

**BI-ANNUAL ENVIRONMENTAL MONITORING  
REPORT**

**Loan No. 02560 – GEO  
JANUARY – JUNE 2016**



**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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**Endorsed by:.....Date:.....**

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## EXECUTIVE SUMMARY AND CONCLUSIONS

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.

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.

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. An inspection audit was carried out by the Engineer's International Environmental Specialist in early April 2014, which became the basis for the writing of the Quarterly Environmental Monitoring Report for the Employer (RD-MORDI) and Financier (ADB). The environmental, health and safety (EHS) issues observed within the period are generally categorized into the following: (i) Main road and access roads; (ii) Camp sites (iii) quarry site, (iv) crushing plant, (v) Rivers crossing the main road (vi) general safety concerns, (vii) Documentation and record keeping requirements.

Following the inspections of the environmental specialist, an Environmental Action Plan was drafted and signed both by the Engineer and Contractor for the implementation of necessary measures. A seminar on Environmental Health and Safety was conducted by the International Environmental Specialist for the Contractor's and Engineer's staff during the reporting period. It was helpful in clarifying issues and facilitating the implementation of needed corrective measures. At this stage of the project, the Contractor has improved significantly in operating an environmental management system.

## PART I: INTRODUCTION

### 1. PRELIMINARY INFORMATION

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

The Republic of Georgia, with its 4.5 million people, 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; (ii) and their development will enhance economic growth through more efficient passenger and freight transport, while enhancing safety.

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.

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 + 3 – Km 0 to Km 12.4 bypassing Kobuleti Town – a new alignment; widening of existing road from Km 31.3 to Km 32.3 near Makhinjauri tunnel
- Contract 2 – Km 12.4 to Km 31.3 bypassing Kobuleti Town – a new alignment
- Contract 4 – Km 32.3 to Km 48.470 bypassing Batumi Town – a new alignment

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 EA's engineers

<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

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, and 3 are covered in Tranche 1 while Contract 4 will be covered in Tranche 2.

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

The Kobuleti Bypass section is part of the so-called Adjara Bypass Project along the Poti – Batumi – Sarpi 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.

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).

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<sup>0</sup>C in winter to 22.5<sup>0</sup>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.

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.

<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

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.

The baseline environmental information gathered during the drafting of the EIA for the project are 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.

The estimated population in 2014 in Adjara Region is around 396,000, consisting of 51% living in urban areas and 49% 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 2,039 million, contributing to 8% of the GDP of Georgia. The main industries in Adjara are manufacturing, agriculture and tourism. 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 with active construction is shown in Figure 1 below.



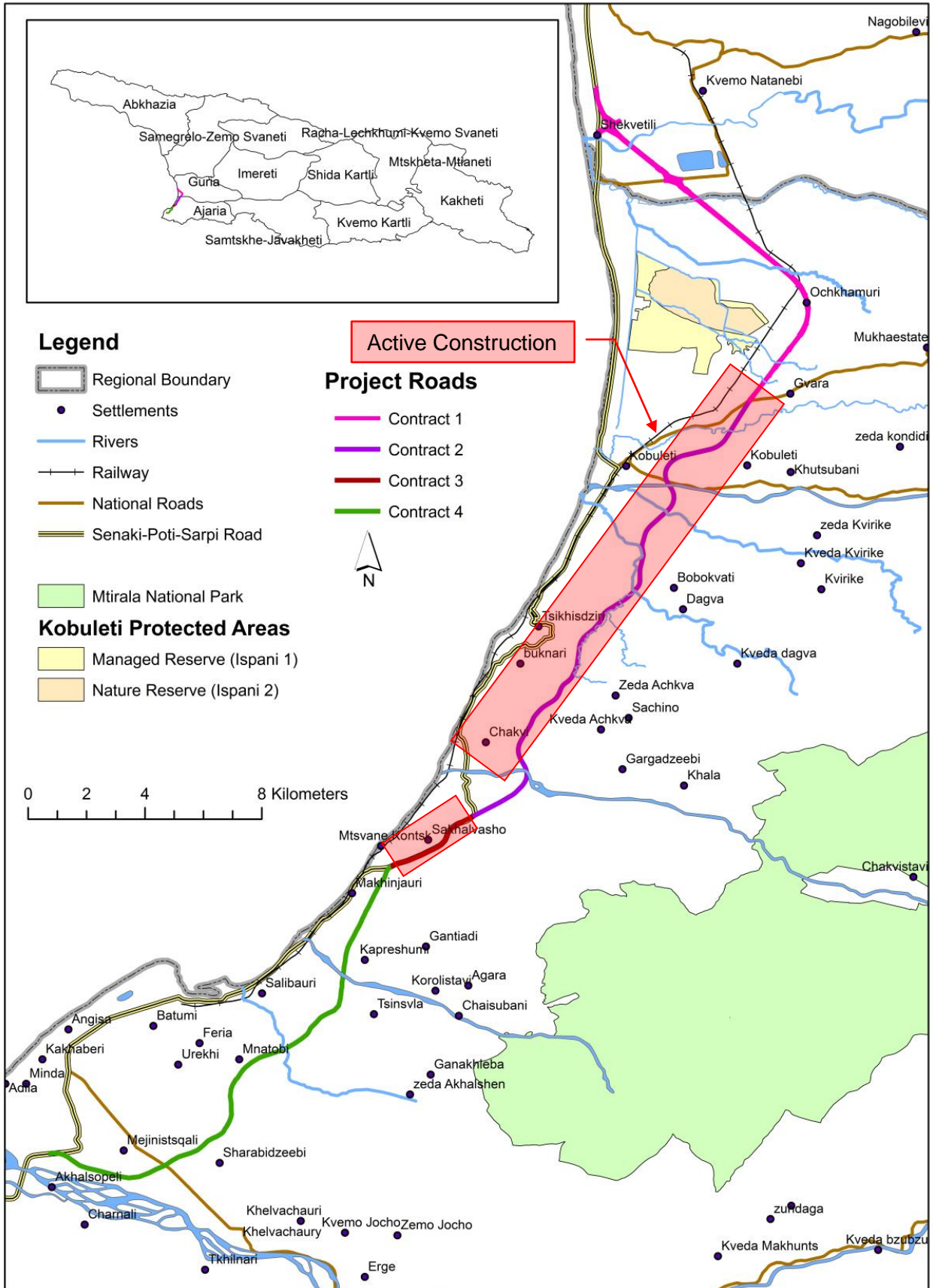


Figure 1: Location Map of the Project



## 2. ENVIRONMENTAL MONITORING WORK COORDINATION

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) domestic 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).

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.

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.

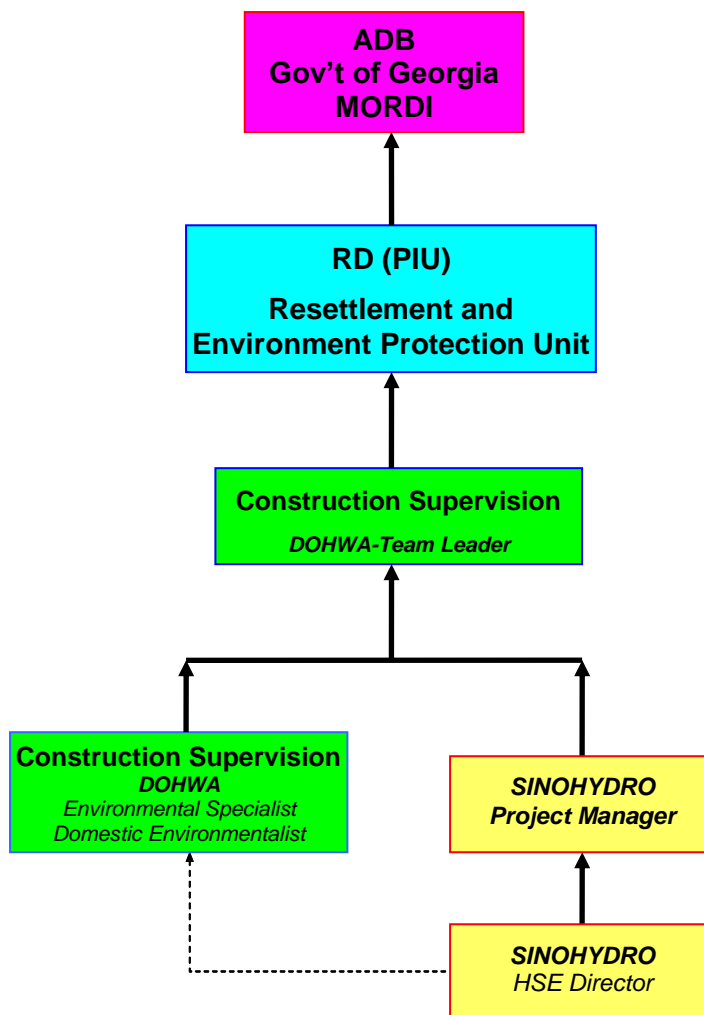


Figure 2: Environmental Monitoring Work Coordination Set-Up

## PART II: ENVIRONMENTAL MONITORING

### 3. PREVIOUS SIX-MONTH CONSTRUCTION ACTIVITIES

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	17.394	92.24	
	On interchanges, junctions and local roads	km	8.770	4.059	46.2	
	Removal and disposal of wire mesh fences	m	1,700	1,700	100	
	Cutting of trees (d >1 m), saw cut and disposal	unit	153	126	82.4	
	Cutting of shrubs, uprooting and transportation	ha	117	113	96.58	
	Demolition of Walls	m <sup>3</sup>	200	55.20	27.6	
	Tree felling & removal of Trees greater than 0.1m in grith	each	860	90	10.47	
	Demolition of Buildings	m <sup>3</sup>	7,650	1,042	13.62	
	Removal & Disposal of Concrete Fences	m	300	31.00	10.3	
<b>Earthwork</b>						
2	Removal of top soil, loading and transportation	m <sup>3</sup>	234,780	234,780	100	
	Excavation of soil and disposal (suitable for embankment filling and unsuitable)	m <sup>3</sup>	759,655	454,053.48	59.77	
	Shaping, leveling and compaction of roadbed surface	m <sup>3</sup>	278,156	194,172.74	69.81	
	Construction of embankment (from quarry to fill)	m <sup>3</sup>	2,389,048	2,389,048	100	
	Transport of Stockpiled topsoil and spread on embankment slopes	m <sup>3</sup>	134,879	112,965.98	83.75	
	Construction of vertical drainage in weak soils (PVD)	m	548,857	308,406	56.2	
	Sand blanket, 1500 mm thick	m <sup>2</sup>	55,553	54,419	98.0	
	Laying geotextile, 250 g/m <sup>2</sup> , in reinforced embankment	m <sup>2</sup>	55,533	42,844	77.1	

Bridges						
3	Construction of Reinforced Concrete Bored Piles	ea	1,159	1,108	95.60	
	Bridges #1,#2,#3,#4, #5, #6, #7, #8, #9, #10, #11, Construction of Raft Foundations	unit	82	67	81.70	
	Bridges #1,#2,#3,#4, #5, #6, #7, #8, #9, #10, #11 Construction of Pier Columns	unit	164	129	78.66	
	Bridges #1,#2,#3,#4, #5, #6, #7, #8, #9, #10, #11 Construction of Cross Beams	unit	82	59	71.95	
	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	26	86.67	
	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, #10 & #11. Installation of Pre-Cast Concrete Sidewalk	m	6,003	3,600	59.97	
	Bridges #1, #2, #3 and #4 Installation of transition slabs	m <sup>3</sup>	207	207	100.00	
	Bridge #7 Cast In-Situ Concrete Slab	m	480	480	100.00	
	Bridge #8 Cast In-Situ Concrete Slab	m	480	480	100.00	
	Bridge #10 Cast In-Situ Concrete Slab	m	480	480	100.00	Commenced May 01, 2015. Completed on 23 January 2016
	Bridge #11 Cast In-Situ Concrete Slab	m	920	840	91.30	Commenced (MSS) May 11, 2015

Reinforced Concrete Culverts/Underpasses						
4	Pipe culvert (pre-cast), d = 1.5 m	unit	40	26	65.00	
	Box culvert (pre-cast), 2.5 x 2.5 m, 4.0 x 2.5 m	unit	16	14	87.5	
	Cast-in-situ box underpass, 5.0 x 6.0 m, 4.0 x 4.0 m	unit	14	14	100	Corrugated Pipe #32
Tunnels (Tunnel #1)						
5	Excavation of Upper Soil Layer of Category V by Drilling and Blasting	100m <sup>3</sup>	18.80	8.40	44.7	
	Installation and removal of temporary support	Soil 100m <sup>3</sup>	282.57	73.18	25.9	
	Operation of Roadheader	Vehicle/hr	851.80	360.50	42.3	
	Drilling of Boreholes, applying of Anchorage (Ø25)	ton	35.53	0.96	2.70	
	Boring of holes D=60~125 in soil , Depth 6~13,5 m	100m	355.23	149.88	42.19	

	Soil grouting with cement m-400 and water glass	m	35,523	14,923	42.01	
	Grating block concrete (1500x1500x400), fill improvement	100m <sup>2</sup>	21.58	13.56	62.8	
	Earth anchor construction(Φ105, Φ12.7mm x 4 strand, L=12m)	ea	562.00	491	87.4	
	Earth anchor construction(Φ105, Φ12.7mm x 4 strand, L=14m)	ea	111.00	111	100	
	Installation of FRP Pipes in the Opening D=Ø114mm	100m	190.44	90.96	47.76	
	Applying of Normal Shotcrete in the Main tunnel (t = 5cm, C20/25)	100m <sup>2</sup>	130.85	13.85	10.6	
	Installation of Permanent Steel Frames	ton	261.71	107.30	41.00	
	Applying of Normal Shotcrete in the main structure (t=25cm, C28/35)	100m <sup>2</sup>	83.95	20.95	25.0	
	Wire Mesh (100 X 100 X Ø4.8)	ton	56.24	26.66	47.40	
	Equipment for applying shotcrete (cement canon)	Vehicle/hour	1,456.86	1,063.93	73.03	
	Installation of FRP Pipes in the opening D = 60mm	100m	14.40	0.96	6.7	
	Ventilation	shift	874.29	520.34	59.52	
	Electric Lighting	shift	874.29	597.34	68.32	
<b>Tunnel No. 2</b>						
	Excavation of Soil, Category II by Excavator of 0.5m <sup>3</sup> capacity	1000m <sup>3</sup>	183.49	165.55	90.22	
	Removal of Soil	ton	165,138.26	152,167.14	92.15	

<b>Asphalt Pavement – Main Road</b>						
<b>6</b>	Provide and Construct Granular Subbase, 320mm thick	m <sup>3</sup>	70,127	51,682	73.70	
	Provide and Lay Granular Base Course, Compacted thickness 150mm	m <sup>2</sup>	181,014	139,238	76.92	
	Provide and Apply Prime Coat as specified including preparation of surface	m <sup>2</sup>	173,378	109,153	62.96	
	Provide and Lay Bituminous Base, compacted thickness 100mm	m <sup>2</sup>	172,678	107,508	62.26	
	Provide and apply Tack Coat as specified including preparation of surface	m <sup>2</sup>	171,989	106,500	61.92	
	Provide and Lay Asphalt Binder Course, compacted thickness 40mm.	m <sup>2</sup>	171,703	106,145	61.82	
	Provide and Apply Tack Coat as specified, including preparation of surface	m <sup>2</sup>	171,433	14,422	8.41	

Provide and Lay Asphalt Surface Course, compacted thickness 40mm	m <sup>2</sup>	171,155	14,243	8.32	
<b>Asphalt Pavement – Ramps at Intersection</b>					
Provide and Construct Granular Sub-base, 260mm thick	m <sup>3</sup>	22,807	2,630.97	11.54	
Provide and Lay Granular Base Course Compacted thickness 150mm	m <sup>2</sup>	64,514	6,152	9.54	
Provide, Lay and Compact Granular Material for shoulders	m <sup>3</sup>	15,540	1,278.36	8.23	
Provide and apply prime coat as specified incl. preparation of surface	m <sup>2</sup>	60,609	7,886	13.01	
Provide and Lay Bituminous Binder Course, compacted thickness 100mm	m <sup>2</sup>	60,253	7,444	12.35	
<b>Gravel Pavement – Local Roads</b>					
Provide and Construct Granular Leveling Layer for Local Roads	m <sup>3</sup>	1,180	744.5	63.1	
Provide and Construct Gravel Surface Layer for Local Roads	m <sup>3</sup>	1,048	239.2	22.8	

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.

#### 4. FRAMEWORK FOR ENVIRONMENTAL MONITORING

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”.

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:

<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



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

<b>Environmental Aspect</b>	<b>Subtopics</b>
1. Management Plan for Protection of Ispani Mire and Swampy Soils (Km 4.76 to Km 8.5)	1.1 Hazardous material storage sites
	1.2 Earth works
	1.3 Erosion and drainage
2. Protection of Flora	2.1 Endangered species
	2.2 Vegetation clearance
3. Protection of Fauna	3.1 Construction activities
	3.2 Poaching
4. Protection Fisheries	4.1 Construction of Bridge Substructure
	4.2 Construction works in the rivers and on the surrounding lands.
5 Waste Management	5.1 General Waste
	5.2 Spoil
	5.3 Hazardous Waste
6. Fuels and Hazardous Goods Management	6.1 Fuels and hazardous goods.
7. Water Resources Management	7.1 Hazardous Material and Waste
	7.2 Discharge from construction sites
	7.3 Construction of Bridges/drainage structures in streams/rivers
	7.4 Soil Erosion and siltation
	7.5 Construction activities in water bodies
8. Drainage Management	8.1 Excavation and earth works, and construction yards
	8.2 Fresh road cuts may immediately trigger intensive erosion during construction and drastic increase of sedimentation
	8.3 Ponding of water
9. Soil Quality Management	9.1 Earth filling with borrow material
	9.2 Storage of hazardous and toxic chemicals
10. Top Soil Management Plan	10.1 Land clearing and earth works
11. Topography and Landscaping	11.1. Land clearing and earth works
12. Borrow Areas Development & Operation	12.1 Degradation of borrow areas
13. Air Quality Management	13.1 Construction vehicular traffic
	13.2 Construction machinery
	13.3 Construction activities
14. Noise and Vibration Management	14.1 Construction vehicular traffic
	14.2 Construction machinery
	14.3 Construction activity
15 Road Transport and Road Traffic Management	15.1 Construction vehicular traffic
16. Construction Camp Management	16.1 Siting and Location of construction camps
	16.2 Construction Camp Facilities
	16.3 Disposal of waste
	16.4 Fuel supplies for cooking and heating purposes
	16.7 Site Restoration
17. Cultural and Religious Issues	17.1 Construction activities near religious and cultural sites
18. Worker Health and	18.1 Anthrax

Environmental Aspect	Subtopics
Safety	18.2 Best practices
	18.3 Water and sanitation facilities at the construction sites
	18.4 Trainings

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. On Waste Management: (i) Approval of the rules of collection, storage and neutralization of the wastes of preventive treatment establishments” 16 August of 2001, 300 (“Georgian Legislative Messenger” N90 24/08/2001) (ii) “Approval of arrangement of polygon/grounds for disposal of solid household wastes and adoption of sanitary rules and norms” 24 February, #36 (Georgian Legislative Messenger #17, 07.03.03)
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 creation and management of Kolkheti protected areas
7. Law of Georgia ‘On the Red List and Red Book’, 2003
8. Law of Georgia ‘On the Red List and Red Book’, 2003
9. Law of Georgia on Cultural Heritage, 2007
10. Environmental Standards and Norms: (i) Ambient Air Quality Norms; (ii) Noise Standards;

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

Also in terms of the noise quality standards for residential areas the following guidelines are adopted<sup>9</sup>:

**Table 5: Georgian Noise Quality Standards in Residential Areas**

Time	Indicative Level (dBA)	Maximum Admissible Level (dBA)
7am – 11 pm	55	70
11pm – 7am	45	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

<sup>9</sup> Ibid

## 5. ENGINEER'S ENVIRONMENTAL AUDITING PROTOCOL AND EMMP

Pursuant to the construction supervision ToR, that the “environmental specialist will develop an environmental auditing protocol for the construction period, formulate a detailed environment monitoring and management plan (EMMP)”, a work-process arrangement was conceptualized to be undertaken by the local as well as the international environmental specialist. The monitoring and management scope can be subdivided into the following:

### 1. Field Supervision

- a. **Field visits** – The environmental specialists should be conducting constant field visits to observe and identify any environmental issues that violates the EMP and any prevailing regulations -
- b. **Inspection photo documentation** – During field inspections, photos should always be taken of any field situation as part of the documentation
- c. **Inquiry with field people** – Background information should be gathered pertaining to the issues observed and this can be obtained from field workers, inspectors, and the community
- d. **Witnessing Parameter Measurement** – Whenever any field measurements should be done by the Contractor, the environmental specialist should always be present to observe the process and to note down his observations.

### 2. Meetings and Discussions

- a. **Consult with TL/DTL** – The environmental specialists should consult with the Team Leader and/or Deputy Team Leader on any environmental issues. He should advice TL and/or DTL on the physical and legal implications of the situations and consider these items in the drafting of “Non-conformance Letters” to the Contractor.
- b. **Discuss with Contractor's HSE** – Any environmental issue should be discussed with the Contractor's HSE in order to determine their commitment in undertaking environmental mitigation measures.
- c. **Presentation & Seminars** – Part of the scope of the environmental specialist is to develop a program for hands on training of Contractor's staff in implementing the EMMP.

### 3. Document Checking

- a. **EMP/ Supplemental Plans & Method Statements** – The environmental specialists should check the documents submitted by the Contractor and comment on their appropriateness and completeness as prescribed in the Technical Specifications and Contract Documents
- b. **Checking Parameter Measurement Results** – The environmental specialist should inspect in detail the results of the parametric Measurements in order to determine any indication of any situation different from normal conditions. When this is discovered, the environmental specialist should alert the Contractor for immediate action. A re-confirmation of the data will serve as secondary check if everything is within the acceptable limits.
- c. **Contractor's Reports and Monitoring Data** – The environmental specialist should also verify reports submitted by the Contractor especially on the evaluation of results of the parametric measurement for air, noise, and water quality.
- d. **Checking of Legal Documents** – permits and all legal documents with relevance to environmental items should be thoroughly checked by the environmental specialist for legislative compliance. This pertains to quarry and borrow pit permits, site approval for campsite, asphalt plant, concrete batching plant and crusher.

#### 4. Report Writing

- a. **Monthly Reports** – Environmental issues should be reported regularly in the monthly reports by the Contractor and to be commented on by the environmental specialist.
- b. **Quarterly Reports** – Results of parametric measurements for noise, surface water, groundwater for drinking, air quality and dust should be reported by the Contractor on a quarterly basis as mentioned in the environmental monitoring plan. These results should be assessed by the environmental specialist for appropriate mitigation measures. The environmental specialist is also obligated to come up with quarterly environmental report to be submitted to the Client and ADB.
- c. **Bi-Annual Reports** – As mentioned in the Particular Conditions of Contracts, the Contractor should come up with a bi-annual environmental report. Upon submission, the environmental specialist should evaluate the environmental report and come up with general comments. As part of the Engineer's reporting obligation a bi-annual report should be compiled by the environmental specialist and to be submitted to the Client and ADB after every six months of monitoring.

The Engineer's environmental audit protocol and environmental management and monitoring plan are shown in the diagram (Figure 3) below.

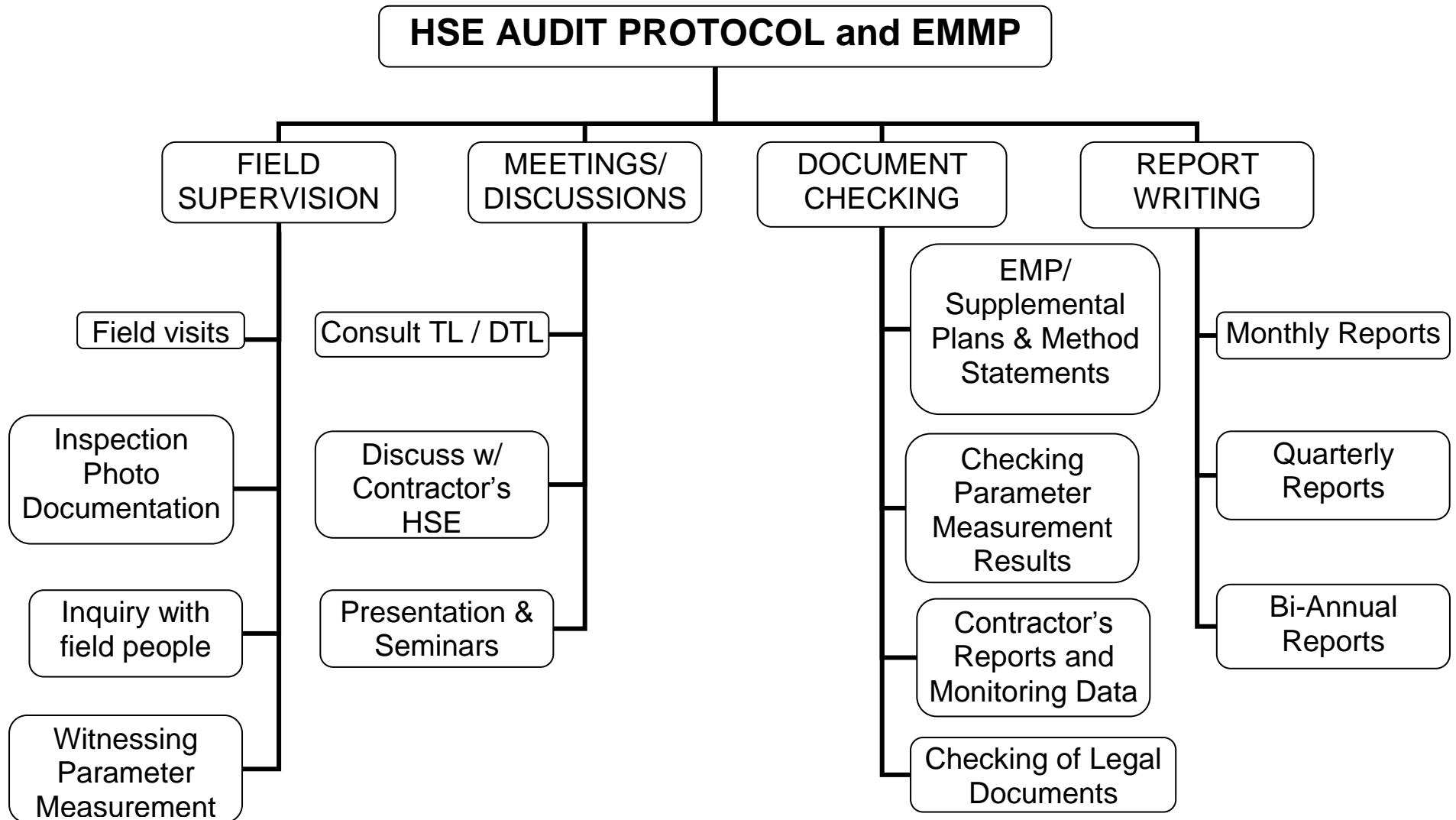


Figure 3: Engineer's Environmental Audit Protocol and EMMP

## 6. SUMMARY OF PERFORMED ENVIRONMENTAL MONITORING ACTIVITIES

Within the previous six (6) months, from January to June 2016, 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 Environmental Chapter of the monthly report of the Engineer..

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; and (vii) worker safety, general hygiene and sanitation.

The Contractor carried out instrumental measurements for air quality and noise from January to June, 2016. Measurement of surface water and groundwater quality was carried out in March and May, 2016. Water quality measurements should be carried out on a quarterly basis, especially for groundwater in camp sites as this has direct impact on the health of the work personnel. 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 2016 indicate that the concentrations are below the threshold levels.

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 January-June 2016**

	Location	Permeable limit	Jan	Feb	Mar	Apr	May	Jun
1	<b>Choloki Campsite</b>	0.5	0.022	0.021	0,022	0.021	0.019	0,021
2	<b>Ochkhamuri Campsite</b>	0.5	0.018	0.018	0,019	0.020	0.019	0,023
3	<b>Laituri Campsite</b>	0.5	0.020	0.022	0,021	0.022	0.023	0,026
4	<b>Bobokvati Campsite</b>	0.5	0.019	0.021	0,020	0.020	0.019	0,021
5	<b>Chakvi Campsite</b>	0.5	0,034	0.027	0,031	0,029	0,025	0,031
6	<b>Bridge #1</b>	0.5	0.020	0.021	0,024	0.022	0.028	0,027
7	<b>Bridge #2</b>	0.5	0.019	0.021	0,022	0.021	0.022	0,025
8	<b>Bridge #3</b>	0.5	0.031	0.025	0,027	0.023	0.016	0,018
9	<b>Bridge #4</b>	0.5	0.028	0.025	0,026	0.024	0.015	0,017
10	<b>Bridge #5</b>	0.5	0.018	0.018	0,019	0.018	0.019	0,019
11	<b>Bridge #6</b>	0.5	0.021	0.022	0,023	0.021	0.017	0,020
12	<b>Bridge #7</b>	0.5	0.019	0.021	0,020	0.019	0.014	0,017



13	Bridge #8	0.5	0.018	0.019	0,022	0.021	0.018	0,019
14	Bridge #8 <sup>1</sup>	0.5	0.021	0.021	0,023	0.022	0.020	0,022
15	Bridge #9	0.5	0.020	0.019	0,023	0.027	0.023	0,026
16	Bridge #10	0.5	0.022	0.019	0,021	0.021	0.017	0,023
17	Bridge #10 <sup>1</sup>	0.5	0.023	0.019	0,023	0.023	0.017	0,025
18	Bridge #11	0.5	0.031	0.025	0,032	0.028	0.029	0,026
19	Bridge #11.1	0.5	0.023	0.022	0,033	0.025	0.024	0,027
20	Bridge #11.2	0.5	0.022	0.023	0,027	0.024	0.023	0,021
21	Tunnel #1	0.5	0.024	0.027	0,024	0.026	0.022	0,027
22	Tunnel #2	0.5	0.017	0.022	0,019	0.021	0.022	0,031

(ii) **Noise Level** – only sites with active construction was taken for noise measurements. Noise measurements was carried out in January-June 2016. Measurement data is listed in table 7 below.

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

**Table 7: Noise Measurements (Average) at selected sites for Jan-June 2016 (dB)**

	Location	Permeable limit	Jan	Feb	Mar	Apr	May	Jun
1	Choloki Campsite	75-80	51.6	53.2	52,6	53.1	53.7	57,0
2	Ochkhamuri Campsite	75-80	53.5	53.5	53,9	53.3	53.8	57,7
3	Laituri Campsite	75-80	62.9	63.2	58,4	57.0	60.8	62.5
4	Bobokvati Campsite	75-80	54.4	55.4	59,3	56.6	58.5	60.9
5	Chakvi Campsite	75-80	57.8	57.8	60,5	60.5	59.4	62.7
6	Bridge #1	75-80	58.0	55.7	59,3	57.3	60.9	60.5
7	Bridge #2	75-80	58.8	58.1	62,5	59.0	60.3	61.4
8	Bridge #3	75-80	59.2	57.4	60,5	57.7	59.7	60,7
9	Bridge #4	75-80	60.0	58.0	60	57.8	53.4	56.2
10	Bridge #5	75-80	59.0	56.0	61,8	58.4	58.8	57.2
11	Bridge #6	75-80	56.2	55.2	59,7	58.2	58.5	58.7
12	Bridge #7	75-80	55.3	55.0	62,5	55.6	56.2	59,5
13	Bridge #8	75-80	56.4	55.8	59,1	58.1	58.0	59,2
14	Bridge #8 <sup>1</sup>	75-80	57.1	55.8	59,3	58.3	59.0	60.0
15	Bridge #9	75-80	53.4	55.4	59,8	56.5	57.2	57.2
16	Bridge #10	75-80	51.7	53.4	59,7	57.5	57.7	58.1
17	Bridge #10 <sup>1</sup>	75-80	51.9	53.8	61,3	62.1	54.9	58.9
18	Bridge #11	75-80	54.9	54.4	60,2	56.7	60.5	59.0
19	Bridge #11.1	75-80	57.7	55.2	59,6	55.5	63.4	62.4
20	Bridge #11.2	75-80	53.9	54.1	62,8	54.7	58.8	60.1
21	Tunnel #1	75-80	62.8	60.7	61,7	60.6	61.1	62.1
22	Tunnel #2	75-80	53.5	53.4	60,7	51.0	56.7	60,7

(iii) **Ground Water Quality** - Ground water samples were obtained from the three campsites and tested for potable water quality parameters in March and May of 2016. Due to the conversation of the Bobokvati campsite laboratory test of potable water has not been carried out. The Contractor has not submitted laboratory test results of potable water from the Chakvi campsite #5. The Contractor was instructed to submit laboratory test results of potable water from Chakvi campsite.

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 (March-May 2016)**

Parameter	Acceptable Limits	Standard	Choloki	Laituri	Ochkhamuri
Odor	2 units	ISO6658	0	0	0
Taste	2 units	ISO6658	0	0	0
Color	15°	ISO7887	10°	10°	10°
Turbidity	3.5 units	ISO7027	1.5	0.3	0.5
pH	6.0-9.0	ISO10523	7.79	7.45	8.05
Chloride	250 mg/l	ISO9297	78.4mg/l	29.4mg/l	31.36mg/l
Ammonia NH3	2.0 mg/l	ISO11905.1	1.4mg/l	<0.05	<0.05
Nitrite (NO <sub>2</sub> -)	0.2 mg/l	GOST4192	0.1	<0.003	<0.003
Nitrate (NO <sub>3</sub> -)	50.0 mg/l	GOST18826	<0.1	<0.1mg/l	0.001mg/l
Total Iron (Fe)	0.3mg/l	ISO6332	0.35mg/l	<0.04mg/l	<0.04mg/l
Total Copper (Cu)	2.0 mg/l	ISO8288	0.02mg/l	<0.002 mg/l	<0.001mg/l
Arsenic (As)	0.01mg/l	GOST4152	<0.005	<0.005	<0.005
Lead (Pb)	0.01mg/l	ISO8288	0.003	0.003	0.002
Dry residue (TDS)	1000-1500 mg/l	GOST18164	174mg/l	160.0mg/l	80.0mg/l
Permanganate index (COD)	3.0 mg/O <sub>2</sub> /l	ISO8467	2.96 mg/O <sub>2</sub> /l	4.95 mg/O <sub>2</sub> /l	1.80 mg/O <sub>2</sub> /l
Calcium	mg/l	ISO7980	42	22	
Magnesium	mg/l	ISO7980	10	7	
Sodium	mg/l	ISO9964.1-93	20	6	
Sulfates(SO <sub>4</sub> <sup>2-</sup> )	mg/l	GOST4389-72	<2.0	<2.0	
Mesophylic aerobic and facultative anaerobic microorganism	37°- ≤20 CFU 22°- ≤100 CFU (in 100ml)	ISO6222	60 90	40 80	20 100
Coliform	in 300ml	ISO9308	No	No	No
Ecole	In 300ml	ISO9308	No	No	No
Fecal	In 250ml	ISO7899-2	No	No	No
Salmonella	In 100ml	ISO6340	No	No	No

**(iv) Surface Water Quality** - Surface water samples were obtained from two locations in five rivers crossing the Lot 2 area and tested for selected surface water quality parameters in May 2016. Water samples have been tested from the Riv. Chakvistskali and Riv. Shuaghele. Due to the bridge works have already been completed the Contractor did not consider it necessary to carry out laboratory testing. The analytical results of the samples collected (see Table 9) indicate that the water quality parameters were within the regulated limits for all five rivers.

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

Parameter	Acceptable Limits	Standard	Riv. Chakvis Tskali	Riv. Shuaghele
Odor	1 unit	ISO6658	0 (none)	0 (none)
Color	25°	ISO 7887	20°	25°
Turbidity	3.5 units	ISO 7027	2.2mg/l	6.0mg/l
Rigidity	mg.eq/l	GOST 4151-72	0.68	1.02
pH	6.5-8.5	ISO10523	7.91	7.92
Sulfates(SO <sub>4</sub> <sup>2-</sup> )	mg/l	GOST4389-72	6.0	<2.0
Chloride Cl-	300mg/l	ISO9297	11.76mg/l	17.64
Ammonia and ammonium iodine	mg/l	GOST4192-82	<0.05	<0.05
Nitrate NO <sub>2</sub> -	0.08-3.3mg/l	GOST 4192	<0.003	<0.003
Nitrate NO <sub>3</sub> -	40-45mg/l	GOST18826	<0.1mg/l	<0.01
Dissolved Oxid	mg /O <sub>2</sub> / l	Collection of Shitskova p..50 .P -2	0.77	0.85
Total copper (Cu)	0.3mg/l	ISO 6332	0.05mg/l	0.45
Arsenic (As)	0.05mg/l	GOST 4152	<0.005	0.01
Magnesium (Mn)	1mg/l	GOST4974	0.002mg/l	0.004
Permanganate Index (COD)	4-6mg/O <sub>2</sub> /l	ISO8467	3.16mg/O <sub>2</sub> /l	2.39
Dry particles (TDS)	1000mg/l	GOS18164	75mg/l	78
Polyphosphates	mg/l	GOST18309-72	0.01	0.019

**(v) Environmental Issues** - The issues encountered in the previous three months were obtained from the Environment Chapter of the monthly progress reports, and summarized as follows:

## PART III: ENVIRONMENTAL MANAGEMENT

### 7. ENVIRONMENTAL MANAGEMENT PLAN (EMP)

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.

### 8. ENVIRONMENTAL ASPECTS IN CONSTRUCTION MONITORING

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 improper storage of material in camp sites, garbage accumulation in campsites, soil contamination issues, electrical safety, water quality of potable water systems, sedimentation of surface water bodies from construction earthwork, as well as worker safety issues.

#### 8.1. Site Inspections and Audits

During the Environmental Monitoring, a number of HSE issues 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 Table 10.

### 9. Results of Monitoring

The results of the monitoring carried out in accordance with EMP procedures, which covers the Environmental situation of reports of first and second quarters of 2016 is presented in the chapters below:

#### 9.1 Monitoring of Campsites

Sanitary hygienic condition of the campsites Choloki, Ochkhauri, Laituri, Chakvi is satisfactory, but at the same time some problems were revealed:

##### Choloki Campsite

EHS issues and non compliances	Corrective measures
<ul style="list-style-type: none"> <li>There is a large number of used tires accumulated at the camp site (See Picture No.1);</li> </ul>	<ul style="list-style-type: none"> <li>Used tires and Scrap Metal should be delivered to the receiver point and the place, liberated from the waste should be</li> </ul>

<ul style="list-style-type: none"> <li>• There is a scrap metal accumulated there (See Picture No.2);</li> <li>• Existing channels at the entrance of the Site are full of used tires and construction waste made up of rubber and steel (See Picture No.3)</li> </ul>	<p>restored;</p> <ul style="list-style-type: none"> <li>– Ditch should be cleaned from the waste and construction waste should be delivered for the utilization or on a dump site.</li> </ul>
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### Ochkhamuri Campsite

EHS issues and non compliances	Corrective measures
<ul style="list-style-type: none"> <li>• There is a construction material and household waste accumulated on site (See Picture No.4);</li> <li>• On the border of the Site, at the adjacent territory of Asphalt-Concrete batching plant, there is a water pond contaminated with oil (See Picture No.5);</li> </ul>	<ul style="list-style-type: none"> <li>– Useless construction material should be delivered to the dump site;</li> <li>– Contaminated water should be discharged from the pit and should be poured into the capped metal barrel for the reuse and the pit should be backfilled with the sand-gravel.</li> </ul>

### Laituri Campsite

EHS issues and non compliances	Corrective measures
<ul style="list-style-type: none"> <li>• Basin of the Crushing Plant is full of silt and cannot perform its function (See Picture No.6). Also the water inside the channel is contaminated due to this fact and the water passes in Riv. Natanebi;</li> <li>• Large volume of household waste is accumulated (See Picture No.7).</li> </ul>	<ul style="list-style-type: none"> <li>– Basin should be cleaned from the silt and deepened. Silt should be disposed to the Dump Site;</li> <li>– Household waste should be disposed to the Dump Site on time.</li> </ul>

### Bobokvati Campsite

EHS issues and non compliances	Corrective measures
<ul style="list-style-type: none"> <li>• Water source in the rest room, is out of the order;</li> <li>• Useable and useless construction material are scattered around;</li> <li>• There is a scrap metal accumulated on site (See Picture No.8);</li> <li>• Drivers of the concrete mixer, are discharging water used for the washing of the cars, on the slope at the border of the camp, which is located near Riv. Dekhva.</li> </ul>	<ul style="list-style-type: none"> <li>– Water supply system should be restored in the rest room;</li> <li>– Water supply system should be restored in the rest room;</li> <li>– Useable construction material should be organized and useless one should be disposed to the Dumpsite;</li> <li>– Washing of the mixers and pouring of the contaminated water into the slopes, should be prevented strongly. Contaminated water should be poured into the existing sedimentation basins, which should be cleaned permanently.</li> </ul>

## Chakvi Campsite

EHS issues and non compliances	Corrective measures
<ul style="list-style-type: none"> <li>• There is a scrap metal accumulated on site (See Picture No.9);</li> <li>• Basin of the Crushing Plant is full of silt and cannot perform its function in normal way (See Picture No.10).</li> </ul>	<ul style="list-style-type: none"> <li>– Scrap metal should be collected and disposed for the reuse;</li> <li>– Sedimentation Basin of the Concrete Plant should be cleaned from the silt and deepened. Silt should be disposed to the Dump Site.</li> </ul>

## 9.2 Monitoring of road construction sites

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>• Some places on the slopes, where it is identified the facts of initial ravine formation, are not covered with the top soil and backfilled with the sand-gravel (See Picture No.11).</li> <li>• There is no grass seeding bush planting facts on the slopes, strengthened with the Gabion Walls. The activity is considered by the Technical Specifications.</li> <li>• On some places of the embankment slopes, from Bridge No.7 to Bridge No.8, Contractor is placing clay material instead of top soil. It will suspend growth of the grass.</li> <li>• On the adjacent territory of Bridge No.8 there are 5 cut trees. Logs of the trees cut during the construction activities are not disposed into the Dump Site as well.</li> <li>• From km0+000-km8+173, there are no discharge chutes constructed on the embankment. It makes threat to the stability of the slopes.</li> <li>• In a dry weather, Contractor does not water the Construction Sites, which contaminates air with the non-organic dust.</li> </ul>	<ul style="list-style-type: none"> <li>– Those places on the slopes, where, we have identified the facts of initial ravine formation, should be covered with the top soil and backfilled with the sand-gravel.</li> <li>– The places of the slopes, from Bridge No.7 to Bridge No.8, covered with clay material should be re-covered with top soil and compacted accordingly.</li> <li>– From km0+000-km8+173, discharge chutes should be constructed on the embankment in order to avoid erosion of the slopes.</li> <li>– In a dry weather, Contractor has to water Construction Sites used by them intensively. This is their contractual obligation.</li> <li>– Cut trees should be disposed into the Bobokvati Camp Site temporarily.</li> <li>– As for the logs of the trees, which are scattered along the Design Road, should be transported into the Dump Site.</li> <li>– It is necessary to seed the grass and plant the bushes on the slopes of the embankment.</li> </ul>



### 9.3 Monitoring of Tunnel Construction Sites

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>• First portal of Tunnel No.1 is full of household waste, especially back sides of the Office and Rest room;</li> <li>• Engineer has fixed the fact of burning of the household waste in the open air (see Picture No.15);</li> <li>• Taps, in the bathroom and rest room are broken and large volume of the water is spilled away (see Picture No.16).</li> </ul>	<ul style="list-style-type: none"> <li>– First portal of Tunnel No.1 is has to be cleaned from the residential waste. It should be collected and transported into the Dump Site;</li> <li>– Burning of the residential waste, should be categorically banned in the open air;</li> <li>– Tap should be fixed ASAP, in order to avoid spilling of the water.</li> </ul>

### 9.4 Monitoring of quarry sites

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>• The Contractor did not start re-cultivation works of the Quarry near the Vil. Zeda Sameba. Exploitation of the mentioned Quarry has been completed in November 27, 2015.</li> <li>• In Vil. Shavghele, Contractor has only levelled surface of the Quarry and did not restore natural habitats.</li> </ul>	<ul style="list-style-type: none"> <li>– Contractor has to start Re-Cultivation works of the Quarry near the Vil.Zeda Sameba, according to the Quarry Re-Cultivation Plan, submitted by the Contractor.</li> <li>– In order to restore Natural Habitats, Contractor has to plant bushes and trees and in case of necessity to transport Top-Soil there and to seed the grass as well.</li> </ul>

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 table #10.

**Table 10: Observed HSE Issues and Recommendations of the International Environmental Specialist**

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

Discrepancies of the Health and Safety Issue	Recommended Corrective measures	Deadline for the implementation	Progress
Some places on the slopes, where, we have identified the facts of initial ravine formation, are not covered with the top soil and backfilled with the sand-gravel.	Those places on the slopes, where, we have identified the facts of initial ravine formation, should be covered with the top soil and backfilled with the sand-gravel.	As soon as possible. July-August	
There is no grass seeding bush planting facts on the slopes, strengthened with the Gabion Walls. The activity is considered by the Technical Specifications.	It is necessary to seed the grass and plant the bushes on the slopes.	September-October	
On the adjacent territory of Bridge No.8 there are 5 cut trees. Logs of the trees cut during the construction activities are not disposed into the Dump Site as well.	Cut trees should be disposed into the Bobokvati Camp Site temporarily. As for the logs of the trees, scattered along the Design road, should be transported into the Dump Site.	July	
The places of the slopes, from Bridge No.7 to Bridge No.8, are covered with clay material not with the top soil. It will suspend growth of the grass.	The places of the slopes, from Bridge No.7 to Bridge No.8, covered with clay material should be re-covered with top soil and compacted accordingly.	July-August	

From km0+000-km8+173, there are no discharge chutes constructed on the embankment. It makes threat to the stability of the slopes.	From km0+000-km8+173, discharge chutes should be constructed on the embankment in order to avoid erosion of the slopes.	August-September	
In a dry weather, Contractor does not water the Construction Sites, which contaminates air with the non-organic dust.	In a dry weather, Contractor has to water Construction Sites used by them intensively. This is their contractual obligation.	Regularly	

**(B) Construction of the Tunnels**

<b>Discrepancies of the Health and Safety Issue</b>	<b>Recommended Corrective measures</b>	<b>Deadline for the implementation</b>	<b>Progress</b>
First portal of Tunnel No.1 is full of residential waste, especially back sides of the Office and Rest room.	First portal of Tunnel No.1 is has to be cleaned from the residential waste. It should be collected and transported into the Dump Site.	July-August	
Engineer has fixed the fact of burning of the residential waste in the open air.	Burning of the residential waste, should be categorically banned in the open air.	It should not happen again	
Taps, in the bathroom and rest room are broken and large volume of	Tap should be fixed ASAP, in order to avoid spilling of the water.	July	

**(C) 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>
There is a large number of used tires accumulated on the camp site.	Used tires and Scrap Metal should be delivered to the receiver point and the place, liberated from the waste should be restored.	July-September	
There is a scrap metal accumulated there.	Scrap Metal should be delivered to the receiver point for the utilization.	July-September	
Existing channels at the entrance of the Site, is full of used tires and construction waste made up of rubber and steel	Ditch should be cleaned from the waste and construction waste should be delivered for the utilization or on a dump site.	July-September	

**(D) Ochkhamuri 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>
There is a construction material and household waste accumulated on site .	Useless construction material should be delivered to the dump site.	July-September	
On the border of the Site, at the adjacent territory of Asphalt-Concrete batching plant, there is a pit, which is contaminated with the water, containing oil.	Contaminated water should be discharged from the pit and should be poured into the capped metal barrel for the reuse and the pit should be backfilled with the sand-gravel.	July	

**(E) Bobokvati 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>
Water source in the rest room, is out of the order.	Water supply system should be restored in the rest room	July	

Useable and useless construction material are scattered around.	Scrap metal should be collected and disposed for the reuse.	July-September	
There is a scrap metal accumulated on site (See Picture No.8).	Useable construction material should be organized and useless one should be disposed to the Dump Site.	July-September	
Drivers of the concrete mixer, are discharging water used for the washing of the cars, on the slope at the border of the camp, which is located near Riv. Dekhva	Washing of the mixers and pouring of the contaminated water into the slopes, should be prevented strongly. Contaminated water should be poured into the existing sedimentation basins, which should be cleaned permanently.	Regularly	

**(F)Chakvi Camp Site**

Discrepancies of the Health and Safety Issue	Recommended Corrective measures	Deadline for the implementation	Progress
There is a scrap metal accumulated on site	Scrap metal should be collected and disposed for the reuse	July-September	
Basin of the Crushing Plant is full of silt and cannot perform its function in normal mode	Sedimentation Basin of the Concrete Plant, should be cleaned from the silt and deepened. Silt should be disposed to the Dump Site.	July-September	

**(G) Territory of Laituri Crashing Plant**

Discrepancies of the Health and Safety Issue	Recommended Corrective measures	Deadline for the implementation	Progress
Basin of the Crushing Plant is full of silt and cannot perform its function . Also the water inside the channel is contaminated due to this fact and the water passes in Riv. Natanebi.	Basin should be cleaned from the silt and deepened. Silt should be disposed to the Dump Site.	July-August	

Large volume of household waste is accumulated there .	Household waste should be disposed to the Dump Site on time.	July-September	
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**(H) Quarry Sites**

Discrepancies of the Health and Safety Issue	Recommended Corrective measures	Deadline for the implementation	Progress
The Contractor did not start re-cultivation works of the Quarry near the Vil. Zeda Sameba. Exploitation of the mentioned Quarry has been completed in November 27, 2015.	Contractor has to start Re-Cultivation works of the Quarry near the Vil.Zeda Sameba, according to the Quarry Re-Cultivation Plan, submitted by the Contractor.	August-October	
In Vil. Shavghele, Contractor has only levelled surface of the Quarry and did not restore natural habitats.	In order to restore Natural Habitats, Contractor has to plant bushes and trees and in case of necessity to transport Top	September-October	



## 10. Visual assessment of the Rivers and Waters Stream environment

Following rivers were assessed

pk	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	Shuaghele
Bridge #11 pk 170+44	Cahkvistskali

Environmental condition, identified during monitoring of the rivers under the Bridges  
 Visual assessment revealed during monitoring of rivers and water flows on Lot-II

Environmental Issues Condition	Condition					Shuaghele	Cahkvistskali
	Achkva	Kintrsihi	Kinkishi	Dekhva pk 68+60	Dekhva pk 81+73		
Coastal Erosion (Northern part)	weak	weak	Moderate	Weak - Moderate	Weak	Weak	Weak
Coastal Erosion (Southern part)	weak	weak	Moderate	Weak - Moderate	Moderate	weak	Moderate
Sedimentation/ Precipitation	Moderate	Moderate	Moderate	Moderate	Weak- Moderate	weak	Moderate
Construction waste	Abs	Abs	Abs	Moderate	Weak	Moderate	Moderately high
Household waste (Iron, Plastics etc )	weak	weak	weak	Moderate	Moderate	Weak	Moderate
Pollutants fall in the river due to the construction activities	No	No	No	No	No	No	Weak

Recommendations for the improvement of the Rivers' condition and environmental protection

- Removal of the household waste from the above mentioned rivers (under Bridge areas)
- Removal of the construction waste from rivers at pk68+60; pk81+73; pk81+73; pk108+37; pk170+44
- The logs of the cut trees are scattered on the right side of Riv. Dekhva- pk68+60. They should be removed.
- On the left side of Riv. Dekhva, in 200 meters from the Bridge at pk-81+73, there is old Pipe Culvert (It has no connection with the Contractor's activities).

## 11. Assessment of the Environmental, Health and Safety issues

Contractor has improved production of the Environmental, Health and Safety Documentations and record making

Positive Intervention	Main Environmental, Health and Safety Issues
<p>Ensuring of the Environmental, Health and Safety Documentations and keeping the register including following issues listed below:</p> <ul style="list-style-type: none"> <li>• On-time delivery of the Environmental Protection parameter measurement results to the Engineer, including lab. tests;</li> <li>• Proper documents (EMP, Method Statements, Management plans of the specific Environment health and safety issues, permissions, licenses);</li> <li>• Records of the Trainings (Health&amp;Safety) of the Employees hold in each 6 month;</li> <li>• Accident Records of the Employees including June, 2016;</li> <li>• Progress Reports;</li> <li>• Accident records of the Construction Equipment and incidents surveys.</li> <li>• Quarry Re-Cultivation Plan(s).</li> </ul>	<ul style="list-style-type: none"> <li>– Absence of the following documents/records</li> <li>– Register of the used materials (Tires, Scrap Metal etc.) which were removed from the Camp Site Territory for the reuse and re- processing.</li> <li>– Records of the Construction Equipment service.</li> </ul>

### 11.1 Impact on Biodiversity

In January-June 2016, no negative impact on flora and fauna has been identified. No cases of poaching have been fixed.

During construction process, several trees have been cut. Part of the cut trees were stockpiled on the territory of Bobokvati campsite but part of them are yet to be transported to the same place. Contractor was instructed about this at the Weekly Meeting (June 29).

## 11.2 General assessment of the experience of professional EHS Issues

In January -June 2016, 1 (one) accident was identified. They were studied and Contractor has made proper measures.

Positive intervention	Main Environmental, Health and Safety Issues
Warning signs posted at relevant locations (e.g., campsites, road work sites).	Gaps in guard rails allow cattle to cross into road leading to motor accidents.
On-site clinic with first aid medications and a doctor (in Chakvi Campsite). First aid medications also available at Bobokvati.	When working many meters from the ground, workers do not wear fall protection lanyards (PPE).
Restroom sanitary conditions improving with addition of soap.	Safety concerns related to electrical safety (e.g., poor wiring, exposed electrical systems, improper grounding etc.).
PPE given to workers to be used during work. Significant improvement in works wearing PPE especially in camp work sites.	No on-site clinic established at Bobokvati Campsite yet.
Safety meetings held on a regular basis to discuss safety issues (every 6 months).	Some workers ignore PPE during work.
Recordkeeping improvement.	
Training on PPE use held for workers.	

## 11.3 Health and Safety Issues identified by GRM

No complaint has been received by the GRM during the first half of 2016.

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

Supervision Service of Department of the Environment Protection of Ajara, by the first half of 2016 has been identified violation of four different articles of the Administrative Code, in particular:

Washing of the car in the Riv. Chakvistskali- Article 58<sup>3</sup>. January 2016.

Contractor was Fined Two times for Non submission of the Reports about Statistics on time- Article 82.<sup>1</sup>. May 2016.

For the unauthorized extraction of the water from the Riv. Chakvistskali. May, 2016

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

In the first half of 2016, Contractor has received following letters, regarding the problematic environmental issues, identified during the Environmental Monitoring. See Table No.11.

**Table No.11 - Correspondence about the improvement of non-compliances issues**

Letter #	Date	Subject	Summary
0037	04.02.2016	Regarding EMP	The Contractor received the Plan how to deal with the revealed Environmental problems, identified during the audit conducted by the Engineer
0070	01.03.2016	Regarding activities of the EHS division of the Contractor	It was mentioned about improved activities of the Contractor's HSE Division in January-February 2016
0073	03.03.2016	Regarding construction of the additional sedimentation basins on the portal of Tunnel No.1	Existing Sedimentation Basin could not ensure cleaning of the contaminated water, running from the Tunnel No.1. The Contractor was asked to prepare additional sedimentation basin.
0102	24.03.2016	Regarding Lab. Analysis of Drinking water quality	It is Contractor's obligation to make Lab. Test of the Drinking an Surface water once in a Quarter, but the Contractor failed to execute it.
0110	28.03.2016	Re-Cultivation of Khustubani Quarry Site	According to the Plan, submitted by the Contractor, Re-Cultivation of the Khustubani Quarry should have been started in December 15, 2016, but the Contractor failed to execute it. The Contractor was requested to start Re-Cultivation works ASAP.
0111	29.03.2016	Regarding planting of the trees, bushes and seeding of grass	The Contractor was instructed that March and May are most appropriate months to seed the grass and for the planting of the trees and bushes March and April are most appropriate months. Contractor was asked to execute these works according to the Technical Specifications Series 3000
0140	5 May	Concerning Ecological Problems	Contractor was informed, regarding those Ecological Problems, which were identified during the previous environmental monitoring and was instructed to solve them ASAP.
0169	28 May	Regarding planting of the trees and seeding grass	Engineer has approved Method Statement submitted by the Contractor, and the Contractor was instructed regarding the approximate locations of Grass seeding and tree planting

**Remark:** Mainly, communication with the Environmental Specialists of the Contractor was done during joint audits and Weekly Meetings.

### 13. Corrective Action Plan

The Contractor failed to fulfill corrective measures of Environmental Health and safety issues on the timely manner which is reflected in the Table No.12.

**Table 12**

Impacted objects	Problems	Mitigation Measures	Implementation date	Status of the activities
Quarry Sites	There is no Quarry re-cultivation done in Vil. Zeda Sameba and Vi. Shuaghele territory	Mentioned Quarries should be re-cultivated ASAP according to the submitted re-cultivation plan	February-March 2016	Partly executed. Shuaghele Quarry-Site is rehabilitated
Slopes of the Cuts and Embankments	About 30 places of the embankment slope are gullied. Cut slopes are not planted with grass	Grass should be seeded and plants planted on the cut slopes should. Places with ravine formation should be filled with the sand gravel material, compacted, covered with the top soil and seeded with the grass.	March-April 2016	In the process of execution
Road Sections	There are logs of the cut trees, scattered along the construction road	Timber logs should be transported into the dump site or buried in soil. They may also be given to the workers as a wood	March 2016	Not executed
Camp Sites	There are used tires and scrap metal accumulated in Choloki  There are construction waste and scrap metal accumulated in	Remains should be collected and disposed for the reuse	March-April 2016	Not executed

	<b>Bobokvati</b>			
	<b>There is scrap metal accumulated in Chakvi</b>			
<b>Sedimentation Channels near Concrete Batching plants, Tunnel No.1 and in Laituri</b>	<b>There is a silt accumulated in Sedimentation Channel. It has to be repaired in Bobokvati</b>	<b>Sedimentation Basin in Bobokvati should be repaired and 1 additional sedimentation channel has to be constructed at Tunnel #1. Channels should be cleaned from the silt.</b>	<b>February-March 2016</b>	<b>Partly executed.</b>
<b>Air condition and noise level</b>	<b>In the dry weather condition, air is contaminated with the dust, due to the traffic movement</b>	<b>Construction sections should be watered intensively during a dry weather days. Measurement of the noise level and contamination of the ambient air should be checked in each month.</b>	<b>April-May 2016 Every day in dry weather</b>	<b>Executed</b>
<b>Ground water and surface water condition</b>	<b>Drinking water basins, are not clean on the Camp-Site territories.</b>	<b>Basins should be cleaned and Disinfected. Lab tests of the surface and potable water should be executed</b>	<b>February-March 2016</b>	<b>Executed. Water basins are cleaned</b>
<b>Construction and household waste</b>	<b>In some cases, household waste from construction camps are removed lately. There are construction remains scattered at Bridge No №8,1 and 11.2</b>	<b>It is necessary to remove waste from the Camp-Site territories permanently.  Places near the Bridges No.8a and 11.2 should be cleaned from the construction waste.</b>	<b>February-March 2016</b>	<b>Executed</b>
<b>To improve Staff awareness of environmental protection, health and safety issues</b>	<b>Personnel should undergo periodic lectures on environmental and safety issues</b>	<b>Staff is trained in environmental and safety issues on the regular basis</b>	<b>February-March 2016</b>	<b>Executed</b>

<b>Road signs and safety</b>	<b>There is a lack of warning signs on some Camp-Sites</b>	<b>Proper warning signs should be installed in each campsite</b>	<b>2016 Year January-March</b>	<b>Executed</b>
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Above mentioned issues are reflected on the Pictures (See Attachment No.1)

**Recommendations for the issues which failed to be executed in Environmental, Health and Safety issues are reflected into the non-consistencies and compliances corrective actions -Table No.10**

For the pending issues further recommendations are as follows:

**Table 13: Recommendations to Address HSE Issues**

<b>Recommendations</b>	<b>Responsible Party</b>
<b>Main Road (Lot 2)</b>	
Sections of the Project road where wash out processes have started should 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.
Trees cut for construction of Project road should be transported and stored at Bobokvati Campsite on temporary basis; As for tree logs that are dumped at almost every section of Project road should be transported in the fill;	Contractor to perform physical interventions; Engineer to monitor progress.
Gutter for avoiding water from the carriageway should be constructed at section km0+000-km8+173 in order to prevent erosion;	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, Ochkhamuri, Laituri, Bobokvati and Chakvi)</b>	
Used material (scrap metal, tires etc.) should be hauled offsite for recycle/beneficial reuse on a regular basis. The territory freed from the used material should be organized accordingly;	Contractor; Engineer to perform weekly inspections
Waste management according to the requirements of ECP #1 of Environmental Management Plan. Burning of waste material at the campsites must be stopped according to requirements of Environmental Management Plan.	Contractor; Engineer to perform weekly inspections
Waste material dumped in the channel must be taken out and transported for utilization or to the dumpsite;	Contractor; Engineer to perform weekly inspections
Used material (scrap metal, tires etc.) should be hauled offsite for recycle/beneficial reuse on a regular basis. Records of material hauled offsite for recycling and/or beneficial reuse should be maintained;	Contractor; Engineer to perform weekly inspections
At the territory of asphalt concrete plant (at Ochkhamuri Campsite) water spilled in the pit polluted with oil material must be pumped and put in the covered metal barrel while the pit must be filled sand and gravel; the territory polluted with oil must be cleaned, used metal barrels must be covered and placed on concrete pad;	Contractor; Engineer to perform weekly inspections
Spillage of water from the mixers (during washing the mixers) on the slope must be stopped. Polluted water must be spilled in existing sediment trap. Sediment trap must be cleaned regularly;	Contractor; Engineer to perform weekly inspections
Used and unused construction material must be segregated and stored at the Bobokvati Campsite. Water supply in the restrooms must be repaired and restored.	Contractor; Engineer to perform weekly inspections
Sediment traps for concrete plant at Chakvi Campsite and crushing Plant in Laituri must be cleaned and deepened. Sediment must be taken in the fill.	Contractor; Engineer to perform weekly inspections
<b>Quarry Sites</b>	
Re-cultivation of the quarrysite at the territory of vil. Zeda Sameba must commence in accordance with quarry restoration plan submitted by the Contractor;	Contractor; Engineer to perform inspections before and after restoration and



	check the compliance with restoration plan
With the purpose of restoration natural habitates at the former territory of quarriesite in vil. Shuaghele trees and bushes must be planted. If necessary the Contractor must spread topsoil, seed grass and etc.	Contractor; Engineer to perform inspections before restoration
<b>Bridge construction at the rivers</b>	
At bridge construction sites waste bins and containers must be supplied for collection construction waste and trash.	Contractor; Engineer to perform weekly inspections
<b>Tunnels</b>	
Construction waste and trash accumulated at the territory of the first portal of tunnel №1 must be collected and transported to the landfill.	Contractor; Engineer to perform weekly inspections
Burning of waste in open air at the territory of first portal of tunnel #1 must be restricted №1; Tap in the restroom must be repaired in order to avoid irrational use of water resources.	Contractor; Engineer to perform weekly inspections
<b>HSE Documentation and Recordkeeping</b>	
The following documentation/records should be initiated and maintained on site: <ul style="list-style-type: none"> <li>- Log of used material (tires, scrap metal etc.) hauled offsite for reuse/recycling.</li> <li>- Vehicle maintenance and accident records (already initiated but must be maintained).</li> <li>- Accident/injury logs (already initiated but must be maintained).</li> </ul>	Contractor; Engineer to perform weekly inspections

## 14. Trainings

In the 6 months of 2016 the following trainings have taken place:

- In February, Environmental Specialist conducted training for the Engineers of the Supervision Team on the Issue: „Social-Economic and Ecological Results of the construction of Kobuleti Bypass Road km0-12.4”. Specific Examples were taken about the reduction of the fuel consumption in 2014-2015 years and about the reduction of exhaust harmful gases.
- In March, training was conducted for the operators and workers of the Concrete Batching plant, located in Bobokvati Camp Site also for drivers of mixers. Environmental Specialists of the Engineer and the Contractor have jointly explained them about some rules of the transportation on production of concrete.
- In June, Contractor has conducted training to the highway workers, concerning the health and safety issues. All the trainees received illustrated brochures about the safety issues.

# ANNEXES

## I. PROJECT PHOTOS

**ANNEX 1  
PHOTO CATALOG  
(June 2016)**

## Choloki Campsite

### Environmental, Health and Safety Issues



Photo 1: large number of used tires scattered



Photo 2: Scrap material accumulated at the site



Photo 3: Channels blocked by used tires and construction  
waste

## Ochkhamuri Campsite Environmental, Health and Safety Issues



Photo 4: Construction and household waste



Photo 5: Water pond contaminated with oil



**Laituri Camsite**  
**Environmental, Health and Safety**  
**Issues**



Photo 6: Basin of crushing plant full of silt



Photo 7: Accumulated household waste

**Bobokvati Campsite**  
**Environmental Health and Safety Issues**



Photo 8: Scrap material scattered at the campsite



## Chakvi Campsite

### Environmental Health and Safety Issues



Photo 9: Scrap material accumulated on site



Photo 10: Basin of crushing plant is full of silt

## Monitoring of Construction Site

### Environmental Health and Safety Issues



Photo 11: Slopes to be covered with top soil



Photo 12: Slopes to be covered with top soil

## Monitoring of Construction Tunnel

### Environmental Health and Safety Issues



Photo 13: Monitoring of Tunnel Construction works



Photo 14: Monitoring of slope cut and earthworks



Photo 15: Fact of burning household waste in the open



Photo 16: Taps are broken in rest rooms