

# BI-ANNUAL ENVIRONMENTAL MONITORING REPORT

Loan No. 2560 – GEO  
JULY – DECEMBER 2017



REPUBLIC of GEORGIA: ROAD CORRIDOR INVESTMENT  
PROGRAM – PROJECT 1, CONSTRUCTION SUPERVISION OF  
KOBULETI BYPASS ROAD

FINANCED BY THE ASIAN DEVELOPMENT BANK

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**For:** Roads Department of the Ministry of Regional Development and  
Infrastructure of Georgia  
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January 2018

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## EXECUTIVE SUMMARY AND CONCLUSIONS

1. A segment of the East-West Highway between Azerbaijan and Georgia and part of the Poti – Batumi – Sarpi road along the western coast of the country known as **Adjara Bypass Project** is being constructed by the Government of Georgia under loan financing from the Asian Development Bank. The Project was determined to be a **Category A** environmental project for which an EIA was processed. The total road length is around 45 km, mostly 2-lane (except in the vicinity of the Makhinjauri tunnel where it is connecting to existing 4-lane) with a number of bridges, culverts, retaining walls, and tunnels. Currently, out of the 4 Contract packages, Contract 1 construction work has been completed, and Contract 2 is actively being constructed with Sinohydro Company (China) as the Contractor and supervised by Dohwa Engineering Co., Ltd. (South Korea) as the Engineer.

2. Within the framework of the project's environmental management, the supervision tasks consist of continuous monitoring by the CSC (the Engineer), environmental monitoring and management of project implementation and assistance in ensuring the implementation of environmental management practices at each stage of the construction. The environmental monitoring is to be carried out by an International Environmental Specialist with the support of domestic environmental specialists. The specialists will develop an environmental auditing protocol for the construction period, formulate a detailed environment monitoring and management plan (EMMP), regularly supervise the environmental monitoring, and submit periodic reports based on the monitoring data and laboratory analysis reports. The specialist will also develop a program for hands on training of contractor's staff in implementing the EMMP.

3. During this current monitoring period, a number of environmental and safety issues were observed by the monitoring team and brought to the attention of the Contractor for corrective measures. During the Environmental Monitoring and Inspection Audit carried out in July-December, correspondingly, which was attended by the head of Environmental Division of the Roads Department of Georgia Mr. G. Sopadze, ADB Country Environmental Focal Mr. Duncan Lang and International-Regional Environmental Consultant of RETA of the ADB Mrs. K. Dgebuadze, some environmental, health and safety (EHS) issues were observed which are generally categorized as follows: (i) Main road and access roads; (ii) Camp sites (iii) quarry site, (iv) Rivers crossing the main road (v) general safety concerns, (vi) Documentation and record keeping requirements.

4. Following the inspections of the environmental specialists, an Environmental Action Plan was drafted for the implementation of necessary measures, which is shown in table #12.

## PART I: INTRODUCTION

### 1.1 Project Background and Objective of the Environmental Monitoring Activity

5. The Republic of Georgia, with its 3.72 million people (as of January 1<sup>st</sup>, 2017 – except of occupied territories), is bounded on the north by Russia and the Caucasus mountain range, to the south by Armenia and Turkey, to the west by the Black Sea and the east by Azerbaijan. With reference to ADB's Project Data Sheet (PDS)<sup>1</sup>, the Government of Georgia is intending to develop the subregional multi-corridor to make the most of the country's locational advantage as a transit hub for the Caucasus and for Euro-Asia road transport, particularly by providing a more efficient route for Turkey and Armenia related traffic. This sub-regional multi-corridor will also ensure Government's new strategic vision of the transport network security. The PDS identifies important of development objectives for an efficiently functioning multi-corridors such as (i) reduction of the cost of subregional and international transport, benefiting both the local economy and the economy of the subregion, and thereby stimulating the development of Euro-Asia trade links; (ii) the subregional multi-corridors also serve as principal domestic corridors linking the major cities, ports and tourist centers; (iii) and their development will enhance economic growth through more efficient passenger and freight transport, while enhancing safety.

6. In the ADB's Report Recommendation to the President (RRP, September 2009)<sup>2</sup> the development potentials of the East-West Highway between Azerbaijan and Georgia have been highlighted, with the ports of Poti and Batumi as the exit points in the Black Sea. These ports also serve the same function to the Agrak–Kapan–Yerevan–Bavra road in Armenia with two southern sections in Georgia. A major segment of this trade and tourist route is the 81 km Poti – Batumi – Sarpi road along the western coast of the country. This road segment, mostly located in the Adjara Autonomous Republic, is a key highway for international transit route in Georgia and a major link to beach resorts in Batumi and Kobuleti. During the tourist season, this road experiences a high volume of traffic and significant increase of accidents.

7. Because of these aforementioned issues and features, the Government of Georgia has decided with ADB's assistance, to construct the so-called Adjara Bypass Project along the Black Sea in Adjara region. The Project was determined to be a **Category A** environmental project for which an EIA was processed. The Project will construct a 2-lane new road (45km), except along a 1-km stretch near Makhinjauri tunnel, where it will merge with the existing 4-lane road. In addition, the Project will have a number of new bridges, culverts, retaining walls, and tunnels. The entire project road is packaged into 4 contracts<sup>3</sup> for preparation of detailed designs and implementation as follows:

- Contract 1 – Km 0 to Km 12.4 bypassing Kobuleti Town – a new alignment; widening of existing road from Km 31.3 to Km 33 near Makhinjauri tunnel
- Contract 2 – Km 12.4 to Km 31.3 bypassing Kobuleti Town – a new alignment
- Contract 3 – Km 32.3 to Km 48.470 bypassing Batumi Town – a new alignment

8. For the implementation phase of the project, construction supervision scope has been tendered with the following objectives of ensuring that (i) high quality construction is achieved; (ii) designs are carried out to the appropriate engineering standards; (iii) all work associated with the project are carried out in full compliance with the designs and specifications; (iv) the

<sup>1</sup> ADB-PDS for 41122-023: Loan 2560-GEO: Road Corridor Investment Program - Project 1 (from <http://www.adb.org/projects/41122-023/main>)

<sup>2</sup> ADB. September 2009. RRP - Proposed Multitranchise Financing Facility Georgia: Road Corridor Investment Program

<sup>3</sup> Government of Georgia. MORDI-Department of Roads. February 2012. Environmental Impact Assessment

EA's engineers and domestic consultants receive in-country and international training in selected areas of tunnel design and construction and pavement design; (v) resettlement, social, environmental, road safety, and monitoring are implemented in accordance with the recommendations of various studies, plans, analysis of the project.<sup>4</sup> Contracts 1, 2, are covered in Tranche 1 while Contract 3 will be covered in Tranche 2.

9. As mentioned in the Terms of Reference (ToR) of the Construction Supervision, the environmental aspects would entail environmental monitoring and management of project implementation and assistance in ensuring the implementation of environmental management practices at each stage of the construction. In addition, the environmental specialist will develop an environmental auditing protocol for the construction period, formulate a detailed environment monitoring and management plan (EMMP), regularly supervise the environmental monitoring, and submit periodic reports based on the monitoring data and laboratory analysis reports. The specialist will also develop a program for hands on training of Contractor's staff in implementing the EMMP<sup>5</sup>.

## 1.2 The Project Area

10. The Kobuleti Bypass section is part of the so-called Adjara Bypass Project along the Poti – Batumi – Sarpı road located the western Black Sea coast of Georgia. The project road also forms part of the main road corridor East-West Highway between Azerbaijan and Georgia. Its connection with the Black Sea ports of Batumi and Poti and the tourist beaches in Kobuleti makes this road an important trade and tourism road for Georgia. Information and data on the Project Road has been extensively elaborated in the EIA documents for the project.

11. Focusing on the entire 45 km project road, the first 16 km and the last 4 km of the project road alignment traverses flat terrains of coastal plain with elevations ranging from 0 to 30 m. The rest of the project road runs through a rolling and hilly terrain with elevations ranging from 20 to 192m. In terms of geology, the project area shows manifestation of several tectonical features such as synclines and anticlines, folds and faults. It is underlain by bedrocks which are volcanogenic sedimentary rocks represented mostly by basalts with tuffa, gravellites and marls. The rocks show signs of intense weathering and disintegration due to the wet subtropical climate. As a result the surface strata generally consist of thick deposits of delluvial (loams and clay) and laterites (loam).

12. In terms of climate, the project area falls within the classification of seaside humid subtropical climatic zone with an average rainfall of 2000mm to 2800mm evenly distributed throughout the year, peaking in September and dipping in May. The average monthly temperature ranges from 5°C in winter to 22.5°C in summer; and the average monthly humidity ranges from 73 to 84%, with dominant northeasterly wind direction. The Project road traverses over four (4) major rivers of length more than 15 km, namely Natanebi, Choloki, Kintrishi, and Chakvistskali; five (5) smaller rivers of lengths between 10 and 15 km, viz. Ochkhamuri, Achkva, Kinkishi, Dehkva, and Korolistskali; and 16 streams.

13. The recognized protected areas near the vicinity of the construction site is the Ispani mire, which is also a RAMSAR wetland site (number 894) located around 350 meters away from the Project road between Km 6 to 12 of Section 1. This wetland has an area of 770 ha and contains two parts – Kobuleti State Nature Reserve (Ispani II, the northern area – 331.25 ha) and Kobuleti Managed Reserve (Ispani I, the south west area- 438.75 ha). The Contractor is aware of this site and special attention is paid to avoid any direct impacts to this protected area.

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<sup>4</sup> ADB. 12 March 2010. Outline Terms of Reference for Consultants for Construction Supervision of Tranche I and Tranche II

<sup>5</sup> Ibid

14. The project's ecosystem is generally characterized by pastureland with cornfields, rolling lands, and wetlands. There are 55 species of mammals in the area with the bats considered as the vulnerable terrestrial mammal. The area is considered also as one of the important sites for Western Palaearctic birds' migration, such as eagle, vulture, falcon, and owl; other fowl species found are duck, crane, grebe, pelican, etc. Out of the 54 species of reptiles recorded in Georgia, about 16 reptiles can be found along the Project alignment. Out of 12 species of amphibians that thrive in Georgia, 10 of them exist in the Project area. In terms of fisheries, there are 47 freshwater and anadromus fish species occur in rivers, and streams of Adjara. The Black Sea salmon (*Salmo labrax*) is an endemic and anadromus species that migrates up the rivers of Kintrishi, Chakvistskali, Charkha during the spawning season.

15. The baseline environmental information gathered during the drafting of the EIA for the project is as follows:

**Table 1: Baseline Information for the Project Road**

Environmental Aspect	Parameter	Value
Surface Water Quality	Total dissolved solids (TDS)	44 to 164
	Dissolved Oxygen (DO) concentration	7.6 to 10
	Nitrate content	0.18 to 2.16 mg/l
	Hydrocarbons content	less than 0.2 mg/l
Groundwater Quality	TDS	less than 300 mg/l.
	TDS of spring water near Makhinjauri tunnel	75 mg/l.
	Bicarbonate as the major anion	36 to 246 mg/l
	Calcium as the major cation	5 to 56 mg/l
	Total coliform content in the groundwater wells	1,000 to 2,000
	Total coliform in spring water	50,000
Noise Quality	Background noise levels	27-32dBA
	Noise levels at a distance of 25m from the centre of the existing Poti – Sarpi road	74dBA
Air Quality	Concentrations of dust (PM)	0.025 to 0.89 mg/m <sup>3</sup>
	CO	0.11 to 2.04 mg/m <sup>3</sup>
	No <sub>2</sub>	0.03 to 0.042 mg/m <sup>3</sup>
Soil Quality	Lead content	8 to 19 mg/kg,
	Zinc content	58 to 84 mg/kg
	Cobalt content	10 to 21 mg/kg
	Copper content	13 to 66 mg/kg
	Nickel content	17 to 59 mg/kg.

16. The estimated population based on January 1<sup>st</sup> 2017 in Adjara Region is around 339,000, consisting of 54% living in urban areas and 46% in rural areas. The ethnic groups are Georgian (97%), Armenian (2%), Russian (0.25%), Greeks, Abkhaz, etc. The most populated city is Batumi, with a population of 161,200. The Gross Domestic Product (GDP) of Adjara was estimated to be GEL 1,420 million, contributing to 8% of the GDP of Georgia. The main industries in Adjara are small scale industry, agriculture and tourism. Development of tourism sector is significant, especially, eco-tourism, sea recreational, mountain skiing, village tourism, cruise tourism, birdwatching, cultural tourism, MICE (Meetings, Incentives, conferences, Exhibitions) tourism (for conducting corporate events) and others.

17. There are around 41 archeological sites identified near the Project area. A number of cultural monuments were discovered during the archeological expeditions in the ravines of Rivers

Choloki, Ochkhamuri, Achkva, Kintrishi, Kinkishi, Chakvistskhali, Korolistskhali and Chorokhi. A map of the Project road is shown in Figure 1 below.

18. It is remarkable that in the period January-October 3,04 million tourists visited Georgia. Income from foreign tourism was identified to be 1,1 billion USD and share of tourism in the GDP of country is 6,7%.





### 1.3 Project progress for the reporting period

19. As of the current date, the construction is being carried out on section Km12+400 – Km31+259, bypassing Kobuleti Town. Construction progress since commencement of the works up to date is as follows:

**Table 2: Construction Progress since commencement of construction up to date within the scope of Lot-2**

(Source: Monthly Progress Reports, prepared by the Engineer for the Roads Department of Georgia)

No.	WORK DESCRIPTION	UNIT	DESIGN	ACTUAL	%	REMARKS
<b>Setting Out and Site Clearance</b>						
1	Basic survey and detailed setting out of road and right-of-way:					
	On main road	km	18.858	18,858.00	100.00	
	On interchanges, junctions and local roads	km	8.770	8,770.00	100.00	
	Removal and disposal of wire mesh fences	m	2,615	2,615	100.00	
	Cutting of shrubs, uprooting and transportation	ha	117	109.98	93.69	
	Demolition of Walls	m <sup>3</sup>	200	55.20	27.60	
	Tree felling & removal of Trees greater than 0.1m in girth	each	860	191.00	22.21	
	Demolition of Buildings	m <sup>3</sup>	7,650	7,650.00	100.00	
	Removal & Disposal of Concrete Fences	m	300	31.00	10.33	
<b>Earthwork</b>						
2	Removal of top soil, loading and transportation	m <sup>3</sup>	265,434	265,434	100.00	
	Excavation of soil and disposal (suitable for embankment filling and unsuitable)	m <sup>3</sup>	759,655	759,655	100.00	
	Shaping, leveling and compaction of roadbed surface	m <sup>3</sup>	278,156	278,156	100.00	
	Construction of embankment (from quarry to fill)	m <sup>3</sup>	2,490,134	2,490,134	100.00	
	Transport of Stockpiled topsoil and spread on embankment slopes	m <sup>3</sup>	134,879	112,966	83.75	
	Construction of vertical drainage in weak soils (PVD)	m	548,857	308,406	56.19	
	Sand blanket, 1500 mm thick	m <sup>2</sup>	55,553	54,419	97.96	
	Laying geotextile, 250 g/m <sup>2</sup> , in reinforced embankment	m <sup>2</sup>	55,533	42,845	77.12	
<b>Bridges</b>						
3	Construction of Reinforced Concrete Bored Piles (BR #1,#2,#3,#4,#5,#6, #7,#8,#9,#10,#11,#11.1,#11.2)	ea	1,276	1,276	100.00	

	Bridges #1, #2, #4, #5, #6, #7, #8, #9, #10, #11 Construction of Raft/Cap Foundations	unit	82	82	100.00	
	Bridges #1,#2,#4,#5,#6,#7,#8,#9,#10, #11 Construction of Pier Columns	unit	164	164	100.00	
	Bridges #1,#2,#4, #5,#6,#7,#8,#9, #10,#11 Construction of Cross Beams	unit	82	79	96.34	
	Bridges #1,#2,#3,#4,#5,#6,#7,#8,#9, #10,#11,#11.1,#11.2 Construction of Abutments bodies, Wing & Back Wall	unit	30	30	100.00	
	Bridges #1,#2,#3,#4,#5,#6 Concreting of cast-in-situ reinforced slab	m <sup>3</sup>	2,721	2,721	100.00	
	Bridges #1, #2, #3, #4, #5, #6, #7, #8, #8A, #9 #10 & #11. Installation of Pre-Cast Concrete Sidewalk	m	6,052	6,052	100.00	
	Bridges #1, #2, #3 and #4 Installation of transition slabs	m <sup>3</sup>	207	207	100.00	
	Bridge #7 #8 & #10 Cast In-Situ Concrete Slab	m	1,440	1,440	100.00	
	Bridge #9 Cast In-Situ Concrete Slab	m	1,180	990.00	83.90	Commenced (MSS) Sept. 2016
	Bridge #11 Cast In-Situ Concrete Slab	m	920	920	100.00	Commenced (MSS) May 11, 2015
<b>Reinforced Concrete Culverts/Underpasses</b>						
4	Pipe culvert (pre-cast), d = 1.5 m	unit	40	40	100.00	
	Box culvert (pre-cast), 2.5 x 2.5 m, 4.0 x 2.5 m	unit	16	16	100.00	
	Cast-in-situ box underpass, 5.0 x 6.0 m, 4.0 x 4.0 m	unit	14	14	100.00	Corrugated Pipe #32

<b>Tunnels</b>						
5	<b>(Tunnel #1)</b>					
	Excavation and Removal of Soil (Main Tunnel NATM)	100m <sup>3</sup>	282.56	282.56	100.00	
	Excavation and Removal of Soil (Cut & Cover Tunnel)	Soil 100m <sup>3</sup>	279.77	221.00	78.99	
	Earth anchor construction(Φ105, Φ12.7mm x 4 strand; 10,12&14m)	ea	959	763	79.56	
	Grating Block Concrete (1500x1500x400), Fill Improvement	100m <sup>2</sup>	21.58	17.17	79.54	
	Forepoling, Steel Frames, Waterproofing and Shotcrete Application	m	255.00	255.00	100.00	
	Drainage Pipes	m	1,230.50	1,230.50	100.00	
	Utility Box & Drainage Concrete	100m <sup>3</sup>	25.44	9.29	36.52	
	Main Tunnel (NATM) Lining Concrete	100m <sup>3</sup>	36.07	36.07	100.00	
	Cut & Cover Portal Lining Concrete	100m <sup>3</sup>	8.56	8.00	93.46	
	Tunnel #1 Electrical Construction	l.s.	1.00	0.46	46.00	

	Base-Crushed Aggregate (0-40mm) (Cement Filter)	m3	553.13	553.13	100.00	
	Provide and Apply Prime Coat as specified including preparation of surface	m3	2212.50			
	Provide and Lay Bituminous Base, compacted thickness 100mm	m3	221.25			
	Provide and apply Tack Coat as specified including preparation of surface	m3	4425.00			
	Provide and Lay Asphalt Binder Course, compacted thickness 40mm.	m3	88.50			
	Provide and Lay Asphalt Surface Course, compacted thickness 40mm	m3	88.50			
	(Tunnel #2)					
	Excavation and Removal of Soil (Cut & Cover Tunnel)	1000m <sup>3</sup>	183.49	183.49	100.00	
	Earth anchor construction(Φ105, Φ12.7mm x 4 strand; 15,16&20m)	ea	87	87	100.00	
	Tunnel Foundation Lean Concrete	m	169	169.00	100.00	
	Tunnel Reinforced Concrete Base Slab	m	169	169.00	100.00	
	Main Tunnel Lining Concrete	m	145	36.00	24.83	
	Tunnel Portal Lining Concrete	m	24	12.00	50.00	

<b>Asphalt Pavement</b>						
	<i>Asphalt Pavement – Main Road</i>					
	Provide and Construct Granular Subbase, 320mm thick	m <sup>3</sup>	70,127	70,127	100.00	
	Provide and Lay Granular Base Course, Compacted thickness 150mm	m <sup>2</sup>	181,014	181,014	100.00	
	Provide and Apply Prime Coat as specified including preparation of surface	m <sup>2</sup>	173,378	166,176.93	95.85	
	Provide and Lay Bituminous Base, compacted thickness 100mm	m <sup>2</sup>	172,678	164,933.13	95.51	
6	Provide and apply Tack Coat as specified including preparation of surface	m <sup>2</sup>	343,422	328,008.23	95.51	
	Provide and Lay Asphalt Binder Course, compacted thickness 40mm.	m <sup>2</sup>	171,703	164,003.08	95.52	
	Provide and Lay Asphalt Surface Course, compacted thickness 40mm	m <sup>2</sup>	171,155	163,471.54	95.51	
	<i>Asphalt Pavement – Ramps at Intersection</i>					
	Provide and Construct Granular Sub-base, 260mm thick	m <sup>3</sup>	22,807	10,982.33	48.15	
	Provide and Lay Granular Base Course Compacted thickness 150mm	m <sup>2</sup>	64,514	50,452.64	78.20	

Provide and apply prime coat as specified incl. preparation of surface	m <sup>2</sup>	60,609	32,162.54	53.07	
Provide and Lay Bituminous Binder Course, compacted thickness 100mm	m <sup>2</sup>	60,253	30,851.88	51.20	
Provide and apply Tack Coat as specified including preparation of surface	m <sup>2</sup>	58,899	34,206.78	57.11	
Provide and Lay Asphalt Surface Course, compacted thickness 40mm	m <sup>2</sup>	59,757	34,021.93	56.93	
<i>Gravel Pavement – Service road for local transport</i>					
Provide and Construct Granular Sub-base, 200mm thick	m <sup>3</sup>	3,089	3,089	100.00	
Provide and Lay Granular Base Course Compacted thickness 150mm	m <sup>2</sup>	12,885	12,885.00	100.00	
Provide and apply Tack Coat as specified including preparation of surface	m <sup>2</sup>	24,577.36	24,577.36	100.00	
Provide and Lay Bituminous Binder Course, compacted thickness 60mm	m <sup>2</sup>	11,826	11,826.00	100.00	
Provide and Lay Asphalt Surface Course, compacted thickness 40mm	m <sup>2</sup>	13,694.45	13,694.45	100.00	
<i>Granular Materials for shoulder</i>					
Provide, Lay and Compact Granular Material for shoulders	m <sup>3</sup>	15,540	14,254.31	91.73	
<i>Gravel Pavement – Local Road</i>					
Provide and Construct Granular Leveling Layer for Local Roads	m <sup>3</sup>	1,180	1,162.45	98.51	

#### 1.4 Changes in project organization and environmental management team

20. Environmental monitoring is overseen by the Roads Department, through a special unit called the Resettlement and Environmental Protection Unit. This unit reviews the EIAs and EMPs related to the Roads Department projects and perform monitoring of compliance of the contractor's performance with the approved EMPs, EIAs, environmental standards and other environmental commitments of the contractor. Environmental monitoring in the field is among the work scope of the Engineer (DOHWA), and the tasks of actual monitoring is undertaken by international environmental specialist and two (2) national environmentalists. Spot surveys and assessments of environmental situations and conditions of the project site were conducted to ascertain compliance of the Contractor to the EIA's EMP. Variances from the established baseline environmental parameters were noted and brought to the attention of the Contractor for corrective measures. Whenever necessary, certain modifications on the work program were recommended to assure compliance on the part of the Contractor (Sinohydro Company, China).

21. The Contractor had assigned an environmental, health and safety Director who would be responsible for environmental compliance based on the project EMP (found in the EIA). Likewise, the Contractor has to come up with its own EMP which served also as their guide for their own self-monitoring of the construction's environmental aspects. This is to ensure an efficient monitoring activity at all times.

22. Environmental issues arising from the construction activities should immediately be brought to the attention of the construction supervision team to coordinate efforts in order to immediately mitigate impacts, protect the environment, and safeguard the health and welfare of the local communities. All these are to be conducted within the framework of the overall construction management and supervision. Aspects in the environmental monitoring are reported in a monthly, quarterly and bi-annual basis to the RD (PIU) and ADB. The applied environmental monitoring work coordination set-up for the Project road is represented in Figure 2 below.

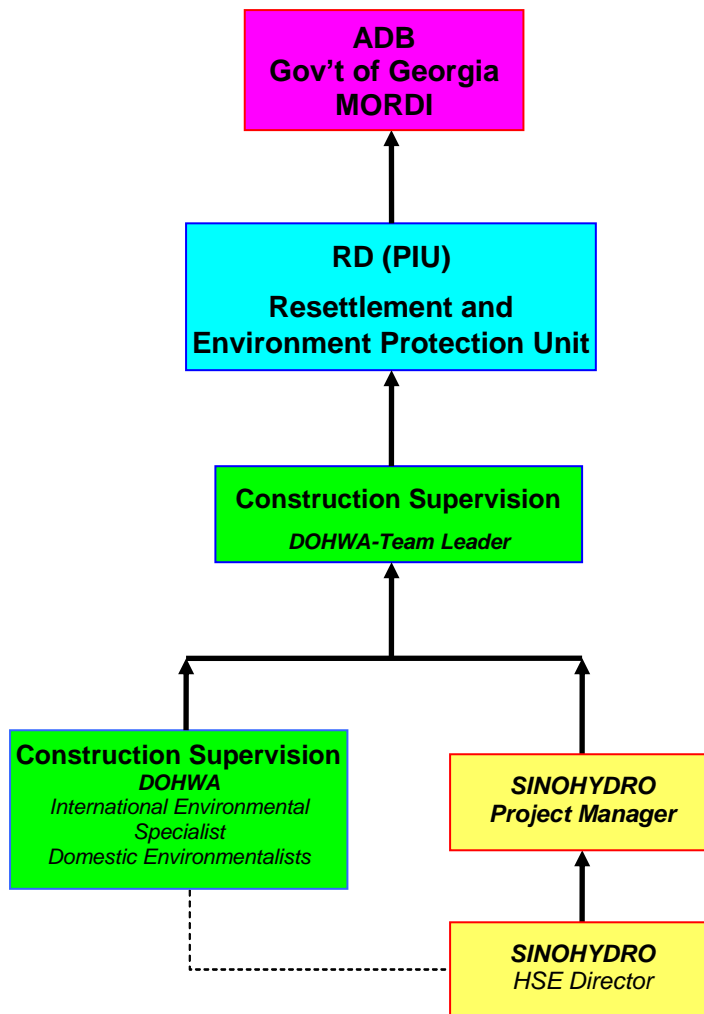


Figure 2: Environmental Monitoring Work Coordination Set-Up

## PART II: ENVIRONMENTAL MONITORING

23. As stated in the Environmental Monitoring Plan of the EIA Report<sup>6</sup> the Contractor should undertake quarterly parametric monitoring of (i) noise and vibration; (ii) surface water quality; (iii) drinking water quality; and (iv) air quality.

Actually, air quality and noise parametric monitoring is carried out on the monthly basis, vibration level in case of necessity, but surface water quality monitoring in case if rivers are effected due to bridge construction activities.

### 2.1 FRAMEWORK FOR ENVIRONMENTAL MONITORING

24. With reference to MFF 0034-GEO: Road Corridor Investment Program - Environmental Assessment and Review Framework<sup>7</sup>, it is stated that “an EMP will be part of the overall project monitoring and supervision, and will be implemented by the Contractor with oversight from the Supervision Consultant (the Engineer) and PMU. Progress on the preparation and implementation and compliance of an EMP (Contractor’s EMP) will be included in the periodic project progress reports. Specific monitoring activities defined in the IEEs or EIAs and EMPs will be carried out by the contractor and monitored by the PMU. RD will submit reports on EMP implementation to ADB for every six months to Category A and B sensitive projects and annually for Category C projects”.

25. The environmental monitoring and management activities for the project is based on the Environmental Impact Assessment (EIA) Reports drafted for the project road component namely the Environmental Impact Assessment Report. ADB Loan No. 2560-GEO - Road Corridor Investment Program (Tranche 1) - Kobuleti Bypass, Kobuleti-Batumi Section and Batumi Bypass Design Project. This EIA report applies to the sections where construction is ongoing. Based on the EIA’s EMP the environmental concerns which need to be monitored and managed are as follows:

**Table 3: Environmental Aspects for the Management and Monitoring**

Environmental Aspect	Subtopics	Frequency & Location
1. Protection of Flora	1.1 Endangered species	Along the entire road section– twice a month.
	1.2 Vegetation clearance	
2. Protection of Fauna	2.1 Construction activities	Along the entire road section– twice a month.
	2.2 Poaching	
3. Protection Fisheries	3.1 Construction of Bridge Substructure	At the bridges: #2 (Riv. Achkva), #4 (Riv. Kintrishi), #5 (Riv. Kinkisha), #7-#8 (Riv. Dekhva), #11 (Riv. Chakvistskali) – once a month.
	3.2 Construction works in the rivers and on the surrounding lands.	
4 Waste Management	4.1 General Waste	Campsites: Choloki, Ochkhamuri, Laituri, Bobokvati, Chakvi – once a month.
	4.2 Spoil	
	4.3 Hazardous Waste	
5. Fuels and	5.1 Fuels and hazardous goods.	Campsites: Choloki,

<sup>6</sup> Government of Georgia. MORDI-Department of Roads. February 2012. Environmental Impact Assessment

<sup>7</sup> ADB. Updated on December 2011. MFF 0034-GEO: Road Corridor Investment Program - Environmental Assessment and Review Framework



Environmental Aspect	Subtopics	Frequency & Location
Hazardous Goods Management		Ochkhamuri, Laituri, Bobokvati, Chakvi – once a month.
6. Water Resources Management	6.1 Hazardous Material and Waste	Campsites and surface water near bridges: #2, 4, 5, 7, 8, 8.1, 9, 11 – once a quarter.
	6.2 Discharge from construction sites	
	6.3 Construction of Bridges/drainage structures in streams/rivers	
	6.4 Soil Erosion and siltation	
	6.5 Construction activities in water bodies	
7. Drainage Management	7.1 Excavation and earth works, and construction yards	Along the entire road section – once a month.
	7.2 Fresh road cuts may immediately trigger intensive erosion during construction and drastic increase of sedimentation	
	7.3 Ponding of water	
8. Soil Quality Management	8.1 Earth filling with borrow material	Along the entire road section – once a month.
	8.2 Storage of hazardous and toxic chemicals	
9. Top Soil Management Plan	9.1 Land clearing, storage and further use	Along the entire road section – once a month.
10. Topography and Landscaping	10.1. Land clearing and earth works	Along the entire road section – once a month.
11. Borrow Areas Development & Operation	11.1 Degradation of borrow areas	Quarries at the territories of Vil. Zeda Sameba and Vil. Shuagele – once a month.
12. Air Quality Management	12.1 Construction vehicular traffic	At the bridges #1 - #11.2, tunnels #1 and #2 – once a month.
	12.2 Construction machinery	
	12.3 Construction activities	
13. Noise and Vibration Management	13.1 Construction vehicular traffic	At the bridges #1 - #11.2, tunnels #1 and #2 – once a month.
	13.2 Construction machinery	
	13.3 Construction activity	
14. Road Transport and Road Traffic Management	14.1 Construction vehicular traffic	Along the entire road section – once a month.
15. Construction Camp Management	15.1 Siting and Location of construction camps	Construction sites – every week
	15.2 Construction Camp Facilities	
	15.3 Disposal of waste	
	15.4 Fuel supplies for cooking and heating purposes	
	15.5 Site Restoration	
16. Cultural and Religious Issues	16.1 Construction activities near religious and cultural sites	There was no necessity in monitoring
17. Worker Health and Safety	17.1 Anthrax	Construction sites – every week
	17.2 Best practices	
	17.3 Water and sanitation facilities at the construction sites	
	17.4 Trainings	

26. In addition, the following laws and regulations are also considered and used as legal and regulatory framework related to road construction activities of the Contractor:

1. Georgian Law of Environmental Protection, 1996
2. Georgian Law on Ambient Air Protection
3. Law of Minerals, 1996
4. Wildlife Law, 1996
5. Law of Georgia "On the System of the Protected Areas, 1996
6. Law of Georgia on Water Resources, 1997
7. Code of Georgian on Water Resources, 1999
8. Law of Georgia on Soil Protection, 1994
9. Law of Georgia 'On the Red List and Red Book', 2003
10. Law of Georgia on Cultural Heritage, 2007
11. Environmental Standards and Norms: (i) Ambient Air Quality Norms; (ii) Noise Standards;
12. Law of Georgia "On Waste Management", 2015;
13. Technical Regulation on Environment, 2014

For the ambient air quality, the guidelines are as shown below<sup>8</sup>:

**Table 4: Ambient Air Quality Guidelines in Georgia**

Parameter	Maximum Admissible Concentrations (MAC) mg/m <sup>3</sup>	Averaging Time
Nitrogen Dioxide (NO <sub>2</sub> )	0.085	30 minutes
	0.04	Annual
Sulfur Dioxide	0.5	30 minutes
	0.05	24 hours
Carbon Monoxide	5.0	30 minutes
	3.0	24 hours
Soot (PM)	0.5	30 minutes
	0.15	24 hours

27. Also in terms of the noise quality standards for residential areas ADB requires that the WB/IFC EHS guidelines are followed. According to the IFC, noise impacts should not exceed the levels presented in **Table 5** or result in a maximum increase in background levels of 3 dB at the nearest receptor location off site:

**Table 5: IFC Noise Level Guidelines**

Receptor	One hour L <sub>aeq</sub> (dBA)	
	Daytime 07:00 – 22:00	Nighttime 22:00 – 07:00
Residential; institutional; educational	55	45
Industrial; commercial	70	60

<sup>8</sup> Government of Georgia. MORDI-Department of Roads. July 2012. Environmental Impact Assessment Road Corridor Investment Program (Tranche 1) Kobuleti Bypass, Kobuleti-Batumi Section and Batumi Bypass Design Project

## 2.2 SUMMARY OF PERFORMED ENVIRONMENTAL MONITORING ACTIVITIES

28. Within the previous six (6) months, from July to December 2017, the Engineer's two (2) domestic environmentalists have been performing environmental monitoring as outlined in the EIA Report. The results of the monthly monitoring were incorporated in the Chapter "Environment" of the Engineer's monthly reports.

29. Primarily the environmental monitoring activities at various locations at the worksites focused on (i) the quality of atmospheric air; (ii) the quality of drinking water and river water; (iii) the condition of soil; (iv) flora and fauna; (v) the condition of construction equipment and transport; (vi) waste management; (vii) worker safety, hygiene and sanitation; (viii) community health and safety.

30. The Contractor carried out instrumental measurements for air quality and noise from July to December, 2017. Measurement of surface water and groundwater quality was carried out in August, 2017. Water quality measurements should be carried out on a quarterly basis, unfortunately till date of fourth quarter laboratory analysis have not been carried out. As per the Contractor laboratory could not take measurements due to the unsuitable weather condition. The monthly environmental parameter measurements and observations are summarized below.

- (i) **Air quality** – Particulate matter only (PM); Due to the relatively low intensity of traffic and construction equipment and lack of residential settlements near to the project road no measurements conducted for Sulphur Dioxide, Nitrogen Oxide, and Carbon Monoxide. It is worth to mentioned, that the mentioned is the reason why the test on heavy metal concentration in the soil is not carried out.

The average PM measurements for the last six months construction campsites and construction sites monitored during the reporting period in 2017 indicate that the concentrations are below the threshold levels.

31. A PC-3A Respirable dust detector was used to measure the particulate data collected.

**Table 6: PM Measurements (average values in mg/ m<sup>3</sup>) at selected sites for July-December 2017**

	Location	Permeable limit	Jul	Aug	Sep	Oct	Nov	Dec
1	<b>Choloki Campsite</b>	0.5	0.023	0.020	0,021			
2	<b>Chakvi Campsite</b>	0.5	0.033	0.025	0,027	0.009	0.085	0.085
3	<b>Bridge #9</b>	0.5	0.025	0.022	0,025	0.013	0.013	0.013
4	<b>Bridge #11.2</b>	0.5	0.029	0.027	0,032	0.008	0.009	0.008
5	<b>Tunnel #1</b>	0.5	0,027	0.025	0,031	0.013	0,013	0.013
6	<b>Tunnel #2</b>	0.5	0.024	0.029	0,029	0.013	0.013	0.013

**Noise Level** – only sites with active construction was taken for noise measurements. Noise measurements were carried out in July-December, 2017. Measurement data is listed in table 7 below. The measurements have been taken at the source locations (at the construction sites). Measurement show that the noise level does not overcome permeable limits of noise. **The data at receptor sites where residential settlements are located are within the limits according the measurements conducted during the reporting period. All measurements carried out at construction sites, were temporary and conducted during the daytime from 12:00 am to 16:00pm. No complaints have been received as the noise impact is temporary.**

32. A Hengsheng HS-5633 noise detection meter was used to collect the decibel readings.

**Table 7: Noise Measurements (Average) at selected sites for July-December 2017 (dB)**

	Location	Permeable limit	Jul	Aug	Sep	Oct	Nov	Dec
<b>1</b>	<b>Choloki Campsite</b>	55 dBA Residential; Institutional; Educational 70 dBA Industrial; commercial	55.4	55.8	54.9			
<b>2</b>	<b>Chakvi Campsite</b>	55 dBA Residential; Institutional; Educational 70 dBA Industrial; commercial	63.5	60.6	62.1	58.4	58.5	58.2
<b>3</b>	<b>Bridge #9</b>	55 dBA Residential; Institutional; Educational 70 dBA Industrial; commercial	64.4	59.3	54.4	60.8	59.9	59.8
<b>4</b>	<b>Bridge #11.2</b>	55 dBA Residential; Institutional; Educational 70 dBA Industrial; commercial	63.0	60.3	61.9	62.8	62.5	62.7
<b>5</b>	<b>Tunnel #1</b>	55 dBA Residential; Institutional; Educational 70 dBA Industrial; commercial	58.4	58.5	62.5	59,1	59.4	59.2
<b>6</b>	<b>Tunnel #2</b>	55 dBA Residential; Institutional; Educational 70 dBA Industrial;	54.4	58.9	64.8	62.5	54.4	60.9

		commercial					
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Note: Choloki campsite has been closed.

- (ii) **Ground Water Quality** - Ground water samples were obtained from the Chakvi campsite and tested for potable water quality parameters on 11<sup>th</sup> August, 2017. Measurements at Choloki campsite have not been carried out after its closure as this site is no longer operational.

33. The water quality measurements indicate that all parameters were within acceptable limits. The results are summarized in Table 8.

Table 8: Potable / Ground Water Quality Measurements in Campsites (August 2017)

Parameter	Acceptable Limits	Standard	Choloki Campsite
Mesophylic aerobic and facultative anaerobic microorganism	37°- ≤20 CFU 22°- ≤100 CFU (in 100ml)	ISO6222.08	37°c- 3 22°c- 5
Coliform	in 300ml	4.2.1884-04	No
Ecole	In 300ml	4.2.1884-04	No
Fecal	In 250ml	ISO7899-2:07	No
Salmonella	In 100ml	ISO19250-10	No

- (iii) **Surface Water Quality** - Surface water samples were obtained from two rivers crossing the Lot 2 area and tested for selected surface water quality parameters on 14 August 2017. Water samples have been tested from the Riv. Chakvistkali and Riv. Sachino. The analytical results of the samples collected (see Table 9) indicate that the water quality parameters were within the regulated limits for both rivers.

Table 9. Surface Water Quality in Lot 2 Rivers (August 2016)

Parameter	Acceptable Limits	Standard	Riv. Chakvistkali	Riv. Sachino
Odor	1 unit	ISO6658	0	0
Color	25°	ISO 7887	15.	20.0
Turbidity	3.5 units	ISO 7027	3.3mg/l	2.3mg/l
Rigidity	mg.eq/l	GOST 4151-72	0,68	0.83
pH	6.5-8.5	ISO10523	7.92	7.24
Sulfates(SO <sub>4</sub> <sup>2-</sup> )	mg/l	GOST4389-72	4.0	2.0
Chloride Cl-	300mg/l	ISO9297	25.48mg/l	30,38
Ammonia and ammonium iodine	mg/l	GOST4192-82	0.15	0.2
Nitrate NO <sub>2</sub> <sup>-</sup>	0.08-3.3mg/l	GOST 4192	0.012	0.03
Nitrate NO <sub>3</sub> <sup>-</sup>	40-45mg/l	GOST18826	0,29	0.37
Dissolved Oxid	mg /O <sub>2</sub> / l	Collection of Shitskova p..50 .P -2	27.8	24.0
Total copper (Cu)	0.3mg/l	ISO 6332	0.20mg/l	0.16
Arsenic (As)	0.05mg/l	GOST 4152	0.006	0.006
Magnesium (Mn)	1mg/l	GOST4974	0.032mg/l	0.03

Permanganate Index (COD)	4-6mg/O <sub>2</sub> /l	ISO8467	2.59mg/O <sub>2</sub> /l	2.39
Dry particles (TDS)	1000mg/l	GOS18164	0.10	0.012
Polyphosphates	mg/l	GOST18309-72	0.01	0.014

## PART III: ENVIRONMENTAL MANAGEMENT

### 3.1 ENVIRONMENTAL MANAGEMENT PLAN (EMP)

34. The Environmental Management Plan (EMP) was designed to avoid, reduce, or at least minimize the adverse environmental impacts that could result from the activities during the implementation and operation of the project. As per the Technical Specification **3001.1 ENVIRONMENTAL MANAGEMENT PLANNING**, “The Contractor shall provide a detailed site-specific (or section-specific) Environmental Management Plan (EMP) which will be based on: (1) Generic/standard EMP structure and mitigation measures for the road construction; (2) Site/section-specific EMP requirements provided by the Employer in his EIAs. Hence, one major requirement is that the Contractor should produce his own EMP appropriate for the project and to be checked by the Engineer’s environmental specialist.

### 3.2 Site Inspections and Audits

35. As a matter of protocol, site inspections were conducted on various environmental aspects of the project and form part of the Monthly Progress Report. Regular inspections were undertaken by local environmental specialists. During the inspections, several environmental health and safety issues were observed and noted. These issues were subsequently brought to the attention of the Contractor’s personnel as well as discussed following the “Auditing Protocol” and EMMP. The main HSE issues observed were generally concerning with the disposal of unusable materials from the site, submission of waste management plan, complete restoration of excavated quarry, erosion created due to earthworks at Tunnel #2 and general safety issues.

34. Table 10 below shows the schedule of conducted audits and monitoring by PIU and SC during the reporting period.

**Table 10: The schedule of conducted audits and monitoring in Kobuleti during the reporting period**

	<b>Kobuleti Site visit</b>	<b>Organization</b>	<b>Date</b>
1	Site audit	DOHWA environmental specialists	04.07.2017
2	Site audit	DOHWA environmental specialists	21.07.2017
3	Site audit	DOHWA environmental specialists	03.08.2017
4	Site audit	DOHWA environmental specialists	25.08.2017
5	Site audit	DOHWA environmental specialists	05.09.2017
6	Site audit	PIU/RD and DOHWA environmental specialists	30.09.2017
7	Site audit	DOHWA environmental specialists	01.10.2017
8	Site audit	DOHWA environmental specialists, RD Environmental Specialists	06-.10.2017
9	Site audit	DOHWA environmental specialists	08-10.10.2017
10	Site audit	DOHWA environmental specialists, RD Environmental Specialists	03.11.2017
11	Site audit	DOHWA environmental specialists	24.11.2017
12	Site audit	DOHWA environmental specialists	06.12.2017

13	Site Audit	DOHWA environmental specialists	22.12.2017
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37. During the Environmental Monitoring, a number of HSE issues (non-compliances) were noted and brought to the attention of the Contractor. The Contractor's HSE Director joined local environmental specialists on-site inspections carried out along the road stretch under construction, camp sites, and quarry sites. An **Environmental Action Plan** was drafted and mitigation measures were jointly discussed to be implemented within the specified time frames. A summary of the identified issues is presented in the ensuing Tables 11 and 12.

38. The results of the monitoring carried out in accordance with EMP procedures, which covers the Environmental situation of reports of the second part of 2017 is presented in the chapters below:

### 3.2.1 Results of Monitoring and Audits

39. Sanitary hygienic condition of the campsites and issues/non-compliances revealed are shown below:

**(Implementation status is shown in the table #11)**

#### Choloki Campsite

EHS issues and non-compliances	Corrective measures
Due to the end of rent agreement, the Choloki campsite has stopped operation and was handed over to the Ministry of Economy and Finance with the relevant documentation	Campsite territory needs additional reinstatement works (see attached photos #1,2,3,4). Particularly, leveling of the territory and disposal of remaining trash – in progress

#### Ochkhamuri Campsite

EHS issues and non-compliances	Corrective measures
<ul style="list-style-type: none"> <li>Ochkhamuri campsite is not operating at this moment.</li> </ul>	<ul style="list-style-type: none"> <li>It is necessary to prepare reinstatement plan of the campsite (photo #5,6) – implementation status is given in the list #11.</li> </ul>

#### Laituri Campsite

EHS issues and non-compliances	Corrective measures
<ul style="list-style-type: none"> <li>Campsite is not operating anymore. Territory has been purchased by Representation of Sinohydro Corporation Ltd in Georgia</li> </ul>	<ul style="list-style-type: none"> <li>Territory of the campsite can be used by the Contractor for storage of utilized construction waste and used tires (photo #7,8) – in progress</li> </ul>

#### Bobokvati Campsite

EHS issues and non-compliances	Corrective measures
<ul style="list-style-type: none"> <li>The campsite has been closed. Rent agreement was valid till November 20, 2017</li> </ul>	<ul style="list-style-type: none"> <li>After dismantling and transferring batching plant, the territory shall be reinstatement, including cleaning of campsite territory from concrete remains (photo #9,10), implementation status is given in the list #11.</li> </ul>

#### Chakvi Campsite

EHS issues and non-compliances	Corrective measures
<ul style="list-style-type: none"> <li>Sedimentation basin of the Concrete Plant is full of silt and cannot operate in normal order, it is damaged and needs repairing.</li> <li>Household and construction waste is accumulated at the territory of the camp,</li> </ul>	<ul style="list-style-type: none"> <li>Sedimentation Basin of the Concrete Plant should be cleaned, silt shall be disposed to landfill, deepen basin, basin shall be repaired;</li> <li>Household and construction waste should be disposed to the dump site on time</li> </ul>



<ul style="list-style-type: none"> <li>• used tires;</li> <li>• Ground is contaminated with the oil during filling up tanks of equipment, filling territory is not covered by the concrete foundation</li> <li>• Contaminated/used oil filters are scattered near the car repair workshop</li> </ul>	<ul style="list-style-type: none"> <li>– Fuel filling area shall be surrounded by the concrete foundation, indicative signs shall be installed at the surrounding area</li> <li>– Hazardous material shall be collected in the 200 l containers, stored and covered on the concrete foundation area (photos #11,12,13,14,15,16,17,18) – implementation status is shown in the list #11.</li> </ul>
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### 3.2.2 Monitoring of road construction sites

40. The following non-compliance issues have been revealed during construction activities of the road:

EHS issues and non-compliances	Corrective measures
<ul style="list-style-type: none"> <li>• At Some places of the road, where grass has not been germinated, it is necessary to make seeding;</li> <li>• Road Embankment soil is sliding at some places, some places are not covered by topsoil</li> <li>• During site visit number of places where waste, concrete washout and soil contamination were identified</li> </ul>	<ul style="list-style-type: none"> <li>– Grass seeding shall be carried out - <b>pending</b></li> <li>– Embankment shall be filled by the sand-gravel material and grass shall be subsequently sown (photos #19, 20, 21, 22, 23, 24)</li> <li>– Waste shall be disposed, concrete wash out places shall be cleaned and contaminated soil shall be replaced. Contaminated soil shall be disposed from the site.</li> </ul>

### 3.2.3 Monitoring of Tunnel Construction Sites

41. The following non-compliance issues have been revealed during construction activities of the Tunnel:

EHS issues and non-compliances	Corrective measures
<ul style="list-style-type: none"> <li>• Construction and household waste are scattered at the first and second portals of Tunnel No.2</li> <li>• Erosion was created due to cutting slopes at the Tunnel #2</li> <li>• Water mixed with concrete is being flush to the local road at the right side of the Bridge #9</li> <li>• At the territory of piers 19 and 21 materials of demolished houses are scattered</li> </ul>	<ul style="list-style-type: none"> <li>– Territory of Tunnel has to be cleaned from the residential and construction waste.</li> <li>– Slope shall be strengthened in order to avoid such processes from development</li> <li>– It is necessary that spilled concrete does not flush to the local road</li> <li>– Construction waste shall be disposed to the landfill area (photos #25, 26, 27, 28, 29, 30, 31, 32). – is in progress.</li> <li>–</li> </ul>

### 3.2.4 Monitoring of quarry sites

42. The following non-compliance issues have been revealed during monitoring of sand gravel quarry:

EHS issues and non-compliances	Corrective measures
<ul style="list-style-type: none"> <li>Quarry located at territory of Vil. Shuagele has not been completely re-cultivated. Natural habitats have not been restored (planting bushes and trees).</li> <li>Contractor owns 2 licenses for the quarry (1001185 and 1001316), which are valid till May and August, 2018 respectively. Remaining available material is about 25 000 m<sup>3</sup>, Contractor is not operating those quarries nowadays. When necessary Contractor is purchasing sand-gravel materials through private sub-contractors, for restoration of which is the owner of a quarry</li> </ul>	<ul style="list-style-type: none"> <li>In order to restore Natural Habitats, Contractor has to plant bushes and trees and in case of necessity transport Top-Soil there and seed grass as well.</li> <li>At this point of time 1350 units of trees have been planted.</li> </ul>

43. In order to solve revealed environmental problems, action plan of EHS non-compliances has been worked out which will be handed over to the Contractor. See tables No. 12, 14 & 15.

### 3.2.5 Visual assessment of the Rivers and Waters Stream Environment

44. Following rivers were assessed on August 20, 2017

Location (pk, km)	Name of the River
Bridge #2 pk 16+20	Achkva
Bridge #4 pk 44+84	Kintrsihi
Bridge #5 pk 54+21	Kinkishi
Bridge #7 pk 68+60	Dekhva
Bridge #8 pk 81+73	Dekhva
Bridge #8a pk 108+37	Shuagele
Bridge #11 pk 170+44	Chakvistkali

It is remarkable that visually rivers are clean.

45. Environmental condition, identified during monitoring of the rivers under the Bridges. Based on Visual assessment during monitoring of rivers and water flows on Lot-II it was concluded that configuration of the river banks of the above listed rivers have not changed. Turbidity monitoring has been carried out and was within the permissible limits (3,5 mg/l).

Environmental Issues/Condition	Condition					Shuaghele	Cahkvistkali
	Achkva	Kintrsihi	Kinkishi	Dekhva pk 68+60	Dekhva pk 81+73		
River Bank Erosion (Northern part)	Minor	Minor	Moderate	Minor-Moderate	Minor	Minor	Minor
River Bank Erosion (Southern part)	Minor	Minor	Moderate	Minor-Moderate	Minor	Minor	Moderate

Sedimentation/ Precipitation	Moderate	Moderate	Moderate	Moderate	Minor	Minor	Moderate
Construction waste	Abs	Abs	Abs	Minor	Moderate	Moderate	Moderately high
Household waste (Iron, Plastics etc )	Minor	Minor	Minor	Minor	Minor	Minor	Moderate

Construction waste is identified under the bridge #10.

46. Recommendations for the improvement of the Rivers' condition and environmental protection:

- Removal of the household and construction waste from under the above listed bridges shall be carried out to the dump area. Partly executed and is being executed.

### 3.2.6 Actions taken to reflect the findings of ADB mission during the reporting period

47. During the Environmental Monitoring and Inspection Audit carried out in July-December, 2017 and September, 30 accordingly, which was attended by the International Environmental Specialist/Country Environmental Focal - Mr. Duncan Lang and International-Regional Environmental Specialist of the ADB/RETA Mrs. Keti Dgebuadze respectively, some environmental, health and safety (EHS) issues/non-compliances were observed and appropriate plan for resolution of non-compliances was made which was subsequently shared with the Contractor for execution. The plan is shown in the Table #11 below.

**Table 11: Status of Observed HSE Issues and Recommendations of Environmental Specialists**

**(A) Road Section km12.4-km31+250, Lot-II**

<b>Discrepancies of the Health Safety and Environment Issue</b>	<b>Recommended Corrective measures</b>	<b>Deadline for the implementation</b>	<b>Progress</b>
As per the Contractor due to the unsuitable weather condition laboratory (hired by the Contractor) was unable to take analysis/measurements of potable and ground water lab tests; Contractor failed to provide such lab test results.	➤ Contractor's responsibility is to submit potable and ground water laboratory test results on a quarterly basis	<b>January, 2017</b>	<b>Not executed till date</b>
Grass seeding according to the full compliance with the Technical Specifications at some places of embankments of the road has not been carried out	➤ Contractor's responsibility is to carry out grass seeding works as per TS Series 3000-3004	<b>March, 2018</b>	<b>Partly executed</b>

Used tires and other construction waste has not been disposed from the Chakvi campsite	➤ Contractor has to ensure disposal of the used tires and other construction waste or storage of them in Laituri campsite which is under his ownership	<b>February, 2018</b>	<b>Partly executed</b>
Traffic management is of low quality at IC #4 – road signs are not installed accordingly	➤ Additional road signs shall be installed, flagmen shall be used	<b>September, 2017</b>	<b>Executed</b>
In some occasions Contractor's personnel is working without helmets	➤ Workers who are not using personal safety equipment shall not be allowed at the work	<b>September, 2017</b>	<b>Executed</b>
Re-cultivation of excavated quarry at Riv. Shuaghele is not carried out (photos #35,36)	➤ Contractor shall immediately start re-cultivation of the mentioned quarry.	<b>October, 2017</b>	Executed (grass has been sown and 650 units of various trees have been planted – photos #37,38,39,40,41,42)
Water is being flush to the local road from the right side of Bridge #9	➤ It is necessary to prevent water from flushing to the local road	<b>September-October, 2017</b>	<b>Executed</b>

Cut slopes shall be strengthened by Macmatt and bushes shall be planted on the top of the gabion walls	➤ It is necessary to use Macmatt on the cut slopes and plant bushes on the top of the gabion walls	September-October, 2017	Executed
Cut trees are stored at different locations (Bobokvati and Chakvi campsites, IC #4 CL403, CL406)	➤ Cut trees shall be transported to Chakvi campsite and subsequently handed-over to the forestry department (photos #43, 44).	January, 2018	Negotiations are ongoing concerning handing-over cut trees to the local forestry department
Territory of the Tunnel #2 is scattered with the household and construction waste	➤ Trash bins shall be provided additionally, waste shall be cleaned	December, 2017	In progress
Erosion is initiated due to the cutting slope near Tunnel #2, landslide took place	➤ It is necessary to strengthen the mentioned slope, in order to prevent landslide development	September-October, 2017	Executed (photo #45, 46)

**(B) Choloki Camp Site**

Discrepancies of the Health and Safety Issue	Recommended Corrective measures	Deadline for the implementation	Progress
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Due to the end of rent agreement, the Choloki campsite has stopped operation and was handed over to the Ministry of Economy and Finance with the relevant documentation	➤ Campsite territory needs additional works on re-cultivation	March, 2018	In progress
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**(C) Ochkhamuri Camp-Site**

Discrepancies of the Health and Safety Issue	Recommended Corrective measures	Deadline for the implementation	Progress
Ochkhamuri campsite is not operating at this moment	➤ It is necessary to prepare re-cultivation plan for the works on the territory of campsite	January, 2018	In progress

**(D) Laituri Camp-Site**

Discrepancies of the Health and Safety Issue	Recommended Corrective measures	Deadline for the implementation	Progress
Campsite is not operating anymore. Territory has been purchased by Representation of Sinohydro Corporation Ltd in Georgia	➤ Territory of the campsite can be used by the Contractor for storage of utilized construction waste and used tires	March, 2018	In progress

**(E) Bobokvati Camp-Site**

Discrepancies of the Health and Safety Issue	Recommended Corrective measures	Deadline for the implementation	Progress
Campsite is closed	➤ After dismantling and transferring batching plant, the territory shall be recultivated, including cleaning of campsite territory from concrete remaining	January – February, 2018	In progress

**(F) Chakvi Camp Site**

Discrepancies of the Health and Safety Issue	Recommended Corrective measures	Deadline for the implementation	Progress
<ul style="list-style-type: none"> <li>Sedimentation basin of the Concrete Plant is full of silt and cannot operate in normal order, it is damaged and needs repairing.</li> <li>Household and construction waste is accumulated at the territory of the camp, used tires;</li> <li>Ground is contaminated with the oil during filling up tanks of equipment, filling territory is not covered by the concrete foundation</li> <li>Contaminated/used oil filters are scattered near the car repair workshop</li> </ul>	<ul style="list-style-type: none"> <li>Sedimentation Basin of the Concrete Plant should be cleaned, silt shall be disposed to landfill, dippen basin, basin shall be repaired;</li> <li>Household and construction waste should be disposed to the dump site on time</li> <li>Fuel filling area shall be surrounded by the concrete foundation, indicative signs shall be installed at the surrounding area</li> <li>Hazardous material shall be collected in the 200 l containers, stored and covered on the concrete foundation area (photos #11,12,13,14,15,16,17,18) – implementation status is shown in the list #11</li> </ul>	<p>October, 2017</p>	<p>Partly Executed (photos 47, 48, 49, 50)</p>
<p>Basin of the Crushing Plant is full of silt and cannot perform its function in normal mode</p>	<p>➤ Sedimentation Basin of the Concrete Plant should be cleaned from the silt and deepened. Silt should be disposed to the Dump Site.</p>	<p>ASAP Regularly</p>	<p>Executed</p>
<p>During filling up water reservoir water tap is not closed on time, which causes irrational use of water</p>	<p>➤ The Contractor has to ensure timely closing of water taps during filling up water tanks in order to rationally use water resources.</p>	<p>January, 2017</p>	<p>Executed</p>
<p>Storage of materials</p>			
<p>Construction materials are</p>	<p>➤ Construction material shall be sorted and</p>	<p>December, 2017</p>	<p>In process</p>



scattered in the campsite	stored		
Bit amount of steel and household waste is accumulated	➤ Waste shall be disposed to dump site	October, 2017	Executed

**Table 12: Action plan and mitigation measures for the upcoming period**

**(A) Road Section km12.4-km31+250, Lot-II**

<b>Discrepancies of the Health and Safety Issue</b>	<b>Recommended Corrective measures</b>	<b>Deadline for the implementation</b>	<b>Progress</b>
Laboratory analysis of potable and surface water is not carried out	➤ Contractor is responsible to carry out laboratory analysis of potable and surface water on a quarterly basis	<b>November-December, 2017</b>	<b>Not executed</b>
Grass seeding according to the full compliance with the Technical Specifications at some places of embankments of the road has not been carried out	➤ Contractor's responsibility is to carry out grass seeding works as per TS Series 3000-3004	<b>March, 2018</b>	<b>Partly executed</b>

Used tires and other construction waste has not been disposed from the Chakvi campsite	➤ Contractor has to ensure disposal of the used tires and other construction waste or storage of them in Laituri campsite which is under his ownership	<b>February-March, 2018</b>	<b>In progress</b>
Cut trees are stored at different locations (Bobkvati and Chakvi campsites, IC #4 CL403, CL406)	➤ Cut trees shall be transported to Chakvi campsite and subsequently handed-over to the forestry department (photos #43, 44).	<b>January, 2018</b>	<b>In progress</b>

**(B) Choloki Camp Site**

<b>Discrepancies of the Health and Safety Issue</b>	<b>Recommended Corrective measures</b>	<b>Deadline for the implementation</b>	<b>Progress</b>
Due to the end of rent agreement, the Choloki campsite has stopped operation and was handed over to the Ministry of Economy and Finance with the relevant documentation	➤ Campsite territory needs additional works on re-cultivation	<b>March, 2018</b>	<b>In progress</b>

**(C) Ochkhauri Camp-Site**

<b>Discrepancies of the Health and Safety Issue</b>	<b>Recommended Corrective measures</b>	<b>Deadline for the implementation</b>	<b>Progress</b>
Ochkhauri campsite is not operating at this moment	➤ It is necessary to prepare re-cultivation plan for the works on the territory of campsite	January, 2018	In progress

**(D) Laituri Camp-Site**

Discrepancies of the Health and Safety Issue	Recommended Corrective measures	Deadline for the implementation	Progress
Campsite is not operating anymore. Territory has been purchased by Representation of Sinohydro Corporation Ltd in Georgia	➤ Territory of the campsite can be used by the Contractor for storage of utilized construction waste and used tires	March, 2018	In progress

**(E) Bobokvati Camp-Site**

Discrepancies of the Health and Safety Issue	Recommended Corrective measures	Deadline for the implementation	Progress
Campsite is closed	➤ After dismantling and transferring batching plant, the territory shall be recultivated, including cleaning of campsite territory from concrete remaining	January – February, 2018	In progress

**(F) Chakvi Camp Site**

Discrepancies of the Health and Safety Issue	Recommended Corrective measures	Deadline for the implementation	Progress
Usable construction materials are not stored as they are scattered on the ground	➤ Useful construction materials shall not be scattered on the ground, those shall be collected and sorted and stored	January, 2018	

### 3.2.6 Evaluation of HSE Documentation and Record Keeping

48. Contractor has improved production of the Environmental, Health and Safety aspects which are reflected below as well as the pending issues which are yet to be solved.

Positive Intervention	Main Environmental, Health and Safety Issues
<ul style="list-style-type: none"> <li>• Grass seeding was intensively carried out at the slopes of the embankment slopes for strengthening purposes</li> <li>• Cut slopes were actively strengthened by means of bio Mac Matt (3D Mac Matt and wire mesh) and planting of bushes on the top of the gabions (photos #51, 52, 53, 54, 55, 56);</li> <li>• Re-cultivation of the quarry at Vil. Khutsubani was carried out;</li> <li>• Re-cultivation of the quarry at Vil. Shuaghele was carried out by means of planting trees and seeding grass;</li> <li>• Choloki campsite has been closed, territory of the campsite has been cleaned from construction waste, and it was handed over to the Ministry of Economy of Ajara with the relevant Act.</li> <li>• Parametric measurement data of Air quality and noise was submitted on time;</li> <li>• Every construction campsite is equipped by the relevant precautionary signs;</li> </ul>	<ul style="list-style-type: none"> <li>– At bridge #9 and tunnel #2 household and construction waste is identified. There are no garbage containers.</li> <li>– Sampling for Potable and Groundwater not yet possible due to unavailability of lab.</li> <li>– Trainings on EHS issues shall be organized for workers regularly, as there are non-compliances in relation with the waste management at the territory of the construction sites.</li> <li>– Contractor has to prepare and submit rehabilitation plans for those campsites which are subject to closure.</li> </ul>

### 3.2.7 Evaluation of General Occupational Health and Safety Practices

49. In July-December 2017, no vital accident was identified. Besides, neither Contractor has informed the Engineer concerning any such incident for this reporting period. **The overall Accidents and Near Misses Log Book is attached as an Annex 1.**

Positive intervention	Main Environmental, Health and Safety Issues
Warning signs posted at relevant locations (e.g., campsites, road construction sites).	During working with welding it has been identified that in some cases gas tank is

	located very close to carbon tank. Workers do not use face protection equipment.
On-site clinic with first aid medications and a doctor (in Chakvi Campsite).	Workers throw plastic bottles and other waste from bridges.
Restroom sanitary condition was improved – it is in compliance with the requirements.	
PPE given to workers to be used during work. While working in high altitude workers use special protective equipment, Significant improvement in works wearing PPE especially in camp work sites (photos #57, 58).	
Safety meetings held on a regular basis where safety issues are discussed.	
Recordkeeping improved.	

### 3.2.8 Impact on Biodiversity

50. In July-December, 2017 no negative impact on flora and fauna has been identified. No cases of poaching have been identified.

51. During the Construction of the road dozens of trees have been cut. Cut trees have been temporarily stored at the places indicated by the special gov't organization (Forestry department of Ajara). In the near future tree logs will be handed-over to the local forestry in accordance with the Georgian Law "on Government Property" Clause 291 and Government Decree #242 of 20 August, 2010 Clause 12 item 5 "On Usage of Forest".

### 3.3 Non-Compliance Notices

#### Correspondence about the improvement of non-compliances issues

52. In the second half of 2017, Contractor has received following letters regarding the problematic environmental issues identified during the Environmental Monitoring process. See Table No.13. Corrective measures and action status is provided in the tables #11 and #12.

Table No.13 - Correspondence about the improvement of non-compliances issues

Status of execution the non-compliances mentioned in the table below is reflected in the tables #11 and 12.

Number of the Letter	Date	Subject	Content
1707-0159	12.07.2017	Concerning distribution of construction waste	The Contractor was asked, to receive permission from the local Municipalities, concerning the distribution of the remains, after the demolition of the Camp-Sites and demolition of the dismantled houses, after the acquisition.
1709-0221	06.08.2017	Concerning condition of Camp-Sites	The Contractor was asked to submit Rehabilitation Plan for the after the canceling of the Camp-Sites.
1709-0224	07.08.2017	concerning strengthening of the cut slopes and planting Trees	The Contractor was asked, to remove part of the Rock on the Cut Slope (km12.01), which was hindering slope strengthening works using Macmat.
1709-0226	07.08.2017	Lab. Test of the Water Quality	The Contractor was asked to make Lab. Test, for the identification Quality of Drinking and Surface Water.
1709-0234	13.08.2017	Concerning construction waste	The Contractor was asked to remove domestic and construction Waste, from the territories identified during the Ecological Monitoring.
1709-0246	29.08.2017	Concerning pending ecological issues	The Contractor was asked to speed up Re-Cultivation Works, on Quarry in Vil.Shuaghele.
1710-0258	11.10.2017	Concerning condition of Camp-Sites	The Contractor was asked, to remove soil contaminated, by Concrete Mixers and sedimentation Basins, from Bobokvati, Chakvi Camp-Sites,
1710-0259	11.10.2017	Waste management on Bridge No.9	The Contractor was asked to avoid concrete pouring on the ground, during Concreting works.
1710-0263	13.10.2017	Concerning the improvement of Ecological Condition on Chakvi Camp site and generally	The Contractor was asked to solve the Pending Problems, identified during the visit of ADB representatives in September 30, 2017, ASAP.
1711-0285	07.11.2017	Problems in Environmental Protection	The Contractor was asked to solve the Pending Problems, identified during the Monitoring on 1-2 November.

1712-0302	04.12,2017	Receiving of the information, concerning Legislative violation from the Contractor's side.	Local Service of Environmental Protection, required to submit information, concerning Legislative violation from the Contractor's side.
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**Remarks:** Mainly, communication with the Environmental Specialists of the Contractor was made during joint audits and regular Weekly Meetings verbally.

### 3.4 Corrective Action Plan

53. The Contractor failed to fulfill corrective measures of environmental health and safety issues in a timely manner which is reflected in the Table No.14.

**Table 14: Corrective action plan**

Impacted objects	Problems	Mitigation Measures	Implementation date	Status of the activities
Slopes of Embankment and Cut	At many places of the road embankment slopes are gullied. and insufficient quantity of top soil is applied	Places of embankment with erosion shall be filled with sand-gravel material, compacted, topsoil shall be placed and grass seeded	March, 2018	Partly executed
Construction site	Cut trees/timber is stored are stored at different places (Bobokvati and Chakvi campsites, IC #4 CL 40, CL406)	Cut trees shall be handed over to the local forestry	January 2018	Negotiations are ongoing concerning handing over of cut trees with the local forestry
Camp sites	<ul style="list-style-type: none"> <li>• Due to the end of rent agreement, the Choloki campsite has stopped operation and was handed over to the Ministry of Economy and Finance with the relevant documentation</li> <li>• Ochkhamuri Campsite is not operating at this moment</li> <li>• Bobokvati campsite is closed</li> <li>• Construction materials are scattered in Choloki campsite</li> </ul>	<ul style="list-style-type: none"> <li>• Choloki campsite needs additional re-cultivation works</li> <li>• Preparation of plan for re-cultivation works at Ochkhamuri campsite</li> <li>• After dismantling and transferring batching plant, the territory shall be recultivated, including cleaning of campsite territory from concrete remaining</li> <li>• Construction material shall be sorted and stored.</li> </ul>	<ul style="list-style-type: none"> <li>• March, 2018</li> <li>• January, 2018</li> <li>• January – February, 2018</li> <li>• December, 2017</li> </ul>	<p>Partly executed.</p> <p>negotiation with haulers is in active stage</p>



Household and Construction waste	Sometimes household and construction waste is disposed from the Chakvi camps with delay	Waste shall be disposed regularly and on time	September, 2017 and regularly	
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54. Above mentioned issues are reflected on the Pictures (See Appendix No.1)

55. Recommendations for the Environmental, Health and Safety issues which failed to have been executed are reflected in the non-compliances and corrective action plan in the table under Table No.15.

56. For the pending issues further recommendations are as follows:

**Table 15: Recommendations to Address HSE Issues**

Recommendations	Responsible Party
<b>Main Road (Lot 2)</b>	
Sections of the Project road where it is considered in the design shall be filled with sand and gravel and covered with topsoil; For stabilization of cut and embankment it is necessary to seed grass on slopes of embankment and plant bushes on slopes of cut;	Contractor to perform physical interventions; Engineer to monitor progress.
Cut trees within the construction project shall be identified with attendance of the representative of Forest Department of Kobuleti and handed over to the local forestry based on the appropriate Act	Contractor to perform physical interventions; Engineer to monitor progress.
Sections of road where big amount of dust is accumulated due to movement of the Contractor's heavy equipment should be regularly and intensively watered.	Contractor to perform physical interventions; Engineer to monitor progress.
<b>Camp Sites (Choloki, Ochkhauri, Laituri, Bobokvati and Chakvi)</b>	
Used material (scrap metal, tires etc.) should be hauled offsite for recycle/beneficial reuse on a regular basis or transported to the Laituri campsite, which is now under ownership of the Contractor.	Contractor; Engineer to perform inspection
Waste Management on a regular basis as per ECP #1	Contractor; Engineer to perform inspection
Complete restoration of the closed campsites as per requirements of ADB	Contractor; Engineer to perform inspection
Cleaning of Chakvi and Bobokvati campsites places contaminated with the concrete	Contractor; Engineer to perform inspection
Continued contamination of adjacent areas to the refueling station at the Chakvi Camp	Contractor; Engineer to perform inspection
Sedimentation ponds at Chakvi Camp requiring regular maintenance with the removal of sediment and installation of absorbent barriers to ensure hydrocarbon materials are absorbed before water is discharged to the river	Contractor; Engineer to perform inspection
Lack of secondary containment for back-up generator at Chakvi Camp and significant contamination of the ground areas adjacent to the generator. Used oil barrels are not stored properly and left directly on the ground	Contractor; Engineer to perform inspection
<b>Quarry Sites</b>	
Condition of planted trees and bushes shall be monitored and in case	Contractor;

of loss shall be compensated	Engineer to perform inspections Sub-Contractor "Solo"
<b>Tunnels</b>	
Territory of Tunnel #2 shall be cleaned from household and construction waste and transported to the dump site.	Contractor; Engineer to perform inspection

### 3.5 Consultations and Complaints

#### 3.5.1 HSE issues reported through the Grievance Redress Mechanism (GRM) Process

57. GRM has not identified any complaints in the second half of 2017.

#### 3.5.2 Health and Safety issues, raised by the local Government Institutions

58. Based on the information provided by the Supervision Service of Department of the Environmental Protection of Adjara, there was no incidents identified violating Administrative Code of Georgia in the second half of 2017 (**Accidents and Near Misses Log Book is attached as Annex 1**).

#### 3.5.3 Trainings

59. In the second half of 2017 the following trainings have taken place:

- In the monthly report of the Contractor chapter "Health, Safety & Environment" it is mentioned that trainings are regularly conducted concerning the mentioned issues.
- Training for Contractor's Georgian labor and specialists of the supervision team of the Engineer concerning actual issues of waste management have been carried out by the Engineer's Environmental Specialists.

### PART IV – Action Plan for the Next Period

- In terms of the defined action plan for the mitigation measures to be undertaken during the next period please see tables 12 and 15.

# **ANNEXES**

- I. ACCIDENTS LOG BOOK**
- II. PROJECT PHOTOS**

## Annex 1 – Accidents and Near Misses Log Book

### Records of accidents occurred in project during 2013-2017

No.	Date	Description	Measures Taken	Follow up
1	3rd May 2013, 19:00	Dumper #21 (IAI-075) hit the tail of the front car during high-speed driving at the entrance of Camp #1, which caused a serious damage on the head of the dumper and cost a direct loss of 10,000 Gel	The Contractor reported to the police at the very first time and handed over the accident to the local patrol police. Then the Contractor sent the driver to the local hospital immediately, and the driver was examined and confirmed no big harm. The Contractor set an example based on this accident and gave safety education to all drivers in this project team by team.	The police confirmed the Georgian Driver Jemali (61004002835) to take the full responsibility and he should undertake part of the loss of the Contractor.
2	On July 10, 2013, on Laituri- Natanebi Road,	The dumper N2 (number CBC 630), of SinoHydro Co. LTD, driven by Zurab Inaishvili, was fallen in accident. The driver was driving the dumper in over speed mode. The driver was seriously injured and admitted in to Hospital. Rescue Service and Ureki regional police representatives arrived at the scene within half an hour. The victim was taken out of the car and immediately transported in Medical Centre of Kutaisi.	The victim was taken to the hospital of Kutaisi. His leg was amputated. He has been supported by the Contractor as well as Supervision Engineers. All necessary expenses for the treatment and rehabilitation was funded by the employer company, "SinoHydro Ltd". But finally he died on September 13, 2013.	Contractor strengthened safety management on the quarry adjacent areas. They have installed additional safety signs, Drivers were once again instructed regarding safety measures during work time on Camp N1 which will decrease risk of the same accidents. Also Social specialist of Supervision Team has strengthened the control on the fulfillment of mentioned conditions.
3	16 <sup>th</sup> September 2013	Georgian worker from team of Mr. Chen Yuming was injured by the grader at the construction site. His foot was hurt and was sent to hospital immediately.	The doctor of campsite took the worker to Kutaisi hospital to have further examination.	The Contractor fully covered treatment cost.
4	16 <sup>th</sup> September 2013	On September 16 <sup>th</sup> , a car accident occurred on the main road outside campsite #2. Due to the fact that local car over-speeded the girder vehicle of Sinohydro was hit. Left bumper and front lights were damaged.	After the accident both cars were dragged into police detaining area.	Court has not yet issued decision about this case.
5	18 <sup>th</sup> September 2013	On September 18 <sup>th</sup> , one Georgian worker's foot was injured by the roller on the asphalt pavement site while refueling, due to the driver's	The worker was sent to the hospital immediately	The Contractor fully covered treatment cost .

No.	Date	Description	Measures Taken	Follow up
		failing to brake in time.		
6	27 <sup>th</sup> September 2013 1:00am	Case near Bridge #5 of Lot 2 was stolen. Thief was caught by police. Over 40 meters cable was stolen and over 1000 Gel loss was caused to the company.	Sinohydro has made a claim on the case and transferred the case to judicial practice	
7	28 <sup>th</sup> September 2013	The storehouse in Camp #4 was broken, in particular a hole with over 1 diameter was cut in the back wall of the room. 2 new water pump, 1 electric hammer, 1 percussion drilling machine were found lost.	The man on duty in the campsite that day was fired and deducted the monthly salary.  The police registered and started the investigation.	The Contractor has enhanced safety at campsites by hiring local company.
8	9th Oct. 2013	On 14:20 of 9th Oct. 2013, dumper #31 (IAI-067) crushed into a tree at 1500m from railway bridge and 150m from curve while returning Laituri Campsite from filling spot at section km3+420-km3+700 due to speeding and delay of turning, which caused damage on the front windshield, headlight, engine cover and headstock and led to a loss of 7852.81 Gel	The Contractor reported to the police at the very first time and handed over the accident to local patrol police. The driver, Ramaz (33001009318), proved himself to be safe and sound. The Contractor set an example based on this accident and gave safety education to all drivers in this project team by team.	The police has identified driver of dumper #31, Ramaz (33001009318), to be the person responsible.
9	Jan. 15, 2014	At about 15:20pm, the carriage of dumper No.40 hit overhead wire so that the electric wire was torn down when the dumper was unloading and filling material at KM8+123.	① The Contractor has investigated the reason of the accident and dealt out punishment to the person responsible for the accident after occurrence of the accident. ② The Contractor has conducted safety education and safety technical disclosure to all drivers of transportation team. ③ The Contractor has arranged personnel to restore the wire.	
10	Jan. 16, 2014	At 23: 05 pm, a dumper tore down an overhead telephone line at bridge 3#.	The Contractor has arranged personnel to restore the line.	
11	Jan. 21, 2014	At 19:43 pm, dumper 14# tore down an electric wire on road side from bridge 3# to quarry.	The Contractor has arranged personnel to restore the line.	
12	Feb. 14, 2014	At about 00:16, dumper 25# rolled over around the corner right ahead of registration office of quarry when turned the corner.	The Contractor has set up safety warning tape and reflective indication sign.	

No.	Date	Description	Measures Taken	Follow up
13	Mar. 03, 2014	At about 14:50, mixer truck was bogged into the right side of local road at bridge 8#.	The Contractor has tamped the place where the accident happened after occurrence of the accident	
14	Mar. 05, 2014	At about 04:50, dumper 5# ran into a tree at the left side of the road when returned to quarry from filling field of bridge 8# passing by bridge 7#, which resulted in serious damage on the head of dumper 5#, fortunately, the driver wasn't injured.	① The Contractor has investigated the reason of the accident and dealt out punishment to the person responsible for the accident after occurrence of the accident. ② Reflective paper has been pasted on the tree located at road side.	
15	Mar. 07, 2014	At about 17:46, mixer truck rolled over at the straight line section of the temporary road between culvert 22# and culvert 23#.	① The Contractor has investigated the reason of the accident and dealt out punishment to the person responsible for the accident after occurrence of the accident. ② Reflective paper has been pasted on the tree located at road side.	
16	5th May 2014	At 3:40pm, a reinforced pier at P1 Bridge #11 fell down, which caused wrist minor fracture on one Georgian worker	① Immediately dialed emergency call and sent the injured worker to the hospital the shortest possible time. ② Marked and kept range of accident site to analyze the cause	
17	24th May 2014	At 9:30am, one dumper fell into a side ditch near Bridge #1. No one injured.	Immediately sent a crane to lift the dumper up	
18	9th Jun. 2014	At 10:30am, reinforcement bars at culvert #31 fell down on one side, which caused minor foot-jam injury on one Georgian worker and minor skin abrasion on one Georgian worker.	① Immediately dialed emergency call and sent the injured worker to the hospital the shortest possible time.	Worker was taken to hospital for Site Checking. Give safety education to all the site workers
19	9th Jun. 2014	At around, 9:30, during the installation of culvert #31, the reinforcement frame collapsed and caused injury on two Georgian workers (one scratching on the arm, another crushed by frame on the leg while bone is alright).	1. The injured worker was sent to the hospital for cure at the first time. 2. All the safety measures on site were checked and made corrections before starting again.	Two workers recovered the next day and were able to work again.
20	15th June	At around 10:20, during construction of wing wall of culvert #27, working excavator damaged exposed gas pipeline and caused a leakage of natural gas.	1. Inform the gas company at the first time. 2. Relevant works suspended before the relocation of gas pipeline.	Works of wing wall at culvert #27 suspended.
21	28th Oct. 2014	At around 11:30 in the morning, when dismantling the scaffolding one worker	① After the accident, the responsible person on site called emergency at first time	

No.	Date	Description	Measures Taken	Follow up
		entered restricted area and one formwork falling from above. The accident caused a injury on the head and canthus. However the worker was wearing the helmet, the accident did not cause any fatal result.	and sent the injured worker to the hospital within shortest time; ② Mark the warning line to protect accident site to analyze the reason; ③ After the accident, the project member organized all the staff in charge of scaffolding working for a safety education and punished the Contractor leader;	
22	29.04.2015	Around 11:20 a.m in 10 <sup>th</sup> span of Bridge #7, one Georgia worker ID #61004014469 sat on the rail of bracket and used spot welding on the steel mould without fastening his safety belt and also the bowls clasp was not tightly fastened. So he fell down from the rail bracket (height around 1m) and injured slightly.	1. Construction manager should educate works to identify the risk and take control of the risk referring to the Safety/Risk card of Construction Site. 2. The man who is in charge of work area II of the structure should ensure the safety and avoid this kind of accident from happening.	After the accident the injured Georgian worker was sent to the nearest hospital of Kobuleti immediately and then he was transferred to the hospital of Batumi for review. The diagnostic report showed that it was slight
23	01.07.2015	In Chakvi Camp Georgian steel fixer ID #61004054498 fractured his right brow ridge somewhere and bled after morning works	1. Construction manager should strengthen management of Georgian workers and avert accidents which happens outside the site during lunch break 2. There should be set a clinic in Chakvi Camp for the convenience of treating injured workers timely.	After the accident happened the Georgian worker was send to the clinic in Choloki Camp and the doctor bandaged his wound and then sent him back home for recuperation. The next days he came back to works in Chakvi Camp.
24	07.12.2015	At about 16:15 worker Omar Abashidze (born in 1975, living in Vil. Kvirike) fell down from bridge pier during dismantling MSS on span #12 of Bridge #11. Unfortunately, he deceased at the accident place. At the accident place there was helmet and safety belt which according to the explanation of the workers was worn by the deceased person. The safety belt was not damaged or torn.	Construction manager should educate works to identify the risk and take control of the risk referring to the Safety/Risk card of Construction Site.	Further to this accident the Contractor has provided safety education sheets signed by deceased person which every worker receives each day before commencement of the works. The investigation of the accident was completed. The result was that the deceased person violated safety rules which caused the accident. Furthermore, Contractor enhanced education of the workers on safety and toughened financial sanctions when workers

No.	Date	Description	Measures Taken	Follow up
				violate safety rules. Contractor added three specialists at the Site.
25.	May, 2017	The Contractor was instructed to provide relevant lighting during night shifts. This was especially related to construction site of BR-09 as during concreting the span of bridge it is difficult for the drivers of concrete mixers to turn the car when the lighting is not sufficient and this can cause accident.	Contractor considered Engineer's instruction	May, 2017