

# Environmental Monitoring Report

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Bi-annual Report  
July–December 2018  
April 2019

## Armenia: North-South Road Corridor Investment Program, Tranche 3

Prepared by “Transport Project Implementation Organization” (TPIO) SNCO for the Ministry of Transport, Communication and Information Technologies (MTCIT) and the Asian Development Bank.

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# Semi-annual Environmental Monitoring Report

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Project Number: 42145  
July- December 2018

Armenia: North-South Road Corridor Investment Program, Tranche 3  
(Financed by the ADB)

Prepared by  
Transport Project Implementation Organization  
Yerevan, Armenia

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## Abbreviations

ADB	Asian Development Bank
CEMP	Contractor's Environmental Management Plan
EMP	Environmental Management Plan
EIA	Environmental Impact Assessment
IEE	Initial Environmental Evaluation
ES	Environmental Specialist
MFF	Multi-tranche Financing Facility
MNP	Ministry of Nature Protection
MOTCIT	Ministry of Transport, Communication and Information Technologies
MoC	Ministry of Culture
SEMP	Site Specific Environmental Management Plan
TMP	Traffic Management Plan
TPIO	Transport Project Implementation Organization" SNCO
EMR	Environmental Monitoring Report

# **1 INTRODUCTION**

## **1.1 Preamble**

This Bi-annual Environmental Monitoring Report covers the time period from July to December of 2018(Number 5).

The Report was prepared with close cooperation with Supervision Consultant, which is the joint venture of SPEA Engineering & IRD Engineering companies.

## **1.2 Headline Information**

Sinohydro Corporation Ltd was hired for reconstruction and improvement of the road section and JV SPEA Engineering & IRD Engineering was recruited for providing supervision consulting services.

Construction works were implemented by Sinohydro Corporation Ltd and its subcontractor S&A mining LLC.

The following construction activities were implemented: soil excavation, clearing and grubbing works, construction of culverts and underpass, embankment. Traffic regulating signs/signals have been installed for safety/security purposes and maintenance of road has been implemented.

In order to ensure the environmental performance, supervision was provided to ensure that the implementation of construction activities meets EMP requirements which is prepared in accordance with ADB Environmental Policy and RA legislation.

Contractor is guided by the EIA and EMP for Tranche 3 as a part of the Bid and Contract documents, Site-specific Environmental Management plans, as well as by the Contractor's Environmental Management Plan prepared by the Contractor that detail on site environmental management requirements implementation and management, particularly construction impacts mitigation, monitoring and reporting requirements in order to ensure the environmental performance. Compliance with EMP is being regularly monitored and reported.

## 2 PROJECT DESCRIPTION AND CURRENT ACTIVITIES

### 2.1 Project Description

1. The RA has selected the Bavra-Yerevan-Agarak route as the North-South Road Corridor to be rehabilitated, reconstructed and expanded and has appointed “Transport Project Implementation Organization” SNCO (TPIO) of the Ministry of Transport, Communication and Information Technologies (MOTCIT) to co-ordinate the work.
2. The Multi-tranche Financing Facility (MFF) is designed to rehabilitate and upgrade national north-south roads to form a new, upgraded and expanded North-South highway. The main objective is to widen the existing 2-lane roads (often in poor condition) to become 4-lane divided roads along existing alignments wherever possible or to construct new alternate 2-lane roads where a single 4-lane road would not be feasible.
3. The Asian Development Bank has provided a loan in the framework of the MFF for the North-South Road Corridor Investment Program to the Government of Armenia to cover the cost of Reconstruction and Improvement of Talin—Lanjik road Section (Km 71+500 to Km 90+200) of M1 Talin—Gyumri Road.
4. The Tranche 3 Project starts at km 71+500 in Talin community and end at km 90+200 close to Lanjik community – about 18.7km. This road is currently a 2<sup>nd</sup> category and has 2 opposite traffic lanes. After reconstruction this road section is expected to be 1<sup>st</sup> category with cement concrete pavement.
5. The reconstruction of 9 overpasses on M2 Yerevan-Artashat and M1 Yerevan-Ashtarak is financed from cost savings from Tranche 3. These works are being carried out by local contractors and are supervised by the Supervising Consultant/Engineer for Tranche 3.

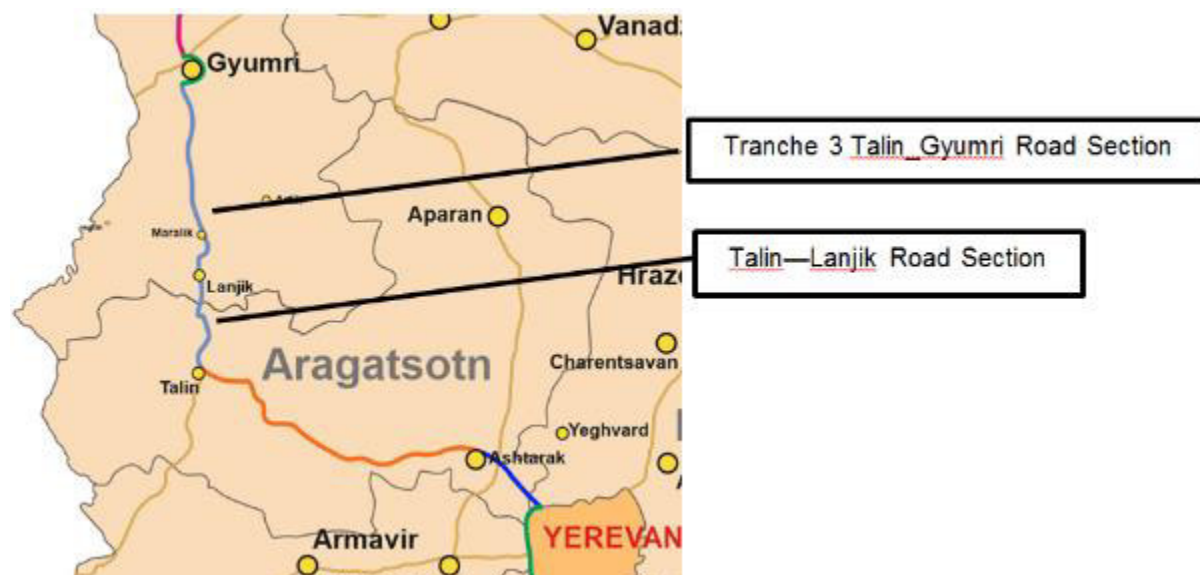


Figure 1. Tranche 3 of North-South Road Corridor



## **2.2 Project Contracts and Management**

ADB carry out periodic Project reviews, inspections of the Project throughout the Project cycle in conformity with the principles and requirements embodied in the SPS 2009. ADB will provide assistance to the TPIO in managing the social and environmental impacts and risks, thus contributing to the promotion of the long-term sustainability of investments.

*Contact information:*

*Phone number:* +374-10-546371 , +374-10-546372 , +374-10-546373

*www.adb.org/armenia*

Transport Project Implementation Organization is implementing day-to-day management of project execution. The TPIO includes a Social and Environmental staff whose responsibilities include the management of all environmental aspects of the project.

*Contact information:*

*Phone number:* +37412 201009 , +37412 201010

*Email:* info@tpio.am

*www.tpio.am*

The Supervision Consultant/Engineer carries out all construction supervision activities and reporting of the project. Environmental Safeguards Unit of the Consultant is responsible for supervising the construction works in relation to environmental and archaeological impact and, in particular, for supervising and reporting on the Contractor's performance in the implementation of the EMP.

*Contact information:*

*Email:* t3\_talinlanjik\_spea\_ird@irdeng.com

Contractors are implementing construction works. Contractor's Environmental Unit is responsible for preparation and implementation of Contractors' EMPs, SSEMPs, monitoring of the construction activities and reporting.

*Contact information:*

*Email:* sinohydro\_am\_tl@163.com

### *TPIO Environmental and Social Staff*

The Project Impact Management activities are undertaken by Head of Environmental Impact Management Service; and Environmental and archaeological Specialist:

Mr. Gevorg Afyan - Head of Environmental Impact Management Service is responsible for Environmental management of the project and compliance with the national environmental legislation of the RA and safeguard policies of financing Donors during the preparation and implementation of the Projects, including design, construction and supervision.

Mr. Mikael Tevosyan - Environmental and Archaeological Specialist is responsible for the compliance of the projects to safeguard policies of financing Donors and RA legislation.

### *Consultant Environmental Safeguards Unit*

Presently the Consultant Environmental Safeguard Unit consists of:

Ms. Edita Vardgesyan - Environmental Specialist (ES), is responsible for the overall management of the environmental safeguards. She employed on a contractual basis. During the reporting period her inputs were: 6 days per month.

Mr. Boris Gasparyan - Archaeological Specialist (AS), responsible for the consultancy on archaeological issues in the road section, compliance of the construction activities to the Armenian archaeological related legislation and inspection visits to the borrow pit, dumping and concrete plant sites with archaeological evaluation purposes. During the reporting period his inputs were: 6 days per month.

### *Contractor's Health and Safety, Environmental, Archaeological and Social Unit*

The Unit is staffed by five people:

Mr. Zhong Zhen Min, the HSE Director, is responsible for the overall management of the Unit;

Mr. Hovhannes Tovmasyan - Environmental Specialist, to assist the HSE director on the environmental management plan implementation;

Mr. Martin Asatryan - Social Impact Specialist, is responsible for the compliance of the Contractor's activities to social part of the ADB Safeguard Policy Statement;

Mr. Ashot Revazyan - Security and Health Specialist is responsible for the compliance of the Contractor's activities to health and safety part of the ADB Safeguard Policy Statement.

Mr. Artur Petrosyan - Archaeologist, is responsible for protection of historical, cultural and archaeological monuments from negative impacts of the construction activities within framework of the EMP implementation;

### 2.3 Project Activities During Current Reporting Period

During reporting period, the following works were continued by the Contractor, i.e. earthworks (clearing and grubbing; common, unsuitable and rock excavation; embankment; subgrade), drainage works (water culverts and syphons), concrete works (underpasses and agricultural underpasses), asphalt works, works on base, subbase and concrete pavement, and works on utilities.

Figure 1: Culvert work at Km76 + 000



Figure 1: Excavation at Km80+700 to Km 80+900



Figure 2: Km81+95 to Km81+100 Embankment



The total number of staffs of the Contractor and Sub Contractor through during the current period was 262. The workforce consisted of 25 Chinese Nationals and 167 Armenian Nationals. The total number of Sub Contractor's staff was 70.

The distribution of the Contractor's peak staff Nos.:

Management, Engineering, Supervisory Technical staff: 15

General Labour: 70

Skilled Labour: 31

Heavy Machinery Operators: 66

Administrative and support: 10

Subcontractor 70

## **2.4 Description of Any Changes to Project Design**

No changes with regards to the design took place during the reporting period.

## **2.5 Description of Any Changes to Agreed Construction methods**

### *Change of Embankment layer thickness*

Specific changes requested include increasing the thickness of each embankment layer from 30 cm to 60 cm; also increasing the maximum rock size from 200 to 300 cm and increasing the thickness of culvert backfill layer thickness from the specified 15 cm to 30 cm. The proposed changes include changing the test methods specified to check the compaction and density of the layers.

The Engineer in principle had not been opposed to the requested changes mainly because this is an accepted practice in much of the World as well, the embankment materials used on the project have been consistently good. The Engineer provided a summary report to the Employer regarding the increase in the embankment layer thickness. The Employer provided a letter of no objection on 03 December 2018 (letter No.1672).

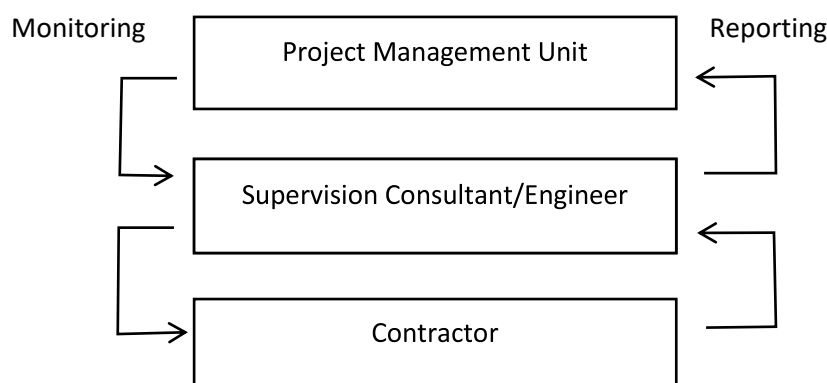
### 3 ENVIRONMENTAL SAFEGUARD ACTIVITIES

#### 3.1 General Description of Environmental Safeguard Activities

Transport Project Implementation Organization is implementing day-to-day management of project execution. The TPIO includes a Social and Environmental staff whose responsibilities include the management of all environmental aspects of the project

The Supervision Consultant/Engineer carries out all construction supervision activities and reporting of the project. Environmental Safeguards Unit of the Consultant is responsible for supervising the construction works in relation to environmental and archaeological impact and, in particular, for supervising and reporting on the Contractor's performance in the implementation of the EMP.

Contractors are implementing construction works. Contractor's Environmental Unit is responsible for preparation and implementation of Contractors' EMPs, SSEMPs, monitoring of the construction activities and reporting.



### 3.2 Site Audits

During the reporting period site audits were carried out according the Monitoring program developed based on the ADB Safeguards and EMP requirements. Unscheduled audit visits were carried out when needed. The following site audits were undertaken:

- Regular audit site visits on weekly basis by contractors' environmental specialists. The audits have been done according to the approved checklist template.
- Regular audit site visits on monthly basis by engineer's environmental specialist. The audits have been done according to the approved checklist template.
- The TPIO environmental specialists participated in some of the audit site visits of the engineer's environmental specialist, but not less than once in a quarter.

Only the site visit planned for December was not implemented by the Engineer's ES due to the unfavourable weather conditions and very limited scale of environmental related civil works. Periodically monitoring visits also conducted by the TPIO based on the necessity, but at least once in a quarter as well as TPIO participated in the ADB mission.

An ADB mission visit took place on October 30, 2018. Participants of the visit were: from ADB – Mrs. Armine Yedigaryan, ADB NEC; from the TPIO - Mr. Mikael Tevosyan; from the Engineer - Mrs. Edita Vardgesyan, ES; from the Contractor - Mr. Hovhannes Tovmasyan, Environmental Specialist, Mr. Ashot Revazyan, Security and Health Specialist and Mr. Martin Asatryan, Social Impact Specialist. The mission visited construction sites, topsoil and dump sites, concrete plant area as well as archaeological sites of Tranche 3, Talin-Lanjik Section.

Details of the site audits are presented in Annex C. No any significant trends observed. Non-compliances observed during the reporting period was mainly corrected.

All the details presented in the Engineer's Monthly and Quarterly reports.

### 3.3 Issues Tracking (Based on Non-Conformance Notices)

During the reporting period, by the letter TL/IT/TR3/WS/18-336 dated November 30, 2018 Contractor was notified that the constant delay in weekly reports is an ongoing non-compliance issue which no longer will be tolerated.

**Table 3-1 Summary of Issues Tracking Activity for Current Period**

Summary Table	
Total Number of Issues for Project	11

<b>Number of Open Issues</b>	-
<b>Number of Closed Issues</b>	-
<b>Percentage Closed</b>	-
<b>Issues Opened This Reporting Period</b>	1
<b>Issues Closed This Reporting Period</b>	0

### 3.4 Trends

Due to the fact that for previous period trends has not been considered information only regarding the current period is presented below taking into account the Non-Compliance Notices;

Quarterly Report No	Total No of Issues	% issues Closed	% issues closed late
3	0	0	0
4	1	0	0

### 3.5 Unanticipated Environmental Impacts or Risks

There is no unanticipated environmental impacts or risks occurred during the reporting period.



## **4 RESULTS OF ENVIRONMENTAL MONITORING**

### **4.1 Overview of Monitoring Conducted during Current Period**

Instrumented measurements and monitoring of environmental parameters (dust, noise, water and vibration) during the reporting period has been implemented at the following points: N 1 (Dust, Noise, Vibration, PK 83+700), N 2 (Dust, PK 85+000), N 4 (Dust, Noise, Vibration, PK 78+500) and N 6 (Dust, PK 75+700). The measurement points are selected based on going construction works criteria.

According to the monitoring reports noise actual levels at measurement point were mainly within the Threshold Limit Values (TLV) set by Sanitary norms, in some cases noise levels exceed TLV, but that was considered as non-significant. The main noise and vibration sources at all noise measurement points are operation of construction equipment and movement of cars and vehicles along the highway. The dust actual concentrations in all measurement points in different daytime periods don't exceed the daily average and maximum permissible concentrations set by the RoA Government Decree No160-N "Norms of maximum permissible concentrations of atmospheric air pollutants in residential areas". At measurement points the actual levels of transport-technological (2nd category) vibration were below the 109 dB TLV.

Water quality monitoring has not been implemented during the reporting period by a reason that the Contractor has not been working in the areas where the water resources exist.

Details of the instrumental measurements presented in Annex D with the summary of the results.

### **4.2 Waste Management**

Currently Contractor has occupied totally 7 sites for permanent disposal of excavated unsuitable subsoil and waste 6 of which are approved by the Engineer.

The following figures recorded on the subsoil excavated during the reporting period; clearing and grubbing 86672 m<sup>3</sup>, common excavation 87802 m<sup>3</sup>, rock excavation 44136m<sup>3</sup>. The part of the subsoil excavated was used for embankment. Some part was temporarily stored at Km 80+000. Around 17057 m<sup>3</sup> was not suitable and was disposed at Talin- 3 DS at km 72+500.

No asphalt was removed during the reporting period.

Liquid waste. Liquid concrete wastewater was properly managed during the reporting period: collected in the Maralik CP pool.

Garbage. The garbage collection bins are installed near the construction sites, Maralik Concrete plant area and near the sub-contractors mobile houses. All the garbage was removed to the Maralik landfill based on the contract with the community.

Issues registered during the reporting period presented in the Annex C

### **4.3 Health and Safety**

#### **4.3.1 Community Health and Safety**

During the reporting period one accident recorded on December 1, 2018 with fatal outcome. The Engineer was informed belatedly, only within the MPR for December submitted in January. The accident/ incident report form was completed by Contractor and attached to the MPR December. According to this report 2 public traffic cars crashed to each other, the injured people (4) were taken to the hospital, the 2 of them died. The road police were informed and the case is currently under the polices' investigation. According to the preliminary version the reason of the accident was that one of the cars not - permitted entered to the opposite traffic side. Details will be provided in the future reports.

#### **4.3.2 Worker Safety and Health**

No any accident recorded during the reporting period

Regular toolbox talks conducted at the site with the workers of Contractor and its sub-contractors.

### **4.4 Training**

Health and Safety trainings held on August 22, 2018. The participants were the drivers of Sinohydro Corporation LLC. About 27 were presented. The topic was the safety of the drivers.

*Photos and MoM's of the trainings*



The training about archaeological component and chance finds procedure was conducted on 17 of August 2018 in the territory of the barrow pit in km 86+400. Drivers and management staff of the Contractor and Sub-Contractor have been participated on the training. The training was organized by environmental team of the Contractor and Engineering companies.

The following topics were presented to the participants:

- The concept of Archaeology and Archaeological component
- Introduction of the places where archaeological units along the highway Talin – Gyumri are situated
- The role and importance of archaeology and archeological component.
- Basic regulations
- Present actions that have to be undertaken in case of encountering of any archaeological materials or units

It aims to provide detailed information to the participants about the places where the archaeological units are located along the highway. Stress on the fact that within the protection zone it is forbidden: to use the area for parking of heavy construction machinery / equipment, to use it as storage for the construction materials. Construction works should be carried out carefully. In case of explosions, heavy equipment used in the vicinity, it is necessary to consider their impact on the monuments. Explain the actions that have to be undertaken in case of encountering any archaeological materials or units.

*Photos and MoM's of the trainings*

Հյուսիս-հարավ բանապահային միջանցի ենթակառուցման ծրագիր, Տրանչե 3 և 4-րդ - Գյումրի հատված  
 “North South Road Corridor” Investment Program, Tranche 3, 4. Talin - Gyumri section  
 Km 71+500 - km 117+670

List of participates / Մասնակիցների ցանկ

## **5 FUNCTIONING OF THE SEMP**

### **5.1 SEMP Review**

The Contractor is mainly complied with all the requirements set in SEMP's/CEMP. Effectiveness of the SEMP's/CEMP considered as high level, changes do not need.

Following SEMP's have been approved during the reporting period;

- The SEMP for the temporary storage area Mastara-TSA-1 at 79+600 is approved by Engineer on November 30, 2018.
- The SEMP for dump sites Mastara-9 DS located at 83+000 and Mastara-6 DS located at Km 79+ 500 approved on July 27, 2018.

Detailed information about the SEMP's is presented in the Annex B.

## **6 GOOD PRACTICE AND OPPORTUNITY FOR IMPROVEMENT**

### **6.1 Good Practice**

During the reporting period as a good practice it is worth mentioning that a tree planting event organized instead of cut trees in accordance to the Tree management plan on November 2, 2018. Totally 320 trees were planted by the sub- contracted company Aremnia Tree Project at the location designated by Talin community. The same company will implement also the further maintenance of trees until the hand over to the community.



### **6.2 Opportunities for Improvement**

New Manual provided by the ADB might be one of the necessary tools to improve the overall safeguard management of the Project. Contractor and Engineer staff should be trained accordingly to comply with the new requirements of reporting.



## **7 GRIEVENCE REDRESS MECHANISM**

### **7.1 Grievances**

xxxx

No any environmental grievance recorded during the reporting period.



## 8 SUMMARY AND RECOMMENDATIONS

- During the reporting period the program has ensured the compliance of Project activities to the national legislation such as Contractor's regular environmental reports submitted to RA MNP in accordance with Armenian legislation: 4th quarter of 2017, 1st quarter of 2018 and annual statistic report for 2017; all necessary communication with local (communities) and territorial administrative authorities (marzes) took place, as well as permits and approvals obtained for any use of territories and roads outside of RoW.
- Also, the compliance with the requirements of ADB environmental safeguard was ensured such as Contractor's environmental management plans, approval of Site-specific Environmental Management Plans containing the identification of site-specific environmental impacts, risk assessment and mitigation measures by the Project in pursuance of ADB SPS (2009) requirements on information disclosure and public participation, ADB conducted review missions to check compliance of the Program activities
- Environmental safeguard reviews were conducted within ADB audit mission. All recommendations were taken into account.
- Grievance redress mechanism has been established in all communities where construction works have been implemented. Preconstruction public consultation and other regular communication with impacted communities took place and the proper functioning of grievance redress mechanism in all communities regularly checked.
- Data on topsoil volumes stripped and stockpiled in Tranche 3 by the end of reporting period presented in the Annex B. New sites for topsoil stockpiling were not opened by the Contractor.
- Project related issues were regularly communicated with the environmental specialists of TPIO and Engineer, as well as Contractor's management and environmental team.
- All generated suitable subsoil was re-used for embankment; other unsuitable part was partially was temporarily stored at Km 80+000 and disposed at Talin- 3 DS at km 72+500. Asphalt waste is not generated during the reporting period.
- Currently 5 sites from 23 are in use, and 14 sites are temporary stopped (see Annex B). New quarries or borrow sites for material were not opened.

- Operation of the concrete plant and camp areas are continuously monitored and generally are satisfactory.
- *Archaeology*: The following activities took place during the reporting period;
  - ✓ The excavation at Mastara 1 Early Bronze Age settlement of Mastara archaeological Complex (km 80+400- km 80+500), as well as excavations at Mastara 1 Neolithic – Chalcolithic site of Mastara archaeological Complex (km 79+650 – km 79+700) are completed.
  - ✓ A warning signs indicating the presence of an anchor was placed on the territory of the site located near the km 79+700 (near stone crashing workshop).
  - ✓ The subcontractor - Institute of Archaeology and Ethnography of the NAS RA has completed researches and rescue excavations near the barrow pit exploited at km 86 + 400 (Mastara community) at the recorded possible archaeological units and has informed the Ministry of Culture.
- Ambient measurements of dust, noise and vibration were performed during the reporting period except December month, because of bad weather conditions.

## ANNEX A: Photos of construction process

<p>Culvert work at Km78+443</p> 	<p>Subgrade surface at Km82+850</p> 
<p>Km71+700 to Km72+025 Embankment</p> 	<p>KM 73+350 – KM 73+550</p> 
<p>KM 79+625</p> 	<p>KM 79+625 – KM 79+800</p> 
<p>Warning sign board in km 79+700 near stone crashing workshop</p>	<p>Excavations in Mastara-1 Early Bronze Age settlement (km 80+400)</p>





Orthophoto of the Mastara-1 complex Neolithic – Chalcolithic settlement on km 79+650 – km 79+700



Orthophoto of the archaeological area near stone crushing workshop in km 79+900



Orthophoto of the Mastara-1 complex Early Bronze Age – Hellenistic Settlement on km 80+400 – km 80+500



Orthophoto of the barrow pit and the archaeological area on km 86+400





**ANNEX B: Status of SEMP's for Tranche 3, Talin-Lanjik Section and operation of the sites as of December 31, 2018**

No	Name of site	Pk Km	SMP approved (Y/N)	Status of operation		
				Temporarily stopped	Currently being operated	Operation not started
Topsoil sites (TSS)						
1	Mastara-7 TSS	76+600	Y/ SEMP is approved on November 6, 2017			
2	Mastara-4 TSS	80+800	Y/ SEMP is approved on October 12, 2017			
3	Mastara-1 TSS	81+200	Y/ SEMP is approved on October 12, 2017			
4	Mastara-5 TSS	85+200	Y/ SEMP is approved on October 12, 2017			
5	Lanjik-4 TSS	87+000	Y/ approved on January 13, 2017			
6	Lanjik- 1TSS	87+300	Y/ approved on January 13, 2017			
Excavated subsoil dump sites (DS)						
7	Talin -3 DS	72+750	Y/ approved on March 13, 2018			
8	Mastara-6 DS	79+500	Y/ approved on July 27, 2018			
9	Mastara-3 DS	80+800	Y/SEMP is approved on			

			October 24, 2017			
10	Mastara-2 DS	82+300	Y/ SEMP is approved on October 24, 2017			
11	Mastara-9 DS	83+000	Y/ approved on July 27, 2018			
12	Lanjik-5 DS	87+200	N/ rejected			
13	Lanjik-2 DS	88+500	Y/ approved on March 9, 2017			
<b>Sites for borrowing subsoil for embankment (BP)</b>						
14	Mastara-BP-1	86+400	Y/ approved on March 13, 2018			
15	Lanjik	87+500	No			
16	Lanjik	87+400	No			
<b>Temporary storage of subsoil</b>						
17	Mastara	79+600	Yes/ approved on Nov 30, 2018			
18	Mastara	80+000	No			
19	Maralik	next to CP	Yes/ approved on Dec 17, 2018			
<b>Concrete plants (CP)</b>						
20	Maralik		Y/conditional approved on March 9, 2017/ update requested			
<b>Crasher machine area (CM)</b>						



21	Mastara	79+500	Y/ approved on May 4, 2018			
<b>Construction camp (CC)</b>						
22	Talin		Y/ approved on March 9, 2017			
23	Maralik		Y/ approved on March 9, 2017			

### ANNEX C: Non-compliances Detected During Monitoring Visits in Reporting Period

	Reference	Requirement	Action to date	Action required/comment
1.	Contractor is operating 2 dump sites without Engineer's approval	SEMPs and sites operation shall be acceptable by Engineer	Improved	All the SEMP's for those dump sites are submitted to the Engineer and approved.
2.	The Contractor entered the surrounding private fields without permission	The Contractor is required do not enter surrounding private fields without permission and restore impacted lands	Improved	The Contractor is required do not enter surrounding private fields without permission.. Appropriate instruction were provided by TPIO and Engineer. Toolbox talks for the Contractors staff provided by TPIO during the reporting period. Damage to the lands have been compensated to the owners satisfaction, as well as land restoration works done as per need.
3.	Dumping of material outside, at the edge of the ROW, without Engineer's approval	The Contractor is required to move the all dumped material from outside of the ROW to the approved dumping sites	Improved	No further actions are required Appropriate instruction were provided by TPIO and Engineer

4.	Some of the trucks were overloaded and not covered entering public roads	trucks entering the public road loaded with earth or bulked material shall be covered	Partially improved	The Contractor shall follow the instruction otherwise non-compliance shall be issued
5.	Insufficient sanitary conditions for workers in the construction sites	Adequate toilets, water as well as proper lanch facilities need to be provided	Partially improved	The Contractor shall follow the instruction otherwise non-compliance shall be issued
6.	Leakages of oil and fuel	Ensure Leakage managed immediately in accordance with SEMP	Partially improved	The Contractor shall follow the instruction otherwise non-compliance shall be issued
7.	Insufficient water spraying as a dust control measure	Ensure proper dust control increasing frequency of water sprinkling	Partially improved	The Contractor shall follow the instruction otherwise non-compliance shall be issued
8.	The stones scattering into the private areas, as well as on the road	Ensure community safety and compensate the damage to the land owners after land restoration	Partially improved	Contractor periodically clean the areas where the collapse is unavoidable. Compensations were provided to the affected persons. The Contractor shall follow the instruction otherwise non-compliance shall be issued
9.	Topsoil stockpiling height levels are not kept	Remove excessive amounts and ensure to 2 m height	Partially improved	Contractor has reduced the height of the stockpiling to some extent but the height still exceeds 2m in some places especially in the middle part

## ANNEX D: Summary of Noise, Dust and Vibration Measurement Results

### Measurement results

Measuring results for each measurement point are presented in testing protocols and summarized in Tables for noise, dust and vibration accordingly.

### Noise, vibration and dust assessment report data

Table 1: Results of noise measurements made at sensitive points during the reporting period compared with baseline noise measurements made on 2016.

### Measurement results

Measuring results for each measurement point are presented in testing protocols and summarized in Tables for noise, dust and vibration accordingly.

### Noise, vibration and dust assessment report data

Table 1: Results of noise measurements made at sensitive points during the reporting period compared with baseline noise measurements.

Measurement time (from - till)	Sound level (equivalent to sound level), LAeq, dBA		Maximum sound level, LAmax, dBA		Threshold limit value (equivalent sound level), dBA	Threshold limit value (maximum sound level), dBA
	operational (31.08.18)	baseline <sup>1</sup> (30.11.16)	operational (31.08.18)	baseline <sup>3</sup> (30.11.16)		
Km 71+150 - 90+200 (Talin-Lanjik section)						
№1 (Km 87+300)						
July, 2018						
11:20-11:30	50.2	59.8	69.1	75.7	55	70
17:15-17:25	60.4	58.0	78.3	77.5		

August, 2018						
11:20-11:30	49.7	59.8	73.8	75.7	55	70
11:20-11:30	49.7	59.8	73.8	75.7		
September, 2018						
11:20-11:30	51.4	59.8	72.6	75.7	55	70
17:15-17:25	66.4	58.0	88.8	77.5		
October, 2018						
11:20-11:30	43.6	59.8	68.7	75.7	55	70
17:15-17:25	45.7	58.0	59	77.5		
November, 2018						
11:20-11:30	48.7	59.8	62.1	75.7	55	70
17:15-17:25	49.4	58.0	66.4	77.5		
№4 (Km 78+500)						
July, 2018						
10:50-11:00	59.7	56.0	77.3	70.0	55	70
17:55-18:05	70	59.2	83.5	71.7		
August, 2018						
10:50-11:00	60.1	56.0	76.6	70.0	55	70
17:55-18:05	58.4	59.2	79.4	71.7		
September, 2018						
10:50-11:00	61.2	56.0	75.7	70.0	55	70
17:55-18:05	76	59.2	89.3	71.7		
October, 2018						
10:50-11:00	58.4	56.0	71.5	70.0	55	70
17:55-18:05	59.2	59.2	77.5	71.7		
November, 2018						
10:50-11:00	61.5	56.0	78.4	70.0	55	70
17:55-18:05	58.1	59.2	75.9	71.7		

Table 2: Results of dust measurements made at sensitive points during the reporting period compared with baseline noise measurements.

Measurement time (from- till)	Dust actual concentration, mg/m <sup>3</sup>		Maximum permissible concentration (MPC) for dust, mg/m <sup>3</sup>	
	operational	baseline	Daily average	Maximum value

<b>Km 71+150 - 90+200 (Talin-Lanjik section)</b>				
<b>№1 (Km 87+300), PM 2.5</b>				
<b>July, 2018</b>				
Average value	0.018	0.005	0.035	0.16
<b>August, 2018</b>				
Average value	0.007	0.005	0.035	0.16
<b>September, 2018</b>				
Average value	0.004	0.005	0.035	0.16
<b>October, 2018</b>				
Average value	0.018	0.005	0.035	0.16
<b>November, 2018</b>				
Average value	0.005	0.005	0.035	0.16
<b>№1 (Km 87+300), PM10</b>				
<b>July, 2018</b>				
Average value	0.044	0.012	0.06	0.3
<b>August, 2018</b>				
Average value	0.016	0.012	0.06	0.3
<b>September, 2018</b>				
Average value	0.011	0.012	0.06	0.3
<b>October, 2018</b>				
Average value	0.037	0.012	0.06	0.3
<b>November, 2018</b>				
Average value	0.012	0.012	0.06	0.3
<b>№2 (Km 85+000), PM2.5</b>				
<b>July, 2018</b>				
Average value	0.018	0.007	0.035	0.16
<b>August, 2018</b>				
Average value	0.01	0.007	0.035	0.16
<b>September, 2018</b>				
Average value	0.005	0.007	0.035	0.16
<b>October, 2018</b>				
Average value	0.02	0.007	0.035	0.16
<b>November, 2018</b>				
Average value	0.008	0.007	0.035	0.16
<b>№2 (Km 85+000), PM10</b>				
<b>July, 2018</b>				
Average value	0.042	0.015	0.06	0.3
<b>August, 2018</b>				
Average value	0.027	0.015	0.06	0.3
<b>September, 2018</b>				
Average value	0.013	0.015	0.06	0.3
<b>October, 2018</b>				
Average value	0.038	0.015	0.06	0.3

<b>November, 2018</b>				
Average value	0.02	0.015	0.06	0.3
<b>№4 (Km 78+500), PM2.5</b>				
<b>July, 2018</b>				
Average value	0.02	0.015	0.035	0.16
<b>August, 2018</b>				
Average value	0.008	0.015	0.035	0.16
<b>September, 2018</b>				
Average value	0.005	0.015	0.035	0.16
<b>October, 2018</b>				
Average value	0.01 5	0.015	0.035	0.16
<b>November, 2018</b>				
Average value	0.026	0.015	0.035	0.16
<b>№4 (Km 78+500), PM10</b>				
<b>July, 2018</b>				
Average value	0.045	0.031	0.06	0.3
<b>August, 2018</b>				
Average value	0.018	0.031	0.06	0.3
<b>September, 2018</b>				
Average value	0.013	0.031	0.06	0.3
<b>October, 2018</b>				
Average value	0.029	0.031	0.06	0.3
<b>November, 2018</b>				
Average value	0.047	0.031	0.06	0.3
<b>№6 (Km 75+700), PM2.5</b>				
<b>July, 2018</b>				
Average value	0.017	0.011	0.035	0.16
<b>August, 2018</b>				
Average value	0.007	0.011	0.035	0.16
<b>September, 2018</b>				
Average value	0.004	0.011	0.035	0.16
<b>October, 2018</b>				
Average value	0.016	0.011	0.035	0.16
<b>November, 2018</b>				
Average value	0.009	0.011	0.035	0.16
<b>№6 (Km 75+700), PM10</b>				
<b>July, 2018</b>				
Average value	0.04	0.024	0.06	0.3
<b>August, 2018</b>				
Average value	0.015	0.024	0.06	0.3
<b>September, 2018</b>				
Average value	0.011	0.024	0.06	0.3
<b>October, 2018</b>				
Average value	0.029	0.024	0.06	0.3

November, 2018				
Average value	0.021	0.024	0.06	0.3

Table 3: Results of vibration measurements made at sensitive points during reporting period (baseline vibration measurements)

Measurement time (from- till)	Vibration actual exposure value, m/s <sup>2</sup>		Vibration exposure action value (EAV), m/s <sup>2</sup>	Vibration exposure limit value (ELV), m/s <sup>2</sup>
	Operational	baseline	Daily average	Maximum value
<b>№1 (Km 87+300)</b>				
Average value of all the measurements during the reporting period	0	0	0.5	1.15
<b>№4 (Km 78+500)</b>				
Average value of all the measurements during the reporting period	0	0	0.5	1.15

## Conclusion

- 55 dBA as equivalent and 70 dBA as maximum noise levels (applied as TLVs for the residential houses) are used for actual noise levels evaluation at point №1 and №4 of Talin-Lanjik section.
- Noise equivalent levels at point №1 of Talin-Lanjik section were within the TLV (55 dBA) set for the territories near the residential houses, while noise maximum levels at point №1 of Talin-Lanjik section were above the TLV (70 dBA) set for the territories near the residential houses.
- Equivalent and maximum noise actual levels at point №4 of Talin-Lanjik section are above the TLVs (55 dBA and 70 dBA accordingly) set by Sanitary norms for the territories near the residential houses.
- The main noise source in both measurement points is operation of construction equipment and movement of cars and vehicles along the highway.
- To decrease the operation noise levels, it is recommended to:
  - Limit the speed of heavy vehicles while passing the residential areas using appropriate warning signs,

- Use modern, technically well maintained and periodically-inspected construction equipment,
- Stop operation of construction equipment at night-time.
- PM2.5 and PM10 (dust particles of 2.5um and 10um accordingly) actual concentrations in all dust measurement points (№1, №2, №4 and №6 of Talin-Lanjik section) don't exceed the daily average and maximum permissible concentrations (MPC) for residential areas set by the RoA Government Decree №160-N "Norms of maximum permissible concentrations of atmospheric air pollutants in residential areas".
- According to the results of vibration instrumental measurements, no vibration exposures were detected near the all vibration measurement points (№1 and №4 of Talin-Lanjik section).

Table 4: Comparison of the local standards with international (IFC performance guidelines)

• **Dust**

№	Name of substance	Maximum Permissible Concentration ( mg/m <sup>3</sup> )		
		National Max	National Daily average	IFC 24 hour
1	PM2.5	0.16	0.035	0.025
2	PM10	0.3	0.06	0.05

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• **Noise**

№	Premises and territories	National	IFC
		Norms (equivalent to sound level), dBA	TLV (equivalent, one hour), dBA
1	Workplace	80	85
2	Shops trading halls, airport and railway stations waiting rooms, drop-off points of public service providers	60	70
3	Territories adjacent to residential buildings, clinics, ambulatories, rest houses, care homes, disabled persons homes, libraries, kinder gardens, schools and other educational facilities	55	55

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• **Vibration**

<b>№</b>	<b>Whole-body vibration</b>	<b>National norms for corrected and equivalent corrected values, dB(A)</b>	<b>IFC Maximum LA<sub>max</sub>, fast, dB(A)</b>	<b>IFC, Equivalent level LA<sub>eq</sub>, 8h, dB(A)</b>
1	Transport-technological (2nd category)	109		
2	Heavy Industry (no demand for oral communication)		110	85

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