projects by UWSCG/IPMO/USIIP and SC:
- Trench construction shall be taken up in small segments, so that work (excavation, pipe laying and refilling) in each segment is completed in a day. No trenches shall be kept open in the night/after work hours, in case construction works are not completed during the day time provide adequate lighting to avoid accidents (MAR-01, all six lots);
 - Informing all residents and businesses about the nature and duration of any work well in advance so that they can make necessary preparations if needed (MAR-01, all six lots);
 - Construction sites should be adequately fenced after the completion of the construction activities (MAR-01/LOT-06, Jandari Reservoir)
122. After giving the strong instructions and issuing the Non-Compliance Notices, contractor improved the situation and sent CAP to SC and UWSCG.

4.7 Training

123. On site environmental and H&S safeguard trainings were conducted for contractor's environmental team of MAR-01 and MAR-02 sub-project by Environmental Specialists of UWSCG/USIIP and SC/HILL on a regular basis. Environmental specialists of contractors were introduced with all necessary safeguard requirements of ADB/SPS 2009.
124. On 23 September 2023 and 18 November 2023 USIIP Environmental Specialist Ms. Kate Chomakhidze and ES of SC/HILL Mr. Nikoloz Neparidze inspected the construction works of MAR-01 and MAR-02 sub-projects, identified inconsistencies in the construction process and provide on-the-job training on Environmental protection, occupational health and safety. Main issues raised during the site visit and training topics were: The walls of the deep trenches (>1.5m) by boards should be strengthened; workers always should use complete set of PPEs; Workers at high altitudes on the reservoir do not wear safety helmets or safety belts. The aforementioned training was attended by representatives of the CC and CS teams for environmental protection and H&S.
125. Contractors developed Corrective Action Plans to address nonconformities identified during the site visit and sent them to SC and UWSCG.

5. FUNCTIONING OF THE SEMP

5.1 SEMP Review (prepared and updated under USIIP/T6, including CHI-01, MAR-01 and Mar-02 sub-projects)

126. The SEMP for Chiatura's water supply network was prepared and approved in January 2020 and further updated and approved during the reporting period, in August 2020 due to changes in the project design.
127. The following SEMPs have been prepared and approved under CHI-01 and MAR-01 sub-project during the previous reporting periods:

CHI-01 Sub-project:

- SEMP for CAMP site (approved in August 2018)
- SEMP for Sachkhere Reservoir (approved in August 2018);
- SEMP for Bisi Reservoir (approved in September 2018);
- SEMP for Lezhubani Reservoir (approved in September 2018);
- SEMP for Navardzeti Reservoir (approved in September 2018);
- SEMP for Perevisy Reservoir (approved in September 2018);
- SEMP for Rustaveli reservoir (approved in September 2018);
- SEMP for Tekhisa Reservoir (approved in September 2018);
- SEMP for Chiatura Well fields (approved in November 2018);
- SEMP for Chiatura Water Supply components (Avarioni&Sapari) (Approved in 10 August 2020)

128. The following SEMPs have been updated due to the changes in project design under CHI-01 sub-project.
- SEMP for Sachkhere reservoir (December 2019);
 - SEMP for Bisi Reservoir (December 2019)

MAR-01 sub-project:

- SEMP for Jandary Reservoir (approved in March 2019);
- SEMP for Kolagiri Pumping Station (approved in March 2019);
- SEMP for CAMP (approved in May 2019)
- SEMP for City Reservoir (approved May 2019)

MAR-02 sub-project:

- SSEMP for MAR-02 (approved in March 2020)

Updated SEMPs under MAR-01 sub-project

- SEMP for MAR-01 (LOT-01/LOT-02/LOT-03 and LOT-06) (September 2022)
- SEMP for MAR-01 (LOT-04/LOT-05) (September 2022)

129. All SEMP's were prepared by Contractor, endorsed by SC and approved by UWSCG. SEMP's were reviewed/commented by the ADB.

6. GOOD PRACTICE AND OPPORTUNITY FOR IMPROVEMENT

6.1 Good Practice

- 130.** During the reporting period, relations between UWSCG/IPMO/USIIP, supervisory consultants, contractors and local communities were improved to avoid further inconsistencies within the USIIP/T6 subprojects. The local population living in the nearest residential houses to the Marneuli WWTP under the MAP-02 sub-project were given wooden sheets cleaned of nails.

6.2 Opportunities for Improvement

- 131.** During the reporting period, IPMO improved tracking of corrective actions. Close monitoring, guidance and communication between PIU, SC and CC has been improved to avoid inconsistencies and improve the current situation. Issues identified during the previous SAEMR, July-December 2022 were taken into account by UWSCG/USIIP and SC/HILL.

7. SUMMARY AND RECOMMENDATIONS

7.1 Summary

132. Individual and joint on-site monitoring activities were conducted by Environmental Specialists of UWSCG/USIIP Ms. Ketevan Chomakhidze and SC/HILL, Mr. Nikoloz Neparidze as well as Social Specialist of SC/HILL Ms. Gvantsa Lukava.
133. In total 59 non-compliances were identified during the reporting period under MAR-01 and MAR-02 sub-projects. The contractors were always informed on the detected non-conformances and were demanded to improve on the deadline set and send photos of improvements. Environmental team of HILL and UWSCG/USIIP monitored the improvements during the next monitoring visits. Corrective action plans were developed by contractors and improved photos of sites were send to SC and UWSCG.
134. 18 Non-compliances were identified during the reporting period under USIIP/T6 MAR-02 sub-project and 3 Non-compliances Notice have been Issued by ESs of USIIP, Supervision Consultant/HILL, relevant Corrective Action Plans were developed by Contractors.
135. During the reporting period, 41 non-compliances were identified and 6 non-compliance notices were issued to the contractor under the USIIP/T6 MAR-01 subproject.
136. No Environmental Quality Measurement was conducted under CHI-01 sub-project as there were no construction activities under the project during the reporting period.
137. During the reporting period environmental quality measurements of ambient air pollution and noise level were conducted under MAR-01 and MAR-02 sub-projects on the quarterly and semi-annual basis.
138. Table 48 provides information about the Recommendations to Address Environmental, Social and H&S Non-Compliances identified during the July-December 2023 under USIIP/T6 sub-projects.

7.2 Recommendations

139. During the reporting period, July-December 2023, the USIIP/T6 was implemented in accordance with the requirements of ADB - SPS 2009 and the National Legislation.
140. More detailed recommendations for the implementation of USIIP/T6 during the next reporting period April 2024 are provided in the Table 48 below:

Table 48: Recommendations to Address Environmental Issues under USIIP/T6 sub-projects

Recommendations under MAR-01 and MAR-02 sub-projects	
Recommendations MAR-01 (LOT-01/LOT-02/LOT-03/LOT-06)	Implementation Status and Date
Noise from the construction activities should not cause disruption and nuisance to nearby community and other sensitive receptors (i.e. school, hospitals).	<p>Instruction are given to contractor to improve the situation and to conduct following mitigation measures immediately.</p> <p>Plan activities in consultation with SC and IPMO/UWSCG so that activities with the greatest potential to generate noise are planned during periods of the day that will result in least disturbance;</p> <p>Noisy construction activities will be avoided during night time;</p> <p>All construction equipment and vehicles shall be well maintained, regularly inspected for noise emissions;</p> <p>Impose speed limits on construction vehicles to minimize emissions along areas where sensitive receptors are located (i.e. temples, hospitals, schools, houses)</p> <p>Install noise barriers (e.g., panels, curtains, or partitions)</p>

Recommendations under MAR-01 and MAR-02 sub-projects	
	<p>to reduce the emission of engine noise.</p> <p>Conduct meetings with population and provide information related to schedule of construction activities and noise caused by the project activities,</p> <p>Should be improved immediately during the implementation of the construction activities.</p>
Recommendations MOR-02	Implementation Status and Date
<p>Safety issues on construction sites, Workers always should use complete set of PPE (to be improved immediately).</p> <p>Safety norms during working at height should be respected, Special equipment during working at heights should be used (to be improved immediately).</p> <p>Adequate fencing should be installed on Jandari Reservoir site.</p>	<p>Instruction are given to contractor to improve the situation and to conduct relevant mitigation measures by the end of March 2024</p>
<p>Noise from the construction activities should not cause disruption and nuisance to nearby community and other sensitive receptors (i.e. school, hospitals).</p>	<p>Instruction are given to contractor to improve the situation and to conduct following mitigation measures immediately.</p> <p>Plan activities in consultation with SC and IPMO/UWSCG so that activities with the greatest potential to generate noise are planned during periods of the day that will result in least disturbance;</p> <p>Noisy construction activities will be avoided during night time;</p> <p>All construction equipment and vehicles shall be well</p>

Recommendations under MAR-01 and MAR-02 sub-projects

	<p>maintained, regularly inspected for noise emissions;</p> <p>Impose speed limits on construction vehicles to minimize emissions along areas where sensitive receptors are located (i.e. temples, hospitals, schools, houses)</p> <p>Install noise barriers (e.g., panels, curtains, or partitions) to reduce the emission of engine noise.</p> <p>Conduct meetings with population and provide information related to schedule of construction activities and noise caused by the project activities.</p> <p>Should be improved immediately during the implementation of the construction activities.</p>
--	---

141. Conduct quarterly monitoring of Noise and Air quality under MAR-01 (LOT-01, LOT-02, LOT-03 and LOT-06) project at the nearest sensitive receptors. The schedule of environmental quality measurements to be carried out during the next reporting period, until the end of April 2024 is presented in the Table 49 below.

Table 49: Conduct Monitoring of Environmental Quality under MAR-01 (LOT-01, LOT-02, LOT-03, LOT-04 and LOT-05) project

Parameters	Quarterly measurement
Dust	March 2024
PM _{2.5} and PM ₁₀	March 2024
Vibration	March 2024
Carbon monoxide	March 2024
Nitrogen dioxide	March 2024
Noise	March 2024

142. Conduct quarterly monitoring of Noise and Air quality under MAR-01 (LOT-04, LOT-05) project at the nearest sensitive receptors. The schedule of environmental quality measurements to be carried out during the next reporting period, until the end of April 2024 is presented in the Table 50 below.

Table 50: Conduct Monitoring of Environmental Quality under MAR-01 (LOT-04 and LOT-05) project

Parameters	Quarterly measurement
Dust	March 2024
PM _{2.5} and PM ₁₀	March 2024
Vibration	March 2024
Carbon monoxide	March 2024
Nitrogen dioxide	March 2024
Noise	March 2024

143. Conduct quarterly monitoring measurements of Noise and Air quality under MAR-02 project at the WWTP construction site and nearest sensitive receptors. The schedule of environmental quality measurements to be carried out during the next reporting period, until the end of April 2024 is presented in the Table 51 below.

Table 51: Conduct Monitoring of Environmental Quality under MAR-02 sub-project

Parameters	Quarterly measurement
Dust	March 2024
PM _{2.5} and PM ₁₀	March 2024
Vibration	March 2024
Carbon monoxide	March 2024
Nitrogen dioxide	March 2024
Noise	March 2024

ANNEXES

ANNEX A: ENVIRONMENTAL QUALITY MEASUREMENT DATA (MAR-02 SUB-PROJECT)

Construction of a Waste Water Treatment Plant in Marneuli Report of Environmental Qualitative Parameters Measurements N23 - 29.11.2023



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Construction of a waste water treatment plant in Marneuli

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1. Principal terms, Definitions

Term	Definition
Acoustic noise	All kinds of continuous, uncomfortable and disturbing sounds, elastic oscillations and waves in the air, which occur as a result of the actions of natural or legal persons and create discomfort; they may have a negative impact on a person's health or social status.
Atmospheric air pollutants	Any substance emitted into the atmospheric air due to the human activity that has or may have a negative impact on human health and/or natural environment.
Vibration	Flexible oscillations and waves in a solid body
Sound	Mechanical (acoustic) oscillations perceived by a human hearing analyzer in 16 Hz - 20 kHz range
Noise	Unfavorable sound, which creates discomfort, affects our auditory system and hampers the perception of desirable sounds.
Admissible noise level	The magnitude of the sound, which does not cause direct or indirect negative effects on a person, does not reduce his ability to work, does not negatively affect his feelings or mood, does not cause a substantial change in a functional system, which is sensitive to him.
Continuous noise	The sound measured by "Slow" time characteristic of the noise meter, which changes by no more than 5 dBA in time.
Intermittent noise	The sound measured by "Slow" time characteristic of the noise meter, which changes in time of no more than >5 dBA.
Background noise	Summary level of all signals, except the signals generated by the study source.
A weighting	The spectrum of noise sound frequency perceptible for human auditory systems.
"IFC"	International Finance Corporation.
"NIOSH"	"National Institute for Occupational Safety & Health" USA.

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Construction of a waste water treatment plant in Marneuli

2. Introduction

"United Water Supply Company of Georgia" LLC is a society based on 100% equity participation of the state, which was established on the basis of the order #1-L/13 of the Minister of Economic Development of Georgia dated January 11, 2010. The company provides water supply and drainage network services throughout Georgia for urban settlements.

As of today, about 20% of the population of Marneuli is connected to the existing sewage network. The sewage network is equipped with DN200 and DN800 diameter pipes. The said sewage network is outdated and can no longer provide for the reception of wastewater. There is no waste water discharge system and treatment facility in the settlement located in the project area. There is no organized collection of polluted waters at all. Therefore, there are high risks of contamination of groundwater and surface waters, as well as soil.

The current project envisages the rehabilitation of the Marneuli sewage networks, as well as the construction and operation of the sewage collector and the wastewater treatment facility, the design capacity of which will be 9931 m³/day, and will serve 100% of the population of Marneuli. The new treatment plant will be located on a plot of agricultural land, with a specified area of 53434.00 sq.m (IN 83.03.25.406). The mentioned plot of land is the property of "United Water Supply Company of Georgia" LLC. The nearest settlement is 50 meters away from the territory.

The rehabilitation project of the Marneuli water drainage system includes the complete rehabilitation/construction of the existing wastewater network and its connection to the main collector. The Marneuli water supply network provides 100% water supply to the city's population.

"United Water Supply Company of Georgia" is the project implementing company.

3. Existing Situation

As mentioned, the present project envisages the arrangement of water drainage networks in Marneuli, the construction of a system of drain collectors for the collection of wastewater and its further transportation, and the construction and operation of a wastewater treatment plant in the city of Marneuli.

The construction of Marneuli waste water treatment plant with full biological cycle is planned in two stages. The first stage will carry out water purification, and the number of people who will receive water services will be approximately 41,000. In the second stage, the performance of the treatment plant will increase in accordance with the requirements of 2040.

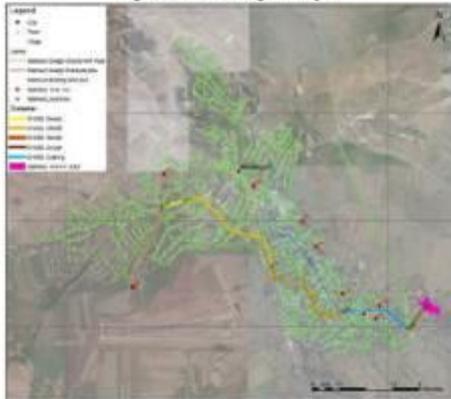
Within the scope of the project, it is envisaged to use the active sludge method together with separate anaerobic decomposition (fermentation) of sediment.

As of today, construction works of the facility are underway. The construction works of the treatment plant are performed by "Ima" company.

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Figure NS.1: Mtskheta sewer network plan



Based on the agreement signed between „Insi“ and L.T.E. „Eco-Sperrt“, Representatives of the „Eco-Sperrt“-s Examination Laboratory performed instrumental measurements of noise levels, vibration levels and particulate matter in outdoor air (PM 2.5, PM 10) at the locations specified by the customer.

4. Environmental Qualitative Parameters

4.1 Noise - Introduction

Noise is any unwanted sound or a combination of sounds of different frequencies and intensities that have an undesirable influence on a human body.

With its physics, noise is the mechanical oscillations of particles of an elastic environment (gas, liquid, organic matter) within the scope of a human auditory analyzer (16 Hz-20 kHz) arising under the influence of a certain force. At the same time, the sound is called regular periodic (tonal) oscillations, and the noise is called an irregular set of sounds, non-periodic, random oscillation processes. Thus, from a hygienic point of view, noise is a combination of sounds of different frequencies and levels of sounds, which hampers the perception of useful audible signals (music,

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irregularities, namely: potholes, cracks, and uneven pavement joints. Dynamic interaction forces between the vehicle and pavement are created by these irregularities resulting in a generation of stress waves that travel through the adjacent soils.

Vibrations produce damaging stress waves that quickly reach building foundations, causing them to vibrate. Several factors may contribute to vibration levels, including: road condition, vehicle speed, vehicle weight, soil conditions, building characteristics, vehicle suspension system, season of the year, and distance between the structure and the road. When a large vehicle strikes an irregularity, an impact load, as well as an oscillating load due to the "axle hop" of the vehicle are generated. The impact load generates ground vibrations that are predominant at the natural vibration frequencies of the soil, whereas the axle hop generates vibrations at the hop frequency, which is a characteristic of the vehicle's suspension system. Vibrations can be amplified if the natural frequency of the building coincides with the natural frequency of the soil.

Vibration sources such as construction activities and road traffic, are among the sources considered potentially dangerous to buildings and structures. In general, structural damages to buildings are extremely rare and are in general caused by other sources. Structural damages occur when the permissive levels of vibration are exceeded. Degrees of damage are methodologically defined and vary from those that do not affect the structural safety of the buildings but affect the value of assets – e.g. formation of cracks in the plaster, increase in existing cracks, damage of architectural elements etc.

4.5 Harmful Substances in the Atmospheric Air - General

Atmospheric air pollution is currently a high environmental risk all over the world. Atmospheric air pollution is a major cause of death and morbidity on the global scale. In any country or region, the atmospheric air quality is not determined by one or two factors only. Rather, it is the result of a combination of several factors and depends on the scale and source of emission, weather conditions, landscape and human factor.

The atmospheric air in Georgia is polluted by emissions from vehicles, energy sector, agriculture and industrial facilities.

The main pollutant of the atmospheric air in urban areas is vehicles. 62-78% of nitrogen oxides (NOx) and carbon monoxide (CO) in the country is emitted in the road transport sector. The dynamics of emissions from this sector is increasing rapidly following the number of vehicles and amount of fuel consumed by them.

4.6 Main Atmospheric Pollutants

The major pollutants of the atmospheric air and the most frequently mentioned substances are: solid particles with the diameter of 10µm or less, solid particles with the diameter of 2.5µm or less (hereinafter, PM10 and PM2.5), nitrogen dioxide (NO2), ozone (O3) and carbon monoxide (CO).

With their origin, the main pollutants have the following properties:

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conversation, etc.) and triggers an unwanted, irritating effect on the human body. Noise is classified depending on the nature of spectrum and time characteristics.

4.2 Noise Sources

Depending on the place of origin, the noise sources are classified as follows:

- The main source of noise in the houses in the urban areas is mainly the traffic with the highest share in noise pollution. The number of cars, their speed, urban development and motor system are the main parameters that impact the noise distribution. Besides, a great share of heavy vehicles in the common car park is noteworthy;
- Engineering, technological and household equipment, as well as human activities are the internal noise sources in the houses;
- Sources related to human life activities, such as playing sports, cleaning the area, etc., within the framework of the micro-district (quarter);
- The external sources are industrial and energy infrastructure.

4.3 Time Characteristics of Noise

Depending on time characteristics, the following types of noise can be identified:

- Permanent noise: with its sound level changing by no more than 5 dB during an 8-hour working day in the working zone or in the rooms of residential and public buildings, as measured by a "slow" time property of the noise meter;
- Non-permanent noise: with its level during an 8-hour working day in the working zone, or during the working shift or on the territory of the settled areas changes by more than 5 dB, as measured by a "slow" time property of the noise meter.

Non-permanent noise is classified as:

- Noise varying in time, with its sound level continuously changing in time;
- Intermittent noise, with its sound level changing gradually (by 5 dB or more). Besides, the duration of intervals, during which the noise level is permanent, is 1 second and more;
- Pulse noise, which is made up of several sound signals with the duration of less than 1 sec. besides, the sound levels as measured by relevant time characteristic "impulse" and "slow" differ by no less than 7 dB.

4.4 Vibration - Introduction

Vibration induced in buildings are a frequent concern in cities around the world. Commonly, complaints are made by homeowners, as heavy construction vehicles travel at various speeds on adjacent roads, resulting in annoying vibrations and possible structural damage. Passenger vehicles rarely produce perceptible vibrations to cause significant structural damage. Generally, traffic induced vibrations are caused by heavy vehicles. These vibrations are generated by road surface

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– **PM10 and PM2.5:** The particles are mainly generated from natural and anthropogenic sources. They are classified as basic PM10 or basic PM2.5. The natural sources include sea salt, naturally emitted dust, flower dust, and volcanic ash; as for the anthropogenic sources, they include fuel combustion for energy generation, home heating and transport, industrial process and waste incineration, agriculture, as well as brake, tire and road wear, together with other types of anthropogenic dust. Black carbon is PM2.5. It is generated from an incomplete combustion of fuel. The main sources of black carbon emission are transport and home heating systems.

– **NO2:** The process of combustion is a major source of nitrogen oxides (NOx) that may be stationary or mobile. Nitrogen monoxide (NO) is the source of emission of the major portion of NOx; consequently, NO is oxidized to produce NO2, although some NO2 emissions occur directly. The proportion of NO2 in the vehicle exhaust (i.e. NO2 / NOx ratio) is significantly higher in diesel than in petrol vehicles because the post-exhaust systems increase NO oxidation what increases the direct emission of greater amounts of NO2.

– **CO:** Carbon dioxide (CO) is a toxic, odorless gas. Low concentrations of carbon dioxide are naturally found in the atmosphere from volcanic action and forest fires. CO is formed from partial oxidation of carbon-containing compounds when there is no sufficient oxygen to produce carbon dioxide. The principal source of external CO is combustion processes from transport and industrial activities.

– **O3:** Ground-level ozone is a pollutant that is quite harmful for human health, particularly for people with asthma. It damages crops, trees and other vegetation and is the main element of smog. Ground-level ozone is not found in its natural form, but is formed by chemical reactions occurring as a result of interaction between the oxides of nitrogen (NOx) and volatile organic compounds (VOCs) and the sunlight. The main source of NOx and VOC are industrial plants, vehicle exhaust, gasoline vapors and chemical solvents. Following the dynamics of O3 reaction, the concentrations are highest in urban settlements.

– **VOC:** Volatile organic compounds (VOCs) are carbonic acid-containing gases and vapors. They evaporate easily at a room temperature. That is why they are called volatile. Many VOCs, such as benzene and formaldehyde, are highly toxic and can cause cancer and serious health problems. A VOC, such as butadiene participates in the generation of ground-level ozone. The severity of health problems much depends on the type of the volatile compound. The anthropogenic sources are: fuel production, distribution, and combustion processes. Vehicles are the major source of emissions due to evaporation, incomplete fuel combustion or biomass combustion.

5. Legislative Requirements

5.1 Noise

As per the state standards, the admissible noise levels are specified by Decree # 297/N of the Ministry of Health, Labor and Social Affairs of Georgia. This Decree sets both admissible noise

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levels and maximum admissible levels for different territories (State Registration Code 470.230.000.11.119.004.920).

The noise levels in the buildings and premises and adjoining areas are also regulated by Technical Regulation no. 398 of the Government of Georgia on August 15, 2017 "On the levels of acoustic noise in the rooms of the residential houses and public establishments and their accommodation areas". The given technical regulation, which is based on the requirements of the international standards (e.g. ISO 1996-1: 2003, "Acoustics, Description, measurement and assessment of environmental noise", Part 1: "Main assessment values and procedures"; ISO 1996-2: 2007 "Acoustics, description and measurement of environmental noise", Part 2) sets the admissible levels of acoustic noise in the rooms of residential, buildings and buildings of public and in the settled areas to protect people against the unfavorable impact of noise.

The requirements of the Georgian and international legislations are identical except some minor changes.

Table 5.1.1: Georgian Standards For Noise Levels

Receptor	Time interval	Average admissible noise level (dB)	Maximum admissible noise level (dB)
Residential	7.00-23.00	55	70
Residential	23.00-7.00	45	60
Commercial	24 hours	60	75

Table 5.1.2: IPC Noise Level Guidelines

Receptor	One hour L _{eq} (dB)	
	During the day 07.00-22.00	At night 22.00-07.00
Residential; institutional; educational	55	45
Industrial; commercial	70	70

For the technical regulation purposes (expert assessment of noise level), the rated parameter of continuous noise is the sound level measured by noise meter LA_dBA with scale A, and the equivalent sound level L_{eq}v_dBA for non-continuous (variable) noise.

As per the given technical regulation, the admissible noise levels are given in table NS.1.3.

Table NS.1.3: Admissible levels of acoustic noise in the rooms of residential and public buildings and their settled areas

№	Purpose/use of area and premises	Allowable limits		
		L _{Day} (dBA)		L _{Night} (dBA)
		Day	Night	
1	Educational facilities and library halls	35	35	35
2	Medical facilities/chambers of medical institutions	40	40	40
3	Living quarters and dormitories	35	30	30
4	Hospital chambers	35	30	30
5	Hotel/motel rooms	40	35	35
6	Trading halls and reception facilities	55	55	55
7	Restaurant, bar, cafe halls	50	50	50
8	Theatre/concert halls and sacred premises	30	30	30
9	Sport halls and pools	55	55	55
10	Small offices (<100m ³) - working rooms and premises without office equipment	40	40	40
11	Big offices (>100 m ³) working rooms and premises without office equipment	45	45	45
12	Conference halls /meeting rooms areas bordering with houses residential, medical establishments, social service and children facilities(<6 storey buildings)	35	35	35
13	Areas bordering with houses residential, medical establishments, social service and children facilities(<6 storey buildings)	50	45	40
14	Areas bordering with houses residential, medical establishments, social service and children facilities(>6 storey buildings)	55	50	45
15	The areas bordering with hotels, trade, service, sport and public organizations	60	55	50

Note:

1. in case noise generated by indoor or outdoor sources is impulse or tonal, the limit must be 5dBA less than indicated in the table.

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2. Acoustic noise limits given above are set for routine operation conditions of the 'space', i.e. windows and door are closed (exception – built-in ventilation canals), ventilation, air conditioning, lighting (in case available) are on; functional (baseline) noise (such as music, speech) not considered.

The results of noise measurements are documented in accordance with the rules established by the effective law. The noise level value of is calculated with 1 dBA accuracy, by considering generally accepted rounding of the value.

5.2 Vibration

DIN 4150-3 is the most widely applied standard internationally for measuring structural vibrations. The measurement procedure can be found in a similar form in other national standards, for example the Italian UNI 9916. The assessment parameter is the maximum value (V_i) of the three individual components (peak values) of vibration velocity at frequencies of 1 to 80 Hz.

The standard provides guide values for permissible vibration velocities for short time and sustained vibrations in three types of buildings.

Table 5.2.1: Guide values for transient vibration

Guide values for vibration velocity for analyzing the effects of transient vibration					
Building Type	Foundation Frequency of the Significant Vibration			Upper ceiling	
	1 – 10 Hz	10 – 50 Hz	50 – 100 Hz	All frequencies	
Frequency range	1 – 10 Hz	10 – 50 Hz	50 – 100 Hz	All frequencies	
Direction	X / Y / Z	X / Y / Z	X / Y / Z	X / Y	Z
Reinforced or framed structures, industrial and heavy commercial buildings	20 mm/s	20 – 40 mm/s	40 – 50 mm/s	40 mm/s	20 mm/s
Unreinforced or light framed structures/ Residential or light commercial type buildings	5 mm/s	5 – 15 mm/s	15 – 20 mm/s	15 mm/s	20 mm/s
Delicate, listed buildings e.g. historical monuments	3 mm/s	3 – 8 mm/s	8 – 10 mm/s	8 mm/s	20 mm/s

Table 5.2.2: Guide values for continuous vibration

Guide values for vibration velocity (v) for analyzing the effects of continuous vibration			
Building Type	Upper ceiling level, all Frequencies		
	X / Y (horizontal)		Z (vertical)
Reinforced or framed structures industrial and heavy commercial buildings	10 mm/s		10 mm/s

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results of the accomplished measurements. The noise meter can store the received signals in internal memory and describe each signal according to level and date stamp. The device has a wind protective cap reducing the impact of environmental conditions (wind, temperature) during recording. As per the International Finance Corporation, the noise level must be measured by using the 1st or 2nd class noise meter meeting the requirements of the guideline of the "International Electrotechnical Committee". As per the same guideline, the noise monitoring is possible to provide with the aim to identify the existing background noise level of the environment adjacent to the design or existing facility or to examine the noise level in the operation phase.

Figure N6.1.1: "SVAN 971" Sound Level Meter



Figure N6.1.2: Organization-owned noise meter



Noise meter configurations during the study were:

- Noise measurement range: 30-130 dB;
- Noise meter response speed: Slow (1 second);
- Frequency weight: A;
- Type of microphone: 0.5" (12.7 mm.) øL Condensator.

6.2 Vibration

The VM40 is designed for measuring vibration in buildings, bridges, towers, pipelines and various other large structures. The measurements serve to prevent possible structural damage or disturbance to people. The VM40 contains a sensor, recording and evaluation electronics and an accumulator in its robust casing. It is especially suitable for autonomous operation over longer periods of time e.g. on construction sites.

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Guide values for vibration velocity (v) for analyzing the effects of continuous vibration		
Building Type	Upper ceiling level, all Frequencies	
	Unreinforced or light framed structures, residential or light commercial type buildings	5 mm/s
Delicate buildings, listed buildings e.g. historical monuments	2.5 mm/s	-

5.3 Atmospheric Air

The air quality standards in Georgia are regulated by the Law of Georgia "On Approving the Qualitative State of Environment". Table N5.3.1 below gives the atmospheric air quality standards of Georgia and World Health Organization (WHO).

Table N5.3.1: Atmospheric air quality standards of Georgia and World Health Organization

Pollutant	Period	Georgian Legislation norm (µg/m3)	WHO norm (µg/m3)
NO2	1 Year	-	40
	1 Hour	200	200
O3	8 Hour	120	100
CO	8 Hour	10	-
PM2.5	1 Year	-	10
	24 Hour	-	25
PM10	1 Year	-	20
	24 Hour	50	50
VOC	-	-	1000*

6. Used Measuring Devices

6.1 Noise

The consulting organization used the equipment of the Polish company "SVANTEK", "SVAN 971" series for measuring noise (Figure N6.1.1, N6.1.2).

SVAN 971 series Sound Level Meters by Polish Svantek are appliances with Class 1 IEC 61672-1:2013 accuracy, capable of storing up to 100000 records. SVAN 971 offers a wide range of results in all needed weighting filters (A, C, Z), as well as 1/1 and 1/3 Octave spectra. SVAN 971 Sound Level Meter allows gaining most resultant noise units: Lpeak, Lmax, Lmin, L, Leq, LE, Lden, LEPd, Lm3, Lm5, Leq statistics (Ln), expected Leq value (EX), standard Leq deviation (SD), measurement time and overload time % (OVL), etc. SVAN 971 software allows developing graphical, table or text

* The value is the WHO recommendation, not a norm of the WHO.

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Figure 6.3.1: Triaxial Vibration Monitor VM40/8



The instrument contains three highly sensitive piezoelectric systems for vibration measurement of all three spatial dimensions. The signal processing is controlled by a microprocessor. The VM40 is operated via its seven keypad buttons and illuminated LCD display. The measurement data can be transferred to a PC via the USB interface. The instrument also has a port for connecting a charger and a relay output for the external signaling of vibration occurrences.

6.3 Air Measuring Device

The New Zealand based "Aeroqual Series 500 Portable Air Quality Monitor" is used to measure air. The air quality meter allows real time monitoring of air pollutants. The device measures the concentration of the following major pollutants in the air:

- Particulate Matter 10µm and 2.5µm (PM10, PM2.5);

The figures 6.3.1 - 6.3.2 below shows the "Aeroqual Series 500 Portable Air Quality Monitor".

Figure 6.3.1: "Aeroqual Series 500 Portable Air Quality Monitor"



Figure 6.3.2: "Aeroqual Series 500 Portable Air Quality Monitor"



The device has different sensors for each type of harmful substance. The device has the following types of sensors:

- Gas sensitive semi-conductor sensor (GSS);

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- Gas sensitive electrochemical sensor (GSE);
- Laser Particle Counter (LPC);
- Photo Ionization Detector (PID).

During performing the measurement, the device records the average minute data of the obtained samples. Measurements was made within 2 hours.

7. Conducted Measurement

The measurement was carried out in Mtskheta, on the construction site of the sewage treatment plant and on the territory of the nearest residential house. The measurement was made on 29/11/2023, for two hours. The measurement of noise, vibration and particulate matter was carried out continuously for two hours.

The measurement was carried out in the area of the construction site and in the nearest residential building, which is located approximately 50 meters away from the construction site. At the time of measurement, construction works were being carried out with high intensity. During the measurement period, self-loading and loading vehicles moved on the construction site.

The measurement process was not affected by any weather conditions (rain, wind). The air temperature during the measurements was as follows:

- 2023/11/29 - 17 °C - Relative Humidity 40%³

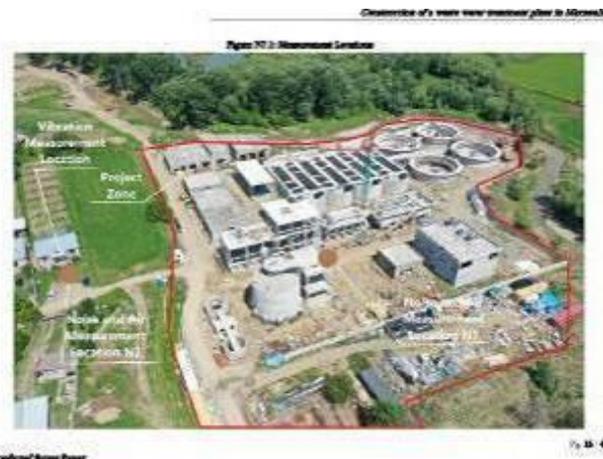
The concentration levels of noise, vibration and particulate matter were measured in line with the requirements of Georgian Legislation and the methodology and procedures developed by the Company.

As a result of studying the existing situation, two points were determined as measurement locations. Below are the measurement points of environmental quality indicators:

Noise Measurement	Construction Site (Measurement Location N1)
	Yard of the residential building adjacent to the project area (measurement point N2)
Air Measurement	Construction Site (Measurement Location N1)
Vibration Measurement	The balcony of the residential building adjacent to the project area

Figure N7.1 below show the measurement points.

³ Source - <http://meteo.gov.ge/>.



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The baseline measurements were performed to identify the levels of noise, vibration and major air pollutants. The detailed data of the gained results are given in annex:

- Annex N1: Photos of the conducted measurements;
- Annex N2: Noise measurement results;
- Annex N3: Graphical data for noise measurement;
- Annex N4: Vibration Measurement Results (Protocol);
- Annex N5: Air measurement results;
- Annex N6: Certificates of expert participating in the measurement;
- Annex N7: ISO standard certificate issued to the company participating in the measurement;
- Annex N8: Device Calibration forms.

For the average values of the conducted measurements see in Table N7.1.

Table 7.1: Result of Measurements

Measurement Parameter		Value	Source of Pollution
Noise dBA	Norm of Georgian legislation (Adjacent to Residential house)	Day	55
		Night	45
	Norm of Georgian legislation (Commercial / Industrial Territory)	Day - Night	60
		Recommendation of the "US National Institute for Occupational Safety and Health" (NIOSH)	8 Hour
	Result - N1 Point (At the Construction site)	2 Hour	64.4
	Result - N2 Point (At the Res. Building)	2 Hour	56.6
Vibration mm/s	DIN 4150-3 Standard	5	Construction Works
	Result (Maximum value recorded)	0.26	

³ The initial and final vibration data are relatively high, which is due to the touch of the device on and off button, as well as moving around the device. Therefore, the initial and the final data are not used in the assessment.

Measurement Parameter		Value	Source of Pollution
PM2.5 (µg/m3)	Allowable Concentration	24 Hour	25
	Result	20 Minute	14
PM10 (µg/m3)	Allowable Concentration	24 Hour	50
	Result	20 Minute	28

As can be seen from the obtained data, the noise level at point N1 is lower than the permissible norm of "NIOSH" (85 dBA) and is 64.4 dBA. The recorded noise level at point N2 (near the house) slightly exceeds the permissible noise norm established by the Georgian legislation and amounts to 56.6 dBA. As mentioned, during the measurement, construction works were being carried out with high intensity. During the measurement period, a self-propelled truck, a crane, a bulldozer and an excavator moved to the construction site.

According to the results of 5-minute intervals of noise measurement at measurement location N2 (near the residential house), noise exceeding the permissible norm was recorded fourteen times (fourteen times in a five-minute interval).

At point N2 (near the residential building), the peak noise level was recorded in the five-minute interval from 16:05 to 16:10, which was 62.7 dBA.

The vibration level is much lower (about 20 times lower) than the value of the DIN 4150-3 standard. During the measurement, the highest vibration result was recorded at 0.26 mm/s.

As can be seen from the measurement results, the level of concentrations of particulate matter in the ambient air is lower than the norm established by the legislation of Georgia and the norm/recommendation of the World Health Organization.

In the 20-minute measurement interval, the highest level of particulate matter was recorded as PM2.5 - 14 (µg/m3), and PM10 - 28 (µg/m3).

The highest concentration of particulate matter was observed in the sample taken at 15:28, which amounted to PM2.5 - 30 (µg/m3), and PM10 - 203 (µg/m3). The mentioned sharp increase was due to the dust caused by the passage of the construction vehicle.

It should be noted here that the concentrations of particulate matter for the two-hour measurement period (and not for the 20-minute section) are PM2.5 - 14 (µg/m3), and PM10 - 24 (µg/m3).

Persons responsible for the measurements:

Archil Revasilvili	Signature	David Kaviladze	Signature
LTD "Eco-Spectri"		LTD "Eco-Spectri"	

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Head of Examination Laboratory

Senior specialist of Environmental and Social Issues

8. Conclusion

- Based on the agreement signed between „Imi“ and L.T.D. „Eco-Spectri“, Representatives of the „Eco-Spectri“-s Examination Laboratory performed instrumental measurements of noise levels, vibration levels and concentrations of particulate matter in ambient air (PM 2.5, PM 10) at the locations specified by the customer;
- The measurement was carried out in Marneuli, on the construction site of the sewage treatment plant and on the territory of the nearest residential house. The measurement was made on 29/11/2023, for two hours;
- The measurement was carried out in the area of the construction site and in the nearest residential building, which is located approximately 50 meters away from the construction site;
- The concentration levels of noise, vibration and particulate matter were measured in line with the requirements of Georgian Legislation and the methodology and procedures developed by the Company;
- During the measurement, construction works were being carried out with high intensity;
- As can be seen from the obtained data, the noise level at point N1 is lower than the permissible norm of „NIOSH“ (85 dBA) and is 64.4 dBA. The recorded noise level at point N2 (near the house) slightly exceeds the permissible noise norm established by the Georgian legislation and amounts to 56.6 dBA. As mentioned, during the measurement, construction works were being carried out with high intensity. During the measurement period, a self-propelled truck, a crane, a bulldozer and an excavator moved to the construction site;
- According to the results of 5-minute intervals of noise measurement at measurement location N2 (near the residential house), noise exceeding the permissible norm was recorded fourteen times (fourteen times in a five-minute interval);
- At point N2 (near the residential building), the peak noise level was recorded in the five-minute interval from 16:05 to 16:10, which was 62.7 dBA;
- The vibration level is much lower (about 20 times lower) than the value of the DIN 4150-3 standard. During the measurement, the highest vibration result was recorded at 0.26 mm/s;
- As can be seen from the measurement results, the level of concentrations of particulate matter in the ambient air is lower than the norm established by the legislation of Georgia and the norm/recommendation of the World Health Organization;
- In the 20-minute measurement interval, the highest level of particulate matter was recorded as PM2.5 - 14 (µg/m3), and PM10 - 28 (µg/m3);

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Annex N1: Photos



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- The highest concentration of particulate matter was observed in the sample taken at 15:28, which amounted to PM2.5 - 30 (µg/m3), and PM10 - 203 (µg/m3). The mentioned sharp increase was due to the dust caused by the passage of the construction vehicle;
- It should be noted here that the concentrations of particulate matter for the two-hour measurement period (and not for the 20-minute section) are PM2.5 - 14 (µg/m3), and PM10 - 24 (µg/m3).

Annex N2: Noise Measurement Results

N1 Measurement		
Date	Location	Distance from Project Area
29.11.2023	Construction Site	10 m.
N1 Measurement Results		
Average	15-10 - 17:10	
	64.4	
5 Minute Average		
1	29.11.2023 15:15	68.3
2	29.11.2023 15:20	75.1
3	29.11.2023 15:25	75.1
4	29.11.2023 15:30	78.2
5	29.11.2023 15:35	63.1
6	29.11.2023 15:40	69.7
7	29.11.2023 15:45	65.5
8	29.11.2023 15:50	62.8
9	29.11.2023 15:55	62.9
10	29.11.2023 16:00	65.5
11	29.11.2023 16:05	70.8
12	29.11.2023 16:10	59.7
13	29.11.2023 16:15	59.7
14	29.11.2023 16:20	65.6
15	29.11.2023 16:25	59.6
16	29.11.2023 16:30	59.8
17	29.11.2023 16:35	57.4
18	29.11.2023 16:40	60.0
19	29.11.2023 16:45	58.8
20	29.11.2023 16:50	58.6
21	29.11.2023 16:55	60.6
22	29.11.2023 17:00	61.9
23	29.11.2023 17:05	65.9
24	29.11.2023 17:10	60.8

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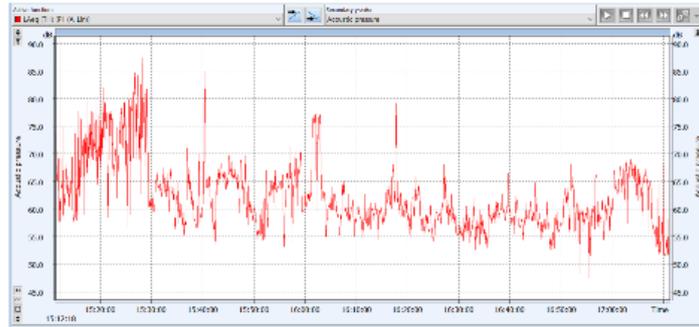
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N2 Measurement		
Date	Location	Distance from Project Area
29.11.2023	Residential Building Yard	50 m.
N2 Measurement Results		
Average	15:10 - 17:10	
	56,6	
5 Minute Average		
1	29.11.2023 15:15	54,6
2	29.11.2023 15:20	56,0
3	29.11.2023 15:25	58,5
4	29.11.2023 15:30	55,2
5	29.11.2023 15:35	53,5
6	29.11.2023 15:40	53,2
7	29.11.2023 15:45	55,6
8	29.11.2023 15:50	52,9
9	29.11.2023 15:55	52,3
10	29.11.2023 16:00	54,8
11	29.11.2023 16:05	62,0
12	29.11.2023 16:10	62,7
13	29.11.2023 16:15	61,0
14	29.11.2023 16:20	58,5
15	29.11.2023 16:25	54,9
16	29.11.2023 16:30	56,3
17	29.11.2023 16:35	55,3
18	29.11.2023 16:40	59,3
19	29.11.2023 16:45	60,5
20	29.11.2023 16:50	59,8
21	29.11.2023 16:55	56,3
22	29.11.2023 17:00	55,0
23	29.11.2023 17:05	57,7
24	29.11.2023 17:10	53,4

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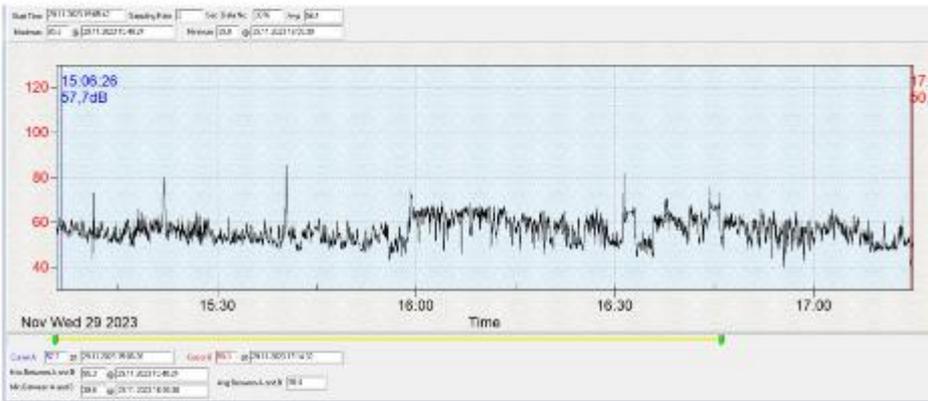
Annex N2: Graphical Data for Noise Measurement

Graphical data for noise measurement- N1 point (Construction Site)



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Graphical data for noise measurement- N2 point (At the residential House)



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Annex IV: Vibration Measurement Results (Protocols)

Measurement period N0	
1. General	
1.1 Person in charge	Asiil Bursalıoğlu - Head of the Examination Lab
1.2 Measurement period	29.11.2023 15:00:45 - 29.11.2023 17:12:06
2. Kind of vibration	
2.1 Location	Construction Works
2.2 Operating conditions	High intensity work
3. Structure	
3.1 Name and address	Çay Mahallesi
3.2 Classification	Belong to a residential house. Open space from these side
3.3 Description	Residential building. According to DIN 4150-3, N2 category of building (residential and similar buildings)
4. Location and position	
4.1 Source of vibration	



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3. Environmental conditions	open space from these side, South-East corner
4. Subjective observations	The vibration of the working spot does not affect the general condition
7. Measuring chain	Triaxial Vibration Meter VM409 Serial number: 180665 Calibration Date: May 2023 Measurement method: DIN 4150-3 Sensor type: Geol. Frequency range: 1-80 Hz Trigger mode: 8dB + average Measurement processing and report generation done with VM40MTE software.
8. Measurement results	8.1 Form chart

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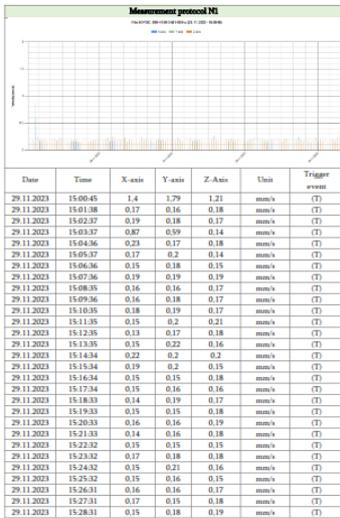


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Measurement period N1						
29.11.2023	15:29:31	0.17	0.2	0.2	mm/s	(T)
29.11.2023	15:30:30	0.18	0.17	0.15	mm/s	(T)
29.11.2023	15:31:30	0.17	0.17	0.18	mm/s	(T)
29.11.2023	15:32:30	0.18	0.2	0.16	mm/s	(T)
29.11.2023	15:33:30	0.19	0.23	0.15	mm/s	(T)
29.11.2023	15:34:29	0.16	0.18	0.18	mm/s	(T)
29.11.2023	15:35:29	0.17	0.15	0.25	mm/s	(T)
29.11.2023	15:36:29	0.17	0.18	0.25	mm/s	(T)
29.11.2023	15:37:29	0.14	0.18	0.19	mm/s	(T)
29.11.2023	15:38:29	0.17	0.21	0.19	mm/s	(T)
29.11.2023	15:40:29	0.13	0.22	0.23	mm/s	(T)
29.11.2023	15:41:28	0.15	0.16	0.15	mm/s	(T)
29.11.2023	15:42:28	0.16	0.18	0.19	mm/s	(T)
29.11.2023	15:43:27	0.16	0.2	0.15	mm/s	(T)
29.11.2023	15:44:27	0.16	0.17	0.13	mm/s	(T)
29.11.2023	15:45:27	0.15	0.17	0.17	mm/s	(T)
29.11.2023	15:46:27	0.16	0.17	0.18	mm/s	(T)
29.11.2023	15:47:26	0.16	0.19	0.23	mm/s	(T)
29.11.2023	15:48:26	0.17	0.18	0.18	mm/s	(T)
29.11.2023	15:49:26	0.19	0.2	0.19	mm/s	(T)
29.11.2023	15:50:26	0.17	0.19	0.17	mm/s	(T)
29.11.2023	15:51:25	0.17	0.24	0.14	mm/s	(T)
29.11.2023	15:52:25	0.17	0.17	0.14	mm/s	(T)
29.11.2023	15:53:25	0.18	0.17	0.18	mm/s	(T)
29.11.2023	15:54:25	0.21	0.17	0.18	mm/s	(T)
29.11.2023	15:55:25	0.15	0.19	0.17	mm/s	(T)
29.11.2023	15:56:24	0.2	0.18	0.18	mm/s	(T)
29.11.2023	15:57:24	0.14	0.15	0.17	mm/s	(T)
29.11.2023	15:58:23	0.17	0.23	0.17	mm/s	(T)
29.11.2023	15:59:24	0.19	0.19	0.18	mm/s	(T)
29.11.2023	16:00:23	0.16	0.19	0.19	mm/s	(T)
29.11.2023	16:01:23	0.15	0.18	0.16	mm/s	(T)
29.11.2023	16:02:23	0.18	0.16	0.22	mm/s	(T)
29.11.2023	16:03:22	0.17	0.2	0.18	mm/s	(T)
29.11.2023	16:04:23	0.17	0.16	0.14	mm/s	(T)
29.11.2023	16:05:22	0.16	0.17	0.18	mm/s	(T)
29.11.2023	16:06:22	0.17	0.19	0.18	mm/s	(T)
29.11.2023	16:07:21	0.17	0.18	0.22	mm/s	(T)
29.11.2023	16:08:21	0.18	0.16	0.17	mm/s	(T)
29.11.2023	16:09:21	0.2	0.16	0.16	mm/s	(T)
29.11.2023	16:10:21	0.16	0.19	0.16	mm/s	(T)
29.11.2023	16:11:21	0.18	0.19	0.14	mm/s	(T)
29.11.2023	16:12:20	0.17	0.17	0.16	mm/s	(T)
29.11.2023	16:13:20	0.17	0.15	0.17	mm/s	(T)

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Measurement protocol NI						
29.11.2023	16:14:20	0.17	0.18	0.14	mm/s	(T)
29.11.2023	16:15:20	0.17	0.14	0.17	mm/s	(T)
29.11.2023	16:16:19	0.16	0.21	0.18	mm/s	(T)
29.11.2023	16:17:19	0.26	0.16	0.21	mm/s	(T)
29.11.2023	16:18:18	0.16	0.19	0.18	mm/s	(T)
29.11.2023	16:19:19	0.15	0.16	0.18	mm/s	(T)
29.11.2023	16:20:19	0.16	0.16	0.19	mm/s	(T)
29.11.2023	16:21:18	0.17	0.16	0.14	mm/s	(T)
29.11.2023	16:22:18	0.15	0.21	0.16	mm/s	(T)
29.11.2023	16:23:17	0.15	0.15	0.2	mm/s	(T)
29.11.2023	16:24:18	0.16	0.17	0.21	mm/s	(T)
29.11.2023	16:25:17	0.17	0.19	0.16	mm/s	(T)
29.11.2023	16:26:17	0.16	0.16	0.18	mm/s	(T)
29.11.2023	16:27:17	0.16	0.18	0.2	mm/s	(T)
29.11.2023	16:28:16	0.16	0.17	0.19	mm/s	(T)
29.11.2023	16:29:17	0.18	0.17	0.18	mm/s	(T)
29.11.2023	16:30:16	0.15	0.16	0.16	mm/s	(T)
29.11.2023	16:31:16	0.17	0.16	0.17	mm/s	(T)
29.11.2023	16:32:15	0.2	0.17	0.18	mm/s	(T)
29.11.2023	16:33:15	0.2	0.14	0.13	mm/s	(T)
29.11.2023	16:34:15	0.23	0.22	0.15	mm/s	(T)
29.11.2023	16:35:15	0.23	0.17	0.22	mm/s	(T)
29.11.2023	16:36:15	0.16	0.17	0.2	mm/s	(T)
29.11.2023	16:37:14	0.16	0.2	0.17	mm/s	(T)
29.11.2023	16:38:14	0.19	0.19	0.15	mm/s	(T)
29.11.2023	16:39:13	0.14	0.18	0.14	mm/s	(T)
29.11.2023	16:40:14	0.15	0.18	0.17	mm/s	(T)
29.11.2023	16:41:14	0.19	0.19	0.18	mm/s	(T)
29.11.2023	16:42:13	0.2	0.16	0.16	mm/s	(T)
29.11.2023	16:43:13	0.17	0.22	0.2	mm/s	(T)
29.11.2023	16:44:12	0.2	0.17	0.16	mm/s	(T)
29.11.2023	16:45:12	0.15	0.16	0.16	mm/s	(T)
29.11.2023	16:46:12	0.17	0.19	0.2	mm/s	(T)
29.11.2023	16:47:12	0.21	0.2	0.18	mm/s	(T)
29.11.2023	16:48:12	0.19	0.18	0.16	mm/s	(T)
29.11.2023	16:49:11	0.2	0.22	0.14	mm/s	(T)
29.11.2023	16:50:11	0.18	0.2	0.15	mm/s	(T)
29.11.2023	16:51:11	0.15	0.19	0.15	mm/s	(T)
29.11.2023	16:52:11	0.24	0.14	0.18	mm/s	(T)
29.11.2023	16:53:11	0.15	0.19	0.14	mm/s	(T)
29.11.2023	16:54:10	0.17	0.17	0.16	mm/s	(T)
29.11.2023	16:55:10	0.15	0.2	0.15	mm/s	(T)
29.11.2023	16:56:09	0.14	0.17	0.18	mm/s	(T)
29.11.2023	16:57:10	0.14	0.16	0.14	mm/s	(T)
29.11.2023	16:58:09	0.15	0.18	0.14	mm/s	(T)

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Conducted Survey Report

Construction of a waste water treatment plant in Mersinli

Measurement protocol NI						
29.11.2023	16:59:09	0.18	0.15	0.23	mm/s	(T)
29.11.2023	17:00:09	0.14	0.17	0.16	mm/s	(T)
29.11.2023	17:01:08	0.15	0.19	0.19	mm/s	(T)
29.11.2023	17:02:08	0.17	0.16	0.16	mm/s	(T)
29.11.2023	17:03:08	0.19	0.17	0.16	mm/s	(T)
29.11.2023	17:04:08	0.14	0.16	0.17	mm/s	(T)
29.11.2023	17:05:07	0.18	0.19	0.17	mm/s	(T)
29.11.2023	17:06:07	0.15	0.19	0.19	mm/s	(T)
29.11.2023	17:07:07	0.12	0.16	0.18	mm/s	(T)
29.11.2023	17:08:07	0.18	0.21	0.15	mm/s	(T)
29.11.2023	17:09:07	0.14	0.22	0.22	mm/s	(T)
29.11.2023	17:10:06	0.16	0.2	0.15	mm/s	(T)
29.11.2023	17:11:06	0.14	0.19	0.14	mm/s	(T)
29.11.2023	17:12:06	0.42	0.53	0.52	mm/s	(T)
29.11.2023	17:12:08	0.42	0.53	0.52	mm/s	END

Generated vibration from construction works does not affect the overall condition

9. Evaluation

10. Signa

Signature: 

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Conducted Survey Report

Construction of a waste water treatment plant in Mersinli

Annex N5: Results of Measurements of Particulate Matter

Index	Date Time	Monitor ID	Location ID	PM10 (µg/m³)	PM2.5 (µg/m³)
1	29 Nov 2023 15:13	1	1	25	20
2	29 Nov 2023 15:14	1	1	15	12
3	29 Nov 2023 15:15	1	1	23	14
4	29 Nov 2023 15:16	1	1	21	16
5	29 Nov 2023 15:17	1	1	24	16
6	29 Nov 2023 15:18	1	1	16	9
7	29 Nov 2023 15:19	1	1	14	9
8	29 Nov 2023 15:20	1	1	23	13
9	29 Nov 2023 15:21	1	1	29	12
10	29 Nov 2023 15:22	1	1	26	15
11	29 Nov 2023 15:23	1	1	12	9
12	29 Nov 2023 15:24	1	1	11	8
13	29 Nov 2023 15:25	1	1	11	9
14	29 Nov 2023 15:26	1	1	12	8
15	29 Nov 2023 15:27	1	1	13	8
16	29 Nov 2023 15:28	1	1	203	30
17	29 Nov 2023 15:29	1	1	52	15
18	29 Nov 2023 15:30	1	1	12	10
19	29 Nov 2023 15:31	1	1	12	9
20	29 Nov 2023 15:32	1	1	14	10
20 min. Average					
21	29 Nov 2023 15:33	1	1	28	9
22	29 Nov 2023 15:34	1	1	18	18
23	29 Nov 2023 15:35	1	1	30	18
24	29 Nov 2023 15:36	1	1	27	15
25	29 Nov 2023 15:37	1	1	20	18
26	29 Nov 2023 15:38	1	1	20	16
27	29 Nov 2023 15:39	1	1	22	14
28	29 Nov 2023 15:40	1	1	27	18
29	29 Nov 2023 15:41	1	1	30	9
30	29 Nov 2023 15:42	1	1	26	9
31	29 Nov 2023 15:43	1	1	19	9
32	29 Nov 2023 15:44	1	1	21	19
33	29 Nov 2023 15:45	1	1	18	10
34	29 Nov 2023 15:46	1	1	16	15
35	29 Nov 2023 15:47	1	1	18	13
36	29 Nov 2023 15:48	1	1	27	12
37	29 Nov 2023 15:49	1	1	27	10
38	29 Nov 2023 15:50	1	1	15	17
39	29 Nov 2023 15:51	1	1	22	12
40	29 Nov 2023 15:52	1	1	26	15
20 min. Average					
41	29 Nov 2023 15:53	1	1	25	9

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Conducted Survey Report

Construction of a waste water treatment plant in Mersinli

Index	Date Time	Monitor ID	Location ID	PM10 (µg/m³)	PM2.5 (µg/m³)
42	29 Nov 2023 15:54	1	1	18	10
43	29 Nov 2023 15:55	1	1	17	10
44	29 Nov 2023 15:56	1	1	29	15
45	29 Nov 2023 15:57	1	1	18	12
46	29 Nov 2023 15:58	1	1	25	10
47	29 Nov 2023 15:59	1	1	25	19
48	29 Nov 2023 16:00	1	1	28	18
49	29 Nov 2023 16:01	1	1	17	13
50	29 Nov 2023 16:02	1	1	30	17
51	29 Nov 2023 16:03	1	1	29	17
52	29 Nov 2023 16:04	1	1	22	19
53	29 Nov 2023 16:05	1	1	25	13
54	29 Nov 2023 16:06	1	1	19	17
55	29 Nov 2023 16:07	1	1	17	9
56	29 Nov 2023 16:08	1	1	20	18
57	29 Nov 2023 16:09	1	1	20	10
58	29 Nov 2023 16:10	1	1	16	17
59	29 Nov 2023 16:11	1	1	16	17
60	29 Nov 2023 16:12	1	1	23	14
20 min. Average					
61	29 Nov 2023 16:13	1	1	20	13
62	29 Nov 2023 16:14	1	1	15	16
63	29 Nov 2023 16:15	1	1	18	10
64	29 Nov 2023 16:16	1	1	28	13
65	29 Nov 2023 16:17	1	1	23	13
66	29 Nov 2023 16:18	1	1	22	10
67	29 Nov 2023 16:19	1	1	28	10
68	29 Nov 2023 16:20	1	1	26	12
69	29 Nov 2023 16:21	1	1	22	12
70	29 Nov 2023 16:22	1	1	30	18
71	29 Nov 2023 16:23	1	1	22	19
72	29 Nov 2023 16:24	1	1	26	12
73	29 Nov 2023 16:25	1	1	26	12
74	29 Nov 2023 16:26	1	1	26	16
75	29 Nov 2023 16:27	1	1	18	16
76	29 Nov 2023 16:28	1	1	30	19
77	29 Nov 2023 16:29	1	1	29	15
78	29 Nov 2023 16:30	1	1	20	18
79	29 Nov 2023 16:31	1	1	21	12
80	29 Nov 2023 16:32	1	1	26	19
20 min. Average					
81	29 Nov 2023 16:33	1	1	20	16
82	29 Nov 2023 16:34	1	1	25	12
83	29 Nov 2023 16:35	1	1	16	9
84	29 Nov 2023 16:36	1	1	30	11

Fig 34 / 41

Conducted Survey Report

Construction of a waste water treatment plant in Mersin

Index	Date Time	Monitor ID	Location ID	PM10 (µg/m³)	PM2.5 (µg/m³)
85	29 Nov 2023 16:37	1	1	29	10
86	29 Nov 2023 16:38	1	1	29	10
87	29 Nov 2023 16:39	1	1	22	11
88	29 Nov 2023 16:40	1	1	28	15
89	29 Nov 2023 16:41	1	1	24	18
90	29 Nov 2023 16:42	1	1	24	19
91	29 Nov 2023 16:43	1	1	30	9
92	29 Nov 2023 16:44	1	1	20	11
93	29 Nov 2023 16:45	1	1	18	10
94	29 Nov 2023 16:46	1	1	21	16
95	29 Nov 2023 16:47	1	1	27	19
96	29 Nov 2023 16:48	1	1	16	18
97	29 Nov 2023 16:49	1	1	22	12
98	29 Nov 2023 16:50	1	1	23	9
99	29 Nov 2023 16:51	1	1	28	17
100	29 Nov 2023 16:52	1	1	29	10
20 min. Average				24	13
101	29 Nov 2023 16:53	1	1	20	13
102	29 Nov 2023 16:54	1	1	20	11
103	29 Nov 2023 16:55	1	1	28	11
104	29 Nov 2023 16:56	1	1	28	12
105	29 Nov 2023 16:57	1	1	25	12
106	29 Nov 2023 16:58	1	1	22	10
107	29 Nov 2023 16:59	1	1	25	12
108	29 Nov 2023 17:00	1	1	18	18
109	29 Nov 2023 17:01	1	1	25	10
110	29 Nov 2023 17:02	1	1	25	17
111	29 Nov 2023 17:03	1	1	20	15
112	29 Nov 2023 17:04	1	1	18	13
113	29 Nov 2023 17:05	1	1	16	19
114	29 Nov 2023 17:06	1	1	20	18
115	29 Nov 2023 17:07	1	1	28	14
116	29 Nov 2023 17:08	1	1	19	15
117	29 Nov 2023 17:09	1	1	30	12
118	29 Nov 2023 17:10	1	1	18	11
119	29 Nov 2023 17:11	1	1	28	11
120	29 Nov 2023 17:12	1	1	17	16
20 min. Average				25	14
2 Hour Average				24	14

Fig. 25 41

Contract Survey Report



ISO 14001:2015

İzmir Büyükşehir Belediyesi Çevre Koruma ve Kontrol Dairesi Başkanlığı Müdürlüğü



ISO 14001:2015

İzmir Büyükşehir Belediyesi Çevre Koruma ve Kontrol Dairesi Başkanlığı Müdürlüğü



İzmir Büyükşehir Belediyesi Çevre Koruma ve Kontrol Dairesi Başkanlığı Müdürlüğü



Ճանաչման ԿԻՄԱՆԻՍՏՆԵՐԻ ԿԱՐԴԱՆԻՑՆԵՐԻ ԿՐԱՍՊԱՅԵԿ

Մայրամուհի I	Մայրամուհի II
	

Կրկնաթղթերի փոխադրում

11 0 4

ԳՐԱԳՐԱԿԱՆ ԿՐԱՍՊԱՅԵԿ

ԳՐԱԳՐԱԿԱՆ ԿՐԱՍՊԱՅԵԿ	ԳՐԱԳՐԱԿԱՆ ԿՐԱՍՊԱՅԵԿ
	

Կրկնաթղթերի փոխադրում

11 0 4

ENVIRONMENTAL QUALITY MEASUREMENT OF AIR, NOISE AND VIBRATION, MAR-01/LOT-01, LOT-02, LOT-03 AND LOT-06



CHINA GEO-ENGINEERING CORPORATION

ENVIRONMENTAL MONITORING REPORT FOR URBAN

SERVICES IMPROVEMENT INVESTMENT PROGRAM

(CONSTRUCTION OF WATER SUPPLY AND WASTEWATER

SYSTEMS IN MARMELLI (LOT2, LOT3))

PREPARED BY:
DG CONSULTING

FINAL VERSION
NOVEMBER 2023

DG Consulting Ltd

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Urban Services Improvement Investment Program, Construction 11/2023 Page 2 of 17

1. General Information and Brief Description of Conducted Activities

Date of Conducted Monitoring Activities: NOVEMBER

Based on the agreement with Client (City of Toronto) DG Consulting was commissioned to carry out environmental monitoring activities for the "Urban Services Improvement Investment Program (USIP)" in Marmell (LOT 1, LOT 2). The purpose of the program is to improve the water supply, distribution network, and sewage services in the City of Toronto. For this purpose, the project has a construction phase. During this phase, various construction activities were carried out.

Monitoring activities were carried out using the monitoring methodology developed by DG Consulting. Monitoring points were placed near the construction site and the location of each point is detailed in the monitoring location map attached to this report.

Monitoring activities were carried out on November 03, 2023, in clear, weather conditions. The average temperature at the afternoon was 12.14°C.

The location of monitoring points is provided in Figure 1.1.1. The GPS coordinates for the monitoring points are provided in the Table 1.1.1.

Table 1.1.1 GPS Coordinates of monitoring points

Monitoring Point	X	Y	Altitude
NVD 1	450720	470100	402 m
NVD 2	450720	470100	402 m

Note: Vibration and Dust monitoring point

DG Consulting Ltd

Urban Services Improvement Investment Program_EnvMonitoring

11/2023

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DG Consulting Ltd

Below are the aerial and ground level photographs of the location of the pipes for the suitable pipe and a
 description of the construction details.

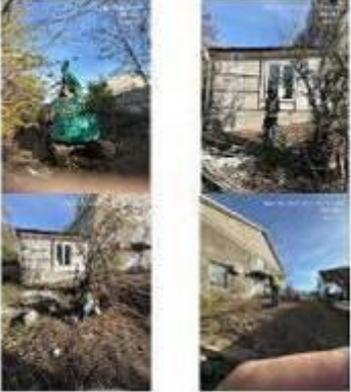


Figure 2.1.3 - WVO 1

The WVO pipe is located in the section of the main line (S) 100m from the start of the sewerage
 network, for the pipe section as shown in the plan. The existing pipe was closed on the night of
 the closed section, the access was provided to the area during the monitoring process.



Figure 2.1.4 - WVO 2

Access to the section shown in (1). The works included the excavation, tracking, and installation of water
 supply pipe. The excavator and other heavy equipment were standing on the site, the access to the end
 of the local road was closed as the monitoring process.

2 Results of Monitoring Activities

2.1 Noise

Noise monitoring was carried out at both selected points. The measurement included 1/1 minute sound
 during the monitoring period, the weather was excellent and. Suitable for the conditions
 area.

The noise measurement results are provided in table 2.1.1 and graphs are given in figure 2.1.2.

Parameter	WVO 1 (dB)	WVO 2 (dB)
LAeq	55.5	62.2
LAmax	55.0	59.7
LAmin	44.0	52.0
L90	51.1	57.7
L10	51.8	58.0

According to the legislation of Georgia, near buildings of sleep and living, the maximum permissible noise
 level during the day is 55 dB.

Exceeding the permissible noise level was observed at both monitoring points. The exceedance of noise
 level at the both points is significant, i.e. 48 in addition, the L10 parameter, which shows the average
 value of the 90% part of the noise level recorded during the test run, has a low value, which shows that
 the measured noise level is not constant. As for the WVO point 2, the exceedance of the permissible noise level
 is relatively high and amounts to 7 dB. The exceedance can be explained by several permissible reasons,
 including intense traffic and pedestrian movement, noise from the local road, outdoor work of the
 residents etc. Additional noise level monitoring is recommended for this area to determine the actual
 intensity of the high noise level.

*Order of the Minister of Labor, Health and Social Protection of Georgia No. 2017N, August 28, 2002 - on the approval of the
 norms of the qualitative state of the environment. Code - 753.10.001.11.1.2007.028

Figure 2.1.2 - The sound graphs of the noise monitoring sessions



2.5. Air Quality

Dust concentration in ambient air was measured at the same points, the same time as the noise and vibration measurements.

The average concentration levels are below the limits set by the Georgian legislation, which is 0.150 mg/m³ (50 microgram (µg)). The results of dust measuring are given in the form of both tables and graphs.

Table 2.3.1 Dust concentration measurement results – NV2.1

Monitoring point	PM ₁₀			PM _{2.5}		
	30-minute average value	min	max	30-minute average value	min	max
NV2.1	20	9	33	9	2	17
Monitoring point	PM ₁₀ µg/m ³					
NV2.1	20	9	33	9	2	17

Table 2.3.2 Dust concentration measurement results – NV2.2

Monitoring point	PM ₁₀			PM _{2.5}		
	30-minute average value	min	max	30-minute average value	min	max
NV2.2	12	25	117	25	9	53
Monitoring point	PM ₁₀ µg/m ³					
NV2.2	12	25	117	25	9	53

measurement graphs below:

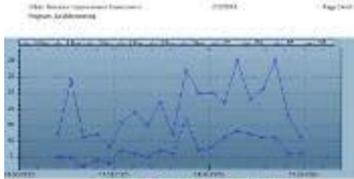


Figure 2.3.1 The dust monitoring results at NV2.1

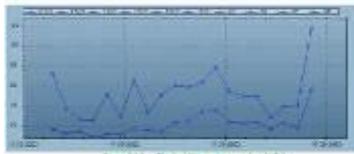


Figure 2.3.2 The dust monitoring results at NV2.2

The monitoring results show that at both NV2 points, the dust concentration is far less than the allowed limit.

Annex 1. Identifying Methodology and Equipment

Noise Level Measurement

The noise level measurements were implemented in accordance with the British Standard BS 6841:2000 "Prediction and assessment of environmental noise". The dust concentration measurements in the ambient air were conducted in accordance to the EU standards.

The monitoring points were selected to represent the impact of the construction on local population as residential or public.

Noise Measurement Equipment

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

- Rose HX-72, First class noise measurement device;
- Vibrocheck, WS-26;
- 3-lead;
- SD Card;



Noise measuring device Rose HX-72

Vibrocheck WS-26



3-lead

SD Card

Noise measurement range: 0-133 dB

Noise measurement's were done for one 30-minute session for each monitoring points.

Vibration Level Measurements

The vibration level measurements are conducted using the Instantel Micromate 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 Micromate 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 Micromate 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 Micromate 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.



Instantel Micromate vibration monitoring device

Dust Concentration Measurements

Dust monitoring was conducted according to the EU standards. The equipment, which was used during the measurement are Trotec PC220, which is installed in the specially designed environmental enclosure, which allows the aerosol to measure dust concentration in ambient air in the field conditions.

Before starting the measurements, Zero Calibration is done regularly, 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 Calibration.



Tracer (PC220 model) installed in Environmental Enclosure



Zero Calibrator

Zero calibrator is attached to the side of the Tracer PC220. Calibration is done before starting the monitoring for the purpose of further correct measurements.

MEASUREMENT OF AIR POLUSION, NOISE AND VIBRATION UNDER MAR-01/LOT-05/LOT-06, 18 OCTOBER 2023

საქართველო
შპს „ნასტო გრუპ“
შრომის და გარემოს პირობების
მონიტორინგი

Georgia
Ltd „Nasto Group“
monitoring and working conditions
and Environmental

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ს.ს „ქოლაი თილ თაი ხაიი ვე თიჯანტ-ის დილაილი საქართველოში“
JSC „Polat Yul Yul Sanaï Ve Tijaant Branch in Georgia“
ხმერის და ვიბრაციის გაზომვის შედეგები 18.10.2023 10:20-11:30
Results of Noise and Vibration measurements on 18.10.2023 10:20-11:30

#	გზომვის წერტილის Measurement Point		გზომვის შედეგები Measurement Results				
	ადგილმდებარეობის Location	კოორდინატ ები Coordinates	ხმური დბ Noise A max/min dB	ვიბრო სიჩქარე Vibro speed		ვიბრო აჩქარება Vibro Acceleration	
				მწვენი/ს dB	დბ	მწ2 m/s ²	დბ dB
1.	ბოლნისი ვორცხელის 53 მიმდებარე ლუტი 4 Bolnisi, near Gogasani 53 Lot 4	0461386 4589304	71,4	<0.1	<66	<0.1	<100
2.	ბოლნისი კ. გამსხურების 2 მიმდებარე ლუტი 5 Bolnisi, near K. Gamsakhurdia 2 Lot 5	0463464 4587951	74,6	<0.1	<66	0.1	100

ხერის აზოტის დიოქსიდის, ნახშირბადის მონოოქსიდის და მტვერი დანბნურების
გზომვის შედეგები 18.10.2023 10:20-11:30
Results of Measurements of Air Pollution with Nitrogen Dioxide, Carbon Monoxide and dust on
18.10.2023 10:20-11:30

#	გზომვის წერტილის Measurement Point		გზომვის შედეგები მგ/მ ³ Measurement Results Mg/m ³		
	ადგილმდებარეობის Location	კოორდინატ ები Coordinates	აზოტის დიოქსიდი Nitrogen Dioxide	ნახშირბადის მონოოქსიდი Carbon Monoxide	მტვერი Dust
1.	ბოლნისი ვორცხელის 53 მიმდებარე ლუტი 4 Bolnisi, near Gogasani 53 Lot 4	0461386 4589304	0.019	0.21	0.056
2.	ბოლნისი კ. გამსხურების 2 მიმდებარე ლუტი 5 Bolnisi, near K. Gamsakhurdia 2 Lot 5	0463464 4587951	0.016	0.13	0.013

გზომვის დროს გამოყენებული ხელსაწყოები, During measurement tools used:
-დამტყვინაობა/ Dust – Gamsa Gel 712, თვლიკაღობილი წყლიანი და ობტაკური
ფილტრით/Self-calibration zero and optical filter
-ხმური/Noise – Mini Sound level meter NR3CC;
-ვიბრაცია/Vibration – Smart Sensor AR63B Vibration Meter;
აზოტის დიოქსიდის და ნახშირბადის მონოოქსიდის - Nitrogen Dioxide and Carbon Monoxide –
AeroQual 500;

2001 წლის 16 აგვისტოს, საქართველოს შრომის, ჯანმრთელობის და სოციალური დაცვის
მინისტრის ბრძანება #297/ნ, გარემოს ხარისხობრივი მდგომარეობის ნორმების დამტკიცებ
შესახებ/ August 16, 2001, The the Minister of Labor, Health, and Social affairs of Georgia #297/N
approval environmental quality of the norms:

- დამტვერიანობის ნორმა შეადგენს 0,5მგ/მ³; Dust norm is 0,5 mg/m³
- აზოტის დიოქსიდის ნორმა შეადგენს 0,2 მგ/მ³; Nitrogen Dioxide norm is 0,2 mg/m³
- ნახშირბადის მონოოქსიდის ნორმა შეადგენს 5 მგ/მ³; /Carbon Monoxide norm is 5,0 mg/m³
- ვიბროსიჩქარის ნორმა შეადგენს 112დბ/ Vibro speed norm is 112 dB
- ვიბროაჩქარების ნორმა სპეციალური დამცავი საშუალებების გამოყენების გარეშე - 126 დბ
Vibro Acceleration norm special protective outlets without using - 126 dB

დირექტორი: ნ. გაბუნია
Director N. Gabunia

ტექნიკური შემსრულებელი ს. ხაცავა
Technical Contractor S. Khatsava

ANNEX B: PHOTOS OF SITES

MAR-02, CONSTRUCTION OF WWTP IN MARNEULI

Photo N1



Photo N2



Photo N3



Photo N4



PHOTO N2 – MAR-01 – (LOT-01, LOT-02, LOT-03 and LOT-06), CAMP Site

Photo N1 – Rehabilitation of City Reservoir in Marneuli



Photo N2



Photo N3



REHABILITATION OF THE WATER SUPPLE SYSTEME IN MARNEULI MAR-01

PHOTO N4



MAR-01/LOT-04, LOT-05 (Construction of sewerage system and collector in Bolnsi)

Photo N5



Photo N6



Photo N7



**CAMP (LOT-04, LOT-05)
Photo N8**



Photo N9



Photo of Mission



ANNEX C: NON-COMPLIANCE NOTICE, MAR-01/LOT-04, LOT-05

31 JANUARY 2023

Photos

ANNEX I – NON-COMPLIANCE NOTICE

Non-compliance Notice Prepared: 31 January 2023

Project: URB Contract No: JOP-04 Contractor: LLC of "POLIFVOD"	Non-Compliance Notice
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Reference:
CONSTRUCTION OF SEWERAGE NETWORK IN BOUNIS CITY LOT II

On 30th January 2023 I visited the site to check the site. I'd like to inform you that I found few items non-compliance and please solve these problems ASAP. This notice is to advise you, the prime Contractor, on the referenced Contract, of the following notice on environmental measures to be implemented.

NON-COMPLIANCE IS:

SEWERAGE NETWORK BOUNIS:

- Safety/warning signs/tapes and trench site barriers around of deep open trenches must be installed to avoid accident;
- Walls of the deep trenches (>1.5m) must be strengthened by boards to avoid landfall of the soil and accidents (workers damage);
- Construction activities information signs must be installed at each construction segment;
- Providing wooden walkways/planks across trenches for pedestrians and metal sheets where vehicle access is required;
- Increasing workforce to complete the work in minimum time;
- Workers always must use complete set of PPEs – Safety helmets – safety shoes – protective clothing/reflective vests – safety gloves.



Environmental Expert: Nikolai Nephantsov

Signature: 

NON-COMPLIANCE NOTICE, MAR-02 – WWTP, 23 SEPTEMBER 2023

Visit report
23 September 2023

Project : Urban Services Improvement Investment Program (USIIP), Georgia	Non-compliance Notice
Contract MAR 02	
Contractor INSI TOSHIBA	
Reference : Construction of Waste Water Treatment Plant in Marneuli	

On 23 September I visited the Marneuli WWTP site. I checked the ongoing activities. As I mentioned previous visit report, I am satisfied of checking the site, but now there is serious problem about the storage of the construction materials and working tools, about the cleaning the site, about the segregation of the

Urban Services Investment Improvement Programme (USIIP), Trench 6 – Construction of Wastewater Treatment Plant in Marneuli – Monthly Progress Report No. 48 September 2023



Urban Services Investment Improvement Programme (USIP), Tranche 6 - Construction of Wastewater Treatment Plant in Harare - Monthly Progress Report No. 46 September 2023



The construction site should be cleaned regularly



Urban Services Investment Improvement Programme (USIP), Tranche 6 - Construction of Wastewater Treatment Plant in Harare - Monthly Progress Report No. 46 September 2023



Urban Services Investment Improvement Programme (USIP), Tranche 6 - Construction of Wastewater Treatment Plant in Harare - Monthly Progress Report No. 46 September 2023



Environmental Expert - Nikolai Nephewits

Urban Services Investment Improvement Programme (USIP), Tranche 6 - Construction of Wastewater Treatment Plant in Harare - Monthly Progress Report No. 46 September 2023

waste, there is only one waste bin which is full of waste. The workers don't use the PPE, they are working on the height without safety belt, without helmet, gloves, special shoes etc. Therefore Non-Compliance Notice given to the Contractor to take actions as per Environmental management plan, specifically the measures mentioned below be corrected by 10 October 2023.

NON-COMPLIANCE:

- The construction materials should be stored properly ;
- The working tools & equipment should be stored properly ;
- The waste should be segregated ;
- The waste bins and places should be labelled for identification ;
- The construction site should be cleaned regularly ;
- The workers must use PPE (helmet, gloves, special shoes and safety belt while working on height.

See photos below

Photos

The construction materials should be stored adequately. The working tools should be stored adequately.

NON-COMPLIANCE NOTICE, MAR-01/LOT-01/LOT-02/LOT-03/LOT-06, 11 OCTOBER 2023

Non-Compliance Report Site Visit Report

11 October 2023

Project: Urban Services Improvement Investment Program (USIIP), Georgia Contract: MAR-1 Contractor: China Geo-Engineering Corporation (CGEC) (People's Republic of China)	Non-compliance Notice
(On 11 October I visited the Marwood site and checked ongoing activities - I'd like to inform you that the trenches are open and there is no informational/warning signs and ribbons and shoring 30' deepness as these were residents cars and workers)	

NON-COMPLIANCE

- The informational/warning signs are not installed.
- The trenches are open and there is no shoring.

See photos below

Photos

Checking activities



Environmental Expert - **Walter Nephelbe**

NON-COMPLIANCE NOTICE, MAR-02 WWTP, 25 OCTOBER 2023

Urban Services Improvement Investment Project - Georgia

Date: 25/10/2023

Urban Services Improvement Investment Project - Georgia

Date: 25/10/2023

Page 1 of 4

Page 2 of 4

Non-Compliance Notice

Project: Urban Services Improvement Investment Program, Georgia
Contract No.: UWSO23-02-0000-02
Contractor: Toshiba Water Solutions, P/L (US)
Supervision Consultant: H&I International N.V. (Netherlands)
Reference: Construction of Waste Water Treatment Plant in Marousi (MAR02)

Non-compliance Notice Marousi

This notice is to advise you, the prime Contractor, on the referenced Contract, of the following notice on environmental measures to be implemented urgently.

NON-COMPLIANCE IN MAROUSI (MAR02)

Waste Water Treatment Plant

- Site materials should be arranged properly and cleaned regularly, including construction materials segregation.

Photo #1, Photo #2



- The contractor is required to instruct and train their workforce in the storage and handling of materials and chemicals that can potentially cause soil contamination.
- Construction chemicals should be managed properly.

Photo #3, Photo #4



- Storage of all hazardous material to be safe, under strict control and clearly labelling all dangerous products.
- There should be a special designated area for hazardous and flammable waste with concrete base and sealing.
- No empty cans allowed on the construction site.

Photo #5, Photo #6



- Workers on height are working without safety and health regulations.
- Without life belts and safety equipment.
- The steel steps should also be installed with proper regulations (physical barriers or life ropes).

To be remedied immediately

Photo #6, Photo #7



Urban Services Improvement Investment Project - Georgia

Date: 25/10/2023

Page 3 of 4

Photo #8, Photo #9



- There are open, deep, unprotected trenches on the construction site that impede the movement of personnel and pose a particular danger at night time.

Photo #10, Photo #11



All these conditions have to be remedied within 5 calendar days by the prime Contractor / Toshiba Water Solutions P/L (US).

Date of site visit: 25.10.2023

Site was visited by:

Kerouni Chronachitso
 UWSO/USP Environmental Consultant

Non-compliance Notice Prepared by Kerouni Chronachitso

Urban Services Improvement Investment Project - Georgia

Date: 25/10/2023

Page 4 of 4

NON-COMPLIANCE NOTICE, MAR-01/LOT-01/LOT-02/LOT-03/LOT-06, 25 OCTOBER 2023

Non-Compliance Notice, UWS&CO

Site Visit: 25 October 2023

Project: USIP	Non-Compliance Notice
Contract No.: LOT-01, LOT-02, LOT-03 and LOT-06	CONSTRUCTION OF WATER SUPPLY AND SEWERAGE SYSTEMS IN MARNEULU AND SEWERAGE SYSTEM AND COLLECTOR IN SOLNDRU.
Contractor: China Geowengineering Corporation (CGEC) (People's Republic of China)	
Supervisor Consultant: HILL	
Reference: "CONSTRUCTION OF WATER SUPPLY AND SEWERAGE SYSTEM IN MARNEULU"	USIP/TE/CR/2022/MAR-01

This notice is to advise you, the Contractor, on the referenced Contract, of the following notice on environmental measures to be implemented urgently.

NON-COMPLIANCE IS:

Construction of Jandari Reservoir in Marneulu

- Construction site should be properly fenced from all sides and equipped with lockable gate
- Proper warning and information signs should be arranged at the entrance and perimeter of the site
- High visible safety signposts and trench side barriers around of deep open excavation should be installed from all sides to avoid accidents of local population
- Workers always should use complete PPE and Safety norms during working at height should be provided
- Construction waste should be timely removed from the construction site and disposed properly
- All construction materials should be properly segregated and stored adequately
- Proper waste containers should be installed and labeled (Household waste and Hazardous waste)
- Waste should be placed only at the proper waste container and discharged timely
- Site inventory should be arranged properly and shared regularly
- Electric cables must be arranged in accordance with standards, so that they do not pose any danger to the workers
- Construction waste must be stored in such a way that it does not pose a threat to the health of workers, in particular, nails must be removed from the boards or stored adequately

Construction of water supply and sewerage system in Marneulu

- Adequate and sufficient quantity of Safety/warning signposts and trench side barriers around of deep open trenches should be installed to avoid accident.
- Walls of the deep trenches (>1.5m) should be strengthened by adequate and sufficient quantity of boards to avoid landslide of the soil and accidents (workers' damage).
- Construction activities information signs should be installed at each construction segment.
- Trench construction shall be taken up in small segments, so that work (excavation, pipe laying and refilling) in each segment is completed in a day. **No trenches shall be kept open in the**

- nighttime work hours:**
- Informing all residents and businesses about the nature and duration of any work well in advance so that they can make necessary preparations if needed;
 - **Providing wooden walkways/planks across the deep and open trenches for pedestrians and metal sheets where vehicle access is required;**
 - Increasing workforce to complete the work in minimum time;
 - The contractor shall control traffic movement on the narrow and gravelled streets of Marneulu:
 - Stop, slow, and safely traffic through work or construction sites;
 - Protect local community in the construction zone by regulating traffic flow;
 - Give traffic control directions and signals clearly and precisely so that motorists understand their meaning.

Photos of Jandari Reservoir



Photos of Marneulu WWS Network



All Photo conditions have to be corrected immediately by Contractor and Supervisor

Date of site visit: 25-10-2023

Site Consultant: Environmental Consultant
UWS&CO/USIP

NON-COMPLIANCE NOTICE, MAR-01/LOT-01/LOT-02/LOT-03/LOT-06, 13 NOVEMBER 2023

Non-Compliance Notice, UWSCG

Site Visit: 13 November 2023

Project: USIP	Non-Compliance Notice
Contract No: LOT-01, LOT-02, LOT-03 and LOT-06	CONSTRUCTION OF WATER SUPPLY AND SEWERAGE SYSTEMS IN MARNULI AND SEWERAGE SYSTEM AND COLLECTOR IN BOLNISI, USHUYI&UN2022MAR-01
Contractor: China Geo-engineering Corporation (CGC) (Peoples Republic of China)	
Supervisor Consultant: HILL	
Reference: "CONSTRUCTION OF WATER SUPPLY AND SEWERAGE SYSTEM IN MARNULI"	
This notice is to advise you, the Contractor, on the referenced Contract, of the following notice on environmental measures to be implemented urgently.	
Construction of Sewerage Network in Marnuli	
<ul style="list-style-type: none"> - Proper warning and information signs should be arranged at the entrance and perimeter of the sites; - High visible safety sign/tapes and trench side barriers around of deep open excavation should be installed from all sides to avoid accidents of local population; - Proper walkways/planks across the deep and open trenches should be provided for pedestrians to have access to their residential houses and businesses; - Adequate and sufficient quantity of trench side barriers around of deep open trenches should be installed to avoid accident; - Walls of the deep trenches (>1.5m) should be strengthened by adequate and sufficient quantity of boards to avoid landslide of the soil and accidents (workers damage); - Construction activities information signs should be installed at each construction segment; - Trench construction shall be taken up in small segments not more than 30m (please see relevant EMP and SEMR requirements), so that work (excavation, pipe laying and refilling) in each segment is completed in a day. No trenches shall be kept open in the night/after work hours; - Increasing workforce to complete the work in minimum time; - There is no Backwater Bucket Control on the construction sites this needs specific training of the workers or permanent control of the excavation movement at sites. 	
Photos of Marnuli WWS Network	



Date of site visit: 13.11.2023	
<p>Site Monitoring was carried out by: Salome Mosidze, Head, Division of the Environmental protection and Social Affairs Kate Chomakhidze, Environmental Consultant UWSCG/USIIP</p>	<p>NCN is prepared by Kate Chomakhidze, Environmental Consultant UWSCG/USIIP</p>

NON-COMPLIANCE NOTICE 18 NOVEMBER 2023

Construction of Water Supply and Sewerage Systems in Mameuli and Sewerage System and Collector in Bolnisi – Lots 4&5 - Bolnisi City sewerage Network and Interceptor - Monthly Progress Report No. 24 – November 2023

APPENDIX 8 – Environment Expert’s Site Visit Reports

Visit Report: 18 November 2023

Project: USIIP	Compliance/non-compliance Report
Contract No: LOT-04 & 05	
Contractor: JSC of "POLATYOL"	
<p>On November 18, I was in Bolnisi and I checked the site; where the main works are being carried out in the central part of the city.</p> <p>It should be noted that deep trench works are no longer in progress. The works are mainly determined by the installation of local wells.</p>	
<p>NON-COMPLIANCE:</p> <ul style="list-style-type: none"> ➤ The used tractor does not have a warning sound signal when reversing ➤ Warning signs should be placed on both sides of the street ➤ The ground left on the street should be fenced off with tape and warning signs <p><u>See photos below</u></p>	

NON-COMPLIANCE NOTICE, MAR-01/LOT-01/LOT-02/LOT-03/LOT-06, 12 DECEMBER 2023

Non-Compliance Notice, UWSCG

Site Visit: 12 December 2023

Project: USBP	Non-Compliance Notice
Contract No: LOT-01, LOT-02, LOT-03 and LOT-06	
Contractor: China Geo-engineering Corporation (CGC) (People's Republic of China)	
Supervisor Consultant: HLL	
<p>Reference: "CONSTRUCTION OF WATER SUPPLY AND SEWERAGE SYSTEM IN MAMEULI"</p>	
<p>This notice is to advise you, the Contractor, on the referenced Contract, of the following notice on environmental measures to be implemented urgently.</p>	
<p>NON-COMPLIANCE IN Construction of Kolgiri Headwork in Mameuli</p> <ul style="list-style-type: none"> - Adequate and sufficient quantity of Safety/warning sign/tapes and trench side barriers around all deep open trenches should be installed to avoid accident of workers on construction site. Photo N1, Photo N2 - Site internally should be arranged properly and cleaned regularly. Waste should be placed only at the proper waste container. Construction waste should be timely removed from the construction site and disposed properly. Photo N3 - All construction materials should be properly segregated and stored adequately. Photo N4 - The use of integral drip trays for generators, tanks and other fixed plant is mandatory throughout the project for all construction sites. Photo N4 - Electric cables must be arranged in accordance with standards, so that they do not pose any danger to the workers. Photo N5 	
<p>Photos of Kolgiri Headwork</p> <p>Photo N1 Photo N2</p>  	

Photo N3	Photo N4
	
Photo N5	Photo N6
	
<p>All these conditions have to be remedied immediately by contractor and Supervisor</p>	
<p>Date of site visit: 12.12.2023</p>	
<p>Kala Chavakadze, Environmental Consultant UWSCG/USBP</p>	

ANNEX E: ACIDENT REPORT

Incident Notification Report

Project Number: 43405-026

31.10.2023

GEO: URBAN SERVICES IMPROVEMENT INVESTMENT PROGRAM

TRANCHE 6

*Construction of Water Supply and Wastewater Systems in Marneuli and
Construction of Wastewater System and Collector in Bolnisi (MAR-01-LOT 2)*

1. Basic Information

Date of Incident: 17 October 2023

Time of Incident: 09:40 AM

Location of Incident: Narimanov Street area, City of Marneuli, Georgia

2. Description of the Incident

Daily activities started around 08:00 AM, and about 30 minutes later, programmed excavation of trench was completed, with a length of approximately 10m, and depth of 3m. At this stage shuttering was installed, by this time, the victim, Elbay Mekhtiev entered in the trench, together with him also entered in trench Suleiman Mamedov which was working in area of the trench box. Around 09:40 AM part of the wall of the trench collapsed, fully covering the victim Elbay Mekhtiev, and hitting Suleiman Mamedov in his left arm.

The other colleagues of the victim immediately called the emergency services, 112, and at the same time entered the trench and tried to dig out the victim. The emergency services arrived 10-15 minutes later and they completed the rescue works, whereas the victim was no longer alive.

When the accident occurred, excavation works were completed, and 2 workers were cleaning the previously laid pipe, and the victim was cleaning the part of the pipe which was out of the trench box area, in this precise moment the collapse of the part wall of the trench occurred.

3. Victim Information

Name: Elbay Mekhtiev

Role/Position: Worker

Employer: GB-I Contractors (sub-contractor of China Geo Engineering)

Contact person : Nephew of Elbay Mekhtiev, Farid Mekhtiev +995 558 136 373

4. Witnesses

Victim and witness: Suleiman Mamedov - Worker

Witness: Artz Aliyev - Foreman

Witness: Romeo Khvichia – Operator of Excavator

Witness: Gurban Karaev - Worker

Witness: Gumrak Gumbalov - Worker

Witness: Kamandar Ashirov – Worker

5. Environmental and Safety Conditions

Sunny, clear sky, temperature around 15 degrees Celsius, little wind, no rain in previous days, soil was dry.

6. Immediate Actions Taken

The colleagues present at the location of the victim present at the location, immediately called the emergency services, 112, and at the same time entered the trench and tried to dig out the victim. The emergency services arrived 10-15 minutes later and they completed the rescue works, whereas the victim was no longer alive.

Collective safety Measures available at this location, was 1 set of "Box trenches"

7. Causes of the Incident

In the affected area, the soil conditions are clearly not stable, since the soil is a mix of backfilling materials and agricultural soil. The accident occur when a wall of the trench not covered by the "trench box" collapsed at the precise moment the victim was in that location.

In this particular location and due to the existing soil conditions, the usage of continuous shoring would be the most advisable method to sustain the walls of the trench.

8. Photographic Evidence



9. Remedial works and additional safety measures

In the days that followed the accident, contractor performed additional safety trainings with all workers involved in the projects, this trainings had a special focuses and warnings about not entering in trench before the installation of "trench boxes"

Before resuming any works, that were suspended four mourning and attendance of the funeral of the deceased, Contractor mobilized to sites additional "trench boxes"

Contractor representatives will strictly implement and follow the "Method Statement for

Excavation Backfilling and Compaction Procedure – Earthworks" Doc No.: MAR-01-CGC-MS-LOT2-02

10. Arrangements with the family of the deceased

In accordance with local custom, representatives of the victim's employer (GB-I Contractors) met with the family and within days a private settlement was reached. Copy of this agreement is attached to this report

Attachments: 1) Agreement with family of the victim

2) Method Statement for Excavation Backfilling and Compaction Procedure – Earthworks" Doc No.: MAR-01-CGC

3) Training given to workers