



REPUBLIC of KAZAKHSTAN
MINISTRY OF TRANSPORT AND COMMUNICATIONS
COMMITTEE OF ROADS



CONSTRUCTION SUPERVISION OF THE ASPARA-BLAGOVESHENKA
SECTION IN ZHAMBYL OBLAST, INVESTMENT PROGRAM PROJECT4
(ADB Loan # L2735-KAZ, CAREC Transport Corridor I)

BIANNUAL ENVIRONMENTAL MONITORING REPORT - January 2014



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Bi-annual Environmental Monitoring Report

Project Number: 41121-053
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KAZAKHSTAN: MFF CAREC Transport Corridor 1 (Zhambyl Oblast Section) [Western Europe- Western People's Republic of China International Transit Corridor] Investment Program - Project 4

(Financed by the Asian Development Bank and Government of
Republic of Kazakhstan)

Prepared by Kocks Consult GmbH for the Asian Development Bank (ADB).

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EXECUTIVE SUMMARY

The Asian Development Bank has provided a loan (L2735-KAZ) to the Government of Kazakhstan for the re-construction of CAREC Transport Corridor I within the country's territory. Part of this road is the 49km Blagoveshenka-Aspara Section (PROJECT 4) which starts at km 261+500 to 310+500 of the "Almaty-Korday-Blagoveshenka-Merke-Taskent-Termez" Road.

The Engineer (Kocks-KECC-Almaty Joba-Quality Plan Joint Venture) for this Blagoveshenka-Aspara Section has compiled this Bi-annual Environmental Monitoring Report consisting of the recently encountered environmental issues along the road sections under construction contract with KCC Engineering & Construction Co., Ltd (Korea), the Contractor. The environmental issues consisted of borrow pit management, dust control, and campsite solid waste management and oil contamination. These were encountered during inspection at road construction areas, bridge sites, contractor's material sources and processing plants, etc. Measures to mitigate impacts were recommended accordingly and discussed within this report.

This six (6) month environmental monitoring report covers the period from July 2013 to December 2013. Within this period, primarily up to November, as per Contract, the Contractor undertook regular parametric measurements for air, noise and water at designated points. In December, due to weather conditions in winter season, parametric measurements were not much done. Also the worksites were inoperable due to weather mostly in the month of December. In addition, the CS Consultant regularly monitors environmental, health and safety issues which for immediate response of the Contractor.

PART I: INTRODUCTION

1. PRELIMINARY INFORMATION

1.1. Project Background and Objective of the Environmental Monitoring

The road Blogovoshenka-Aspara (Project 4) is a segment of the CAREC Transport Corridor I and within Kazakhstan territory which is being financed by the Asian Development Bank under loan agreement with the Government of Kazakhstan. This project is being executed by the Ministry of Transportation and Communication with the Committee for Roads overseeing the entire program project. The Engineer supervising this Project 4 component is Kocks-KECC-Almaty Joba-Quality Plan Joint Venture, as while the Contractor undertaking the construction is JSC "KCC Engineering & Construction Co. Ltd".

Project 4 is a 49km Blagoveshenka-Aspara Section (km261+500 to km 310+500) and involves the upgradation of a 49 km section from category-II (existing two-lane) to four lane category-IB from km 261.5 to km 310.5 within the existing right-of-way. The construction of this component started in February 2012 which was supervised by the Employer¹.

This environmental monitoring of the Project 4 – (49km) Blagoveshenka-Aspara Section (km261+500 to km 310+500) by the International Environmental Specialist² covers the period from July 2013 to December 2013 in compliance with the environmental scope of the construction supervision. The main purpose of environmental monitoring works is to ensure that the environmental mitigation measures during construction are implemented through a thorough supervision by the Engineer during the construction phase. Environmental issues also are anticipated to be identified in advance for avoidance and ensure timely completion of the project.

1.2. The Project Area

The project road sections 49km Blagoveshenka-Aspara Section (km261+500 to km 310+500) is part of the "Almaty-Korday-Blagoveshenka-Merke-Taskent-Termez" Road and is generally following the existing highway alignment within the Zhambyl Oblast. The area traversed by the road is generally classified as lowlands and plains. The mountainous portions that serve as borders with the Kyrgyz Republic are found 15km south of the corridor. Several small rivers cross the project road from south to north. The project road is shown in the figure below:

¹ Kocks Consult GmbH. September 2012. Inception Report – Construction Supervision Services. Contract L2735-KAZ: MFF CAREC Transport Corridor I Investment Programme, Project 4 (Aspara-Blagoveshenka)

² Mr. Samuel E. Sapuay, International Environmental Specialist – Kocks Consult

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Figure 1: Location of the Project Road

1.3. Technical Description of the Road Project

This Blagoveshenka-Aspara Section is designed for Category IB, as per the following design details:

- Width of the road embankment –27,5m;
- Carriageway width: 7,5 m (2 x 3, 75 m);
- Number of lanes : 4
- Width of shoulder: (2 x 3, 75 m). Shoulders 2 * 0.75 m asphalted.
- Embankment slope ratio is changeable from max 1:1.5 to min 1:4, depend on height of embankment
- Cross slope of the carriageway 2 %;
- Shoulder cross fall 4 %;

There will be four Bridges built in the Project and drainage structures will be built. Details of the new bridges are shown in the following table.

Table 1: Project Bridge Description

New Station - km	Identification of Bridges	Note
262+372.60 Shu river	5*24 T beam L=127,115m,S=3410m2 W-11.5+5+11.5 Sidewalks 2*0.75	Existing bridge is on Kyrgyzstan land and bridge has to be built on new road.

New Station - km	Identification of Bridges	Note
270+223.000 Shorgo river	Slabs 3*15 L=35.15m,S=1048m2, W=-9.5+5+9.5 m Sidewalks 2*0.75	Demolition of bridge and building a new one
277+593 Aksu river	Slabs 3*15 L=50.2,S=1340m2, W=9.5+5+9.5 Sidewalks 2*0.75	Demolition of bridge and building a new one
282+179.58 Karabalta river	Slabs 2*15 L=35.15m,S=1048m2, W=9.5+5+9.5 Sidewalks 2*0.75	Demolition of bridge and building a new one

In addition to the above water crossings, a number of pipe culverts have been installed for the project road. The existing culverts on the project road are predominantly concrete pipes from diameter 750mm up to diameter 1,500 mm. Some box culverts with varying sizes from 2x2m up to 4x4m exist. Neither condition, nor the size of the existing culverts meet the requirements of the new category I road all culverts are being replaced by new ones. Hence, all of these have been replaced to conform to the required specifications.

1.4. Environmental Characteristics of the Project Area

Prior to the ADB funded project, a two lane road existed already along the current alignment with a right-of-way of 40 meters. The project enlarges the right-of-way to 70 meters. Except in portions where the road avoids the Kyrgyz territory, the project road follows the original alignment. Hence, as per previous determination, the project was judged to be Category B project with limited impact to the existing environment.

The land relief along the project road can be generally described as slightly inclined alluvial-proluvial flatland with some areas of rigidly undulating and with rigid-valley formed by loess and silty-clay soil. The reconstructed alignment crosses the Shu River delta. Within this region a number of Shu River tributaries are crossed necessitating waterway infrastructures such as bridges and culverts.

Natural vegetation follows the floodplain of the Shu River tributaries and mostly consists of feather grass, fescue, anabases salsa, rare ephemera, black saxaul and willow. The fauna is represented by wild rams, roe, hare, pheasants and partridges.

The local climate is abrupt continental dry, with hot summer and moderately cold winter. Spring seasons is short and warm with frost still occurring in late months of May, while the autumn is dry and warm. Frost free conditions lasts to around 5-6 months within a normal year.

Shu region has population of around 93,000 with Shu as the center. Merke region has population of around 71,900 concentrated mainly in Merke. It is anticipated that the road improvement project will enhance transport of fish, farm products and livestock in these regions and facilitate the delivery of cargoes to these centers.

During the archeological examination, around 13 artifacts with cultural and historical were discovered in the near the vicinity of the project but far enough to be affected by the project as they were 210m to 2146 m from the road centerline.

PART II: ENVIRONMENTAL MONITORING

2. ENVIRONMENTAL MONITORING FRAMEWORK

The environmental monitoring framework for the project is based on the construction supervision ToR, GCC/PCC, Technical specifications, project IEE for Category B³ and ADB guidelines.

2.1. Methodology for Environmental Monitoring in Construction Supervision

As stipulated in the Contract for the project, the Contractor would adhere to the requirements of the environmental aspects of the contract document particularly in the General Conditions of Contract (FIDIC) as follows:

- 4.8 – Safety Procedure**
- 4.18 – Protection of Environment**
- 4.15 – Access Route**
- 4.24 – Fossils**
- 6.7 – Health & Safety**

In addition, detailed requirements are presented in the Technical Specifications particularly the following:

Section 106 – Protection of Environment

- A. General
- B. Fuel & Chemical Storage,
- C. Water Quality
- D. Air Quality.
- E. Noise, Earthwork,
- F. Preservation of Antiquities,
- G. Preservation of Antiquities
- H. Environmental Enhancement

Section 113 – Diversion and Traffic Control Measures – mainly the **B. Traffic Management Plan**

The initial obligation of the Contractor was to formulate a project Environmental Management Plan (EMP) based on the findings contained in the 2008 Environmental Impact Assessment (EIA) Report. In the succeeding months the Contractor's EMP was revised based on the comments of the international environmental specialist. Subsequently, the EMP was resubmitted and accepted with stipulations that the EMP will have to be revised should the need arises.

As the work progresses, the Consultant monitored the Contractor's compliance with the Environmental Management Plan and reported on the impacts encountered and mitigation measures employed and made further recommendations as deemed necessary. The periodic

³ ADB's Safe Guard Category – Category B The proposed project's potential adverse environmental impacts are site-specific, few if any of them are irreversible, and in most cases mitigation measures can be designed more readily than for category A projects. An initial environmental examination (IEE), including an EMP, is required

inspection ensures that the Contractor is complying with the project EMP in all of the aspects of the work as part of their contractual obligations.

In general, as stipulated in the ToR for the Construction Supervision on the environmental aspect the Consultant shall “Carry out the following duties related to environmental mitigation measures during construction (a) to ensure that all the environmental mitigation measures required to be implemented are incorporated in the contract documents; (b) supervise and monitor the implementation of environmental (management)/mitigation plan (EMP); and (c) in case of unexpected environmental impacts, coordinate with the Project Director and PMC to recommend necessary measures to the Committee of Roads and ADB for Implementation”. Based on this the Environmental specialist shall establish coordinative work with relevant staff of the Consultant and the Contractor to ensure that environmental issues are recognized prior to or discovered during work implementation.

Coordinative communication channels shall be established according to the following work coordination chart:

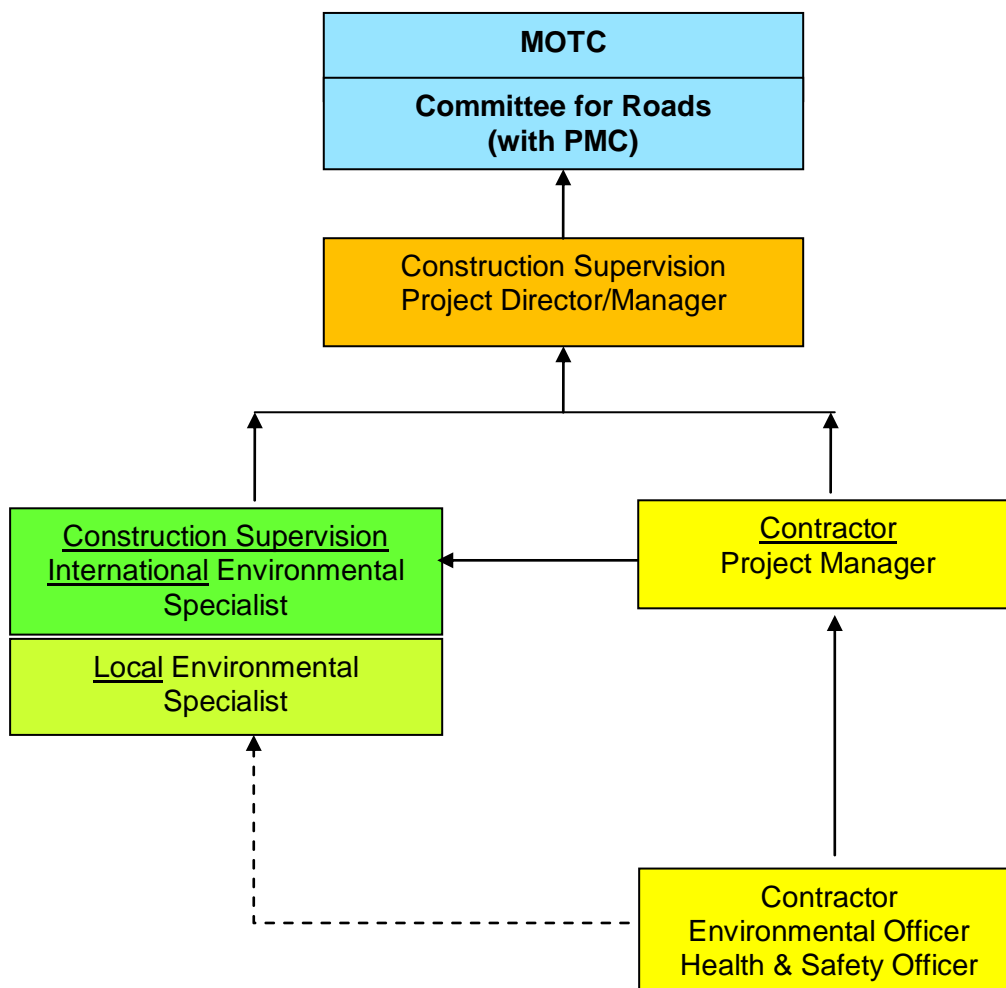


Figure 2: Work Coordination Arrangement

2.2. CS Consultant (The Engineer) Environmental Monitoring Work Protocol

Under the guidance of the International Environment Specialist, inspectors of the Engineer regularly conduct environmental monitoring on the Project. Findings and results of their monitoring activities are incorporated in the monthly and quarterly reports as well as in the Periodic Environmental Monitoring Reports for The Project.

During actual site visits of the International Environment Specialist, on-the-spot field inspections to various impact sites such as borrow pit, concrete plant, sand & gravel washing areas as well as contractor's campsite and residential and commercial areas along the project road are conducted. Environmental issues are noted down and presented to the Contractor as part of the consultation process, whereby issues will be resolved. The effectiveness of the mitigation measures is assessed after site implementation to determine if such measures were effective. In cases when they were ineffective, other measures will be implemented and further reassessed and when they are determined to be successful, the Contractor's measures are deemed compliant with the environmental requirements. This Environmental Monitoring Work Protocol is outlined below.

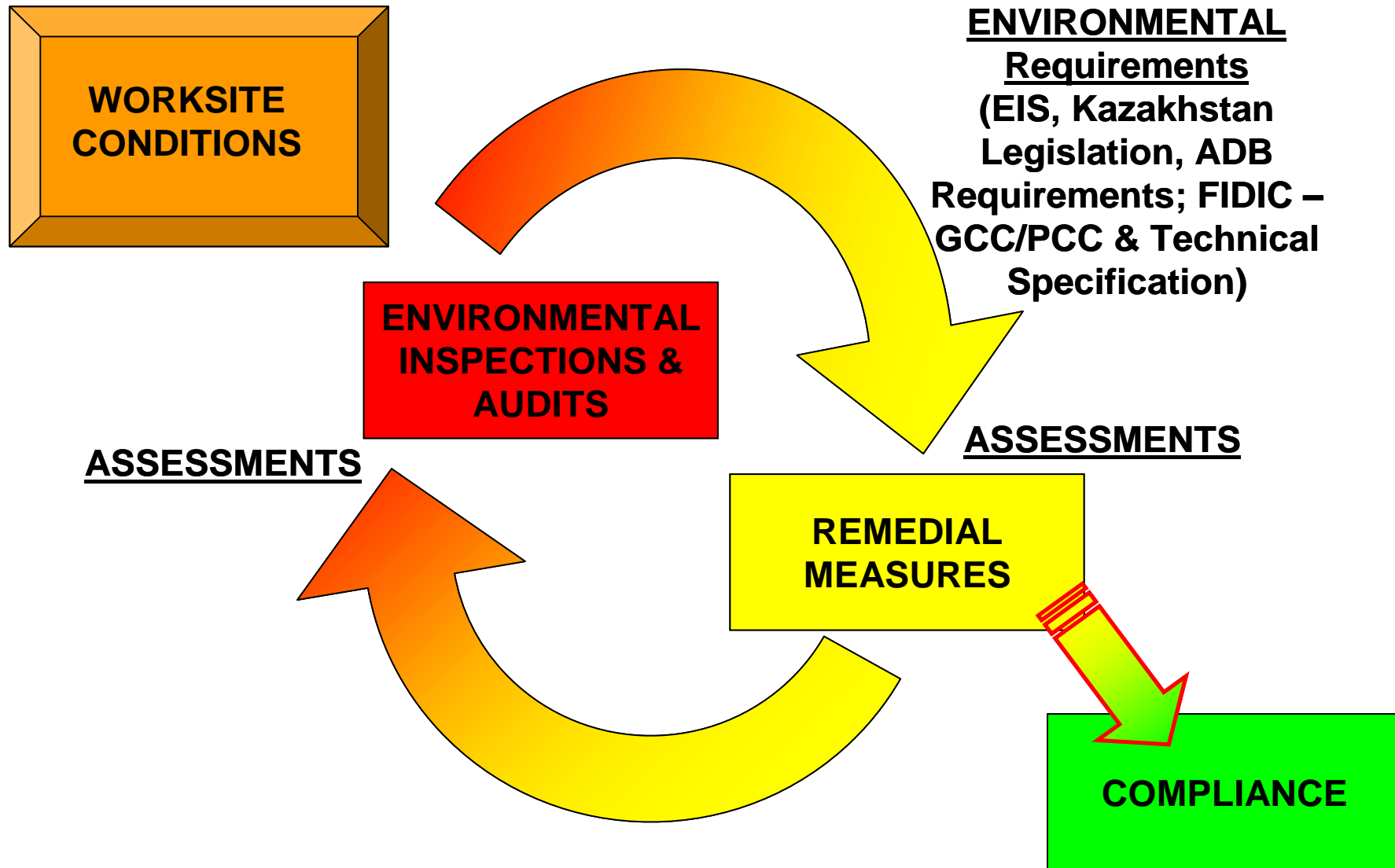


Figure 3: Environmental Monitoring Work Protocol

As stipulated in the Contract for the project, the Contractor will adhere to the requirements of the environmental aspects of the contract document particularly in the General Conditions of Contract (FIDIC) as follows:

- 4.8 – Safety Procedure**
- 4.18 – Protection of Environment**
- 4.15 – Access Route**
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- 6.7 – Health & Safety**

In addition, detailed requirements are found in the **Technical Specifications** particularly the following:

Section 106 – Protection of Environment

- A. General
- B. Fuel & Chemical Storage,
- C. Water Quality
- D. Air Quality.
- E. Noise, Earthwork,
- F. Preservation of Antiquities,
- G. Preservation of Antiquities
- H. Environmental Enhancement

Section 113 – Diversion and Traffic Control Measures – mainly the B. Traffic Management Plan

2.3. Contractor's Environmental Monitoring Procedures Health and Safety Management

As mentioned in the previous Bi-annual Environmental Report, the Contractor started monitoring the physical environment at the vicinity of the project road in April 2012. The parameters being monitored with instrument measurements are (i) noise and vibration, (ii) water quality, (iii) air quality and (iv) flora and fauna monitoring. These indicators form the **Baseline monitoring parameters** for the project road which can be referred to in the course of the construction of the project as well as during its operation. In addition, a number of pertinent sites are also monitored by the Contractor for any impacts of the construction activities such as quarries and borrow areas, bypass roads, bridge sites, contractor camp subcontractors temporary camps, concrete plant, crusher plant, asphalt plant, the villages (along the bypass) and crossing roads. Impacts will be recorded and mitigated in accordance to the EMP.

A staff was designated as health and safety officer for the project with duties to deal with safety on: (i) performance of construction and assembly works; (ii) for fire protection; (iii) work performance of an erecting crane; (iv) gas supply; (v) electricity supply; and (vi) provision special cloths and other facilities for individual protection of workers.

In case of accident, the Contractor is to submit brief summary about the accidents as part of the monitoring activities for the previous month.

2.4. Required Environmental Reporting

As mentioned in the Appendix 2 (item **2.3 Reporting Procedures**) of the IEE document, the Contractor's Environmental Action Plan (CEAP) or Contractor's EMP should provide description and explanation communication procedures between construction personnel and environmental protection, safety and traffic control staff, including (i) Communication facilities and Routine communication and reporting systems.

It is also mentioned in 2.3.2 Environmental and Safety Reports of Appendix 2, that Initial Environmental Baseline Report should be submitted in accordance with Section 2.4. Based on this Section, a Baseline monitoring program should be presented consisting of Environmental Baseline Survey (EBS) on (i) air quality; (ii) water quality; and (iii) noise. In addition, Environmental Safety Reports should be submitted which summarizes weekly updates and compiled for monthly reporting to the Engineer. The Engineer should also be notified promptly of any accident and effective communication should be established with all Subcontractors. Summaries of these items should be part of the Contractor's Monthly Progress Reports.

As stated in the Particular Conditions of Contract, the Contractor should also submit a Bi-annual environmental report, which is a compilation of monthly report with appropriate summaries of the issues, activities and measures undertaken within the period.

3. PERFORMED ENVIRONMENTAL MONITORING ACTIVITIES

Within the six-month period the Contractor undertook monthly monitoring of air, noise and water quality at specified locations. The Engineer likewise, as part of his tasks, monitors the environmental aspects of the project as well and reviews the environmental monitoring activities of the Contractor. The international environmental specialist of the CS Consultant (Kocks) visited the site in early July 2013 and January 2014 as part of Consultant's periodic monitoring. The places inspected consisted of the project roads, material sources, work camps and concrete batching plants.

3.1. Environmental Monitoring Procedures of the Contractor

The Contractor started monitoring the physical environment at the vicinity of the project road in April 2012. The parameters being monitored are (i) noise and vibration, (ii) water quality, (iii) air quality and (iv) flora and fauna monitoring. These indicators form the **Baseline monitoring parameters** for the project road which can be referred to in the course of the construction of the project as well as during its operation. Previously, the Contractor was conducting air and noise measurements every 10 km along the project. However, in October 2012, the international environmental specialist advised the Contractor to measure at locations where impacts to people are more appreciable. Hence the measurement locations were changed accordingly. For the measurement for water quality, to monitor the impact of the construction activities at bridge sites, upstream and downstream measurements were done along the rivers. In the previous six month, these were the stations where measurements on the parameters were undertaken. The basic procedures are described below:

- **Noise and vibration** – Measurements for noise and vibration were performed monthly (Jul. – Dec. 2013) at the following locations as shown in the map below: (i) Camp1; (ii) Camp2; (iii) BSU; (iv) DSU; (v) Saryb1; and (vi) Saryb2. The Norms on protection of the environment from noise and vibration are in accordance with the established standards. The industrial sites of general contractor are located far from populated places, therefore additional monitoring for noise and vibration effects in populated places is not necessary. Monthly readings taken on noise and vibration were not exceeding the norms.
- **Water quality** – There four rivers that crosses the road construction site. They are Shu, Shorgo, Aksu, and Karabalta Rivers. Accordingly, bridges are being constructed as required by the project. To monitor the impact of the bridge construction in Jul. to Dec. 2013, upstream and downstream of the bridge sites were measured. In addition, the sand & gravel washing equipment has a retention pond that acts as siltation and sedimentation basin. Water quality was measured prior to and after discharging in the Shu River – hence, there are six (6) monitoring stations for water quality measurements for Jul.-Dec. 2013.
- **Air quality** – Air quality is controlled at relevant sites and along the road construction sections by obtaining readings monthly (Jul.-Dec. 2013) at the following locations as shown in the map: (i) Camp1; (ii) Camp2; (iii) BSU1; (iv) BSU2; (v) DSU1; (vi) DSU2; (vii) Sarybulak1; and (viii) Sarybulak2.
- **Monitoring of fauna and flora** – Monitoring of fauna and flora is carried out by direct observation. The habitats of rare animals and birds are not disturbed, as the construction progresses along the project section. Flora along the vicinity of the road is largely affected by dust and traffic emissions.

A map showing these monitoring points for Jul.-Dec. 2013 is shown in the next page.

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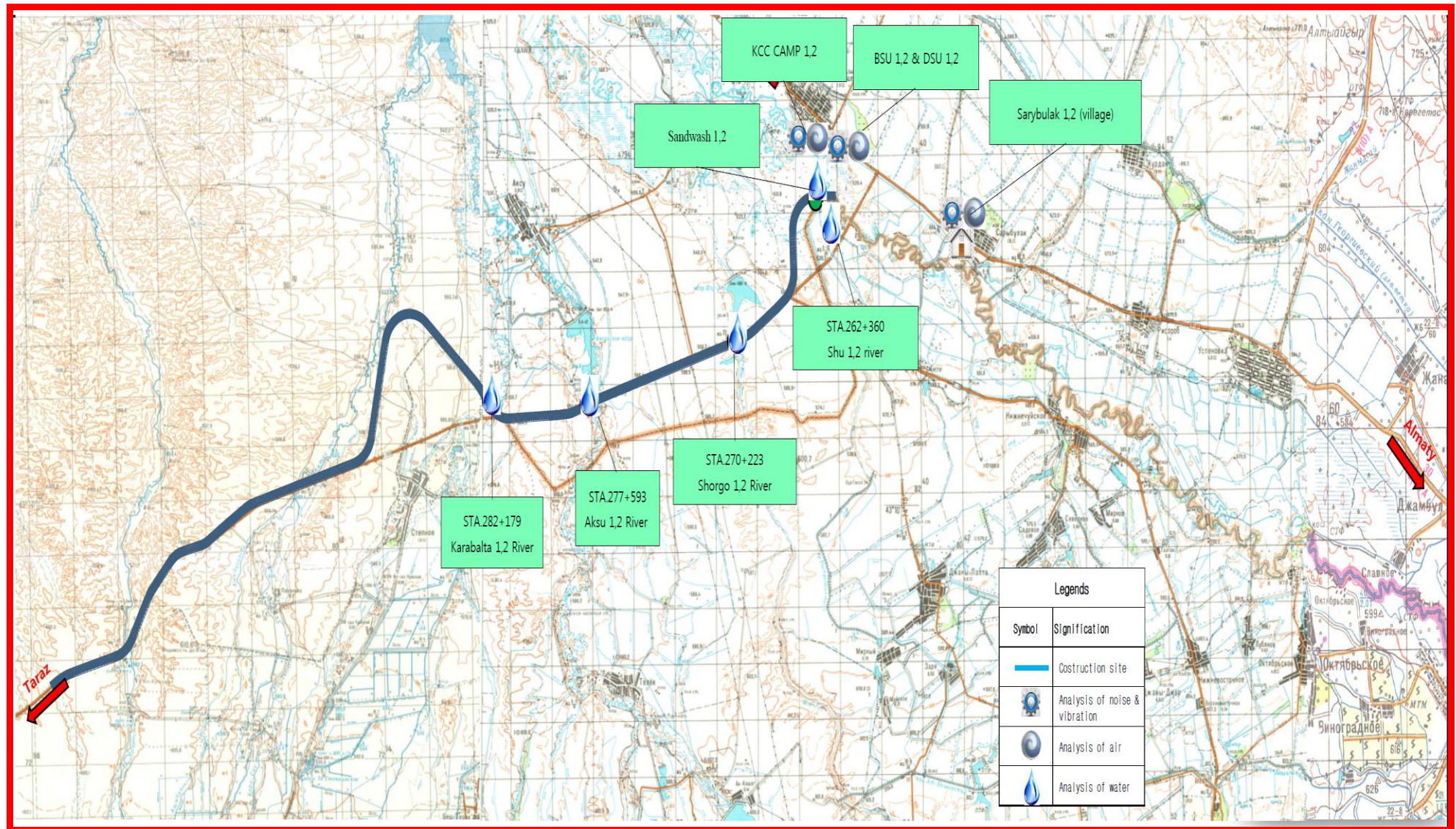


Figure 4: Environmental Parameter Sampling Locations (Jul.-Dec. 2013)

3.2. Monitoring Activities of the Contractor

From July – December 2013, the Contractor, JSC “KCC Engineering & Construction Co. Ltd” undertook monthly parameter readings and observation with compiled summary report. As shown in the previous map, the measurement stations are Camp 1, 2 = locations in the Kaynar campsites; BSU 1, 2, = concrete batching plant areas; DSU 1, 2 = crusher plant areas ad Sarybulak 1, 2 = location in Sarybulak Village. The results of the previous monitoring activities are shown below:

Air Quality⁴: Measurements were done monthly and at 8 sampling stations. The results show that air quality is below the limit as observed in the Table below. From the results of the air measurements, it shows that, generally, the air quality was below the prescribed maximum permissible levels in Kazakhstan.

Table 2: Air Quality Measurements (mg/m³) from Jul. to Dec 2013

Months	Parameter →	NO2	SO2	CO	Dust
	MPC Values →	0.085	0.5	5	0.3
July	Camp1	0.001	0.002	0.009	0.004
	Camp2	0.004	0.006	0.018	0.009
	BSU1	0.00	0.006	0.005	0.008
	BSU2	0.012	0.009	0.022	0.018
	DSU1	0.006	0.004	0.016	0.003
	DSU2	0.011	0.011	0.028	0.013
	Sarybulak1	0.003	0.002	0.014	0.003
	Sarybulak2	0.002	0.005	0.019	0.008
August	Camp1	0.002	0.001	0.002	0.003
	Camp2	0.008	0.005	0.007	0.015
	BSU1	0.004	0.002	0.004	0.009
	BSU2	0.022	0.012	0.026	0.019
	DSU1	0.012	0.025	0.082	0.083
	DSU2	0.014	0.045	0.103	0.120
September	Camp1	0.001	0.000	0.011	0.004
	Camp2	0.008	0.002	0.018	0.007
	BSU1	0.004	0.004	0.016	0.012
	BSU2	0.014	0.013	0.036	0.017
	DSU1	0.007	0.016	0.023	0.026
	DSU2	0.011	0.018	0.072	0.042
October	Camp1	0.001	0.001	0.009	0.005
	Camp2	0.009	0.004	0.012	0.009
	BSU1	0.003	0.002	0.005	0.008
	BSU2	0.008	0.009	0.019	0.013
	DSU1	0.006	0.007	0.015	0.016
	DSU2	0.007	0.015	0.029	0.022

⁴ Based on the Resolution of the Government of the Republic of Kazakhstan on January 25, 2012 № 168, On approval of the Sanitary Rules "sanitary and epidemiological requirements for ambient air in urban and rural areas, soils and their security, content areas of urban and rural settlements

Months	Parameter →	NO2	SO2	CO	Dust
	MPC Values →	0.085	0.5	5	0.3
November	Camp1	0.003	0.001	0.006	0.004
	Camp2	0.007	0.004	0.009	0.010
	BSU1	0.004	0.006	0.009	0.012
	BSU2	0.008	0.012	0.017	0.015
	DSU1	0.010	0.008	0.024	0.056
	DSU2	0.012	0.019	0.067	0.028
December	Camp1	0.007	0.002	0.004	0.001
	Camp2	0.013	0.007	0.008	0.003

Noise⁵: Noise measured at the six (6) sites was **under** the maximum allowable value as shown in the Table below. This indicates that noise generating equipment and machinery were adequately controlled during this period such that noise generation was minimized.

Table 3: Noise Measurements (in dBA) from Jul. to Dec 2013

Sampling point	Maximum allowable values	Jul	Aug	Sep	Oct	Nov	Dec
Camp1	75	42.2	46.1	46.1	45.6	43.9	44.8
Camp2	75	42.3	44.8	44.8	44.7	46.9	44.2
BSU	75	43.3	43.3	56.6	48.1	50.9	-
DSU	75	49.1	49.1	58.6	46.7	53.9	-
Saryb1	75	43.7	-	-	-	-	-
Saryb2	75	43.8	-	-	-	-	-

⁵ Based on GOST 12.1.050-86, GOST 23337-78, GN (Order of the Minister of Health from 3.12.2004 № 841)

Water Quality⁶: Measurements results for water quality were for most of the 22 parameters previously established were generally acceptable. In August 2013, the sand washing equipment was no longer operating; hence no more measurements were done in this spot.

From July to November 2013, as the weather was normal and flows in these rivers are as usual, measurements were done as before. Generally, readings do not show any significant water quality issues. In these five (5) months, the phosphorous (P) levels were elevated, due perhaps to farming activities upstream. However, since the road and bridge construction does not entail the use of phosphorous bearing substance, the elevated concentrations could not be attributed to the construction activities.

Suspended solids were also elevated but seemed within its usual concentrations. From the Table below it is shown that the suspended solids reading for Shu River in November 2013 was around 16 mg/l, way above the maximum permissible concentration (MPC) of 0.25 mg/l. In a 2013 water quality monitoring for Chu basin inside Kyrgyzstan territory, specifically for Station 9 – “River Chu, Chu Nijnye below 0.7 km below the village, 2 km below the confluence of Novotroitsk Outfall Drain” (available in the internet⁷), the total suspended solids readings were as follows:

- For August 2013 = 35.6 mg/l
- For December 2013 = 149.2 mg/l

It is quite obvious that by comparison, the water quality further improved downstream, where the Shu River bridge construction was being performed. This indicated that natural clarification (settling of suspended solids) process occurred as the water flowed downstream to the project area. It can be concluded that the high concentration of suspended solid originated upstream of the project area and not caused by the project itself.

Also, oil contaminant level was below limit and seems to be stable. No water quality measurements were done in December 2013 since no work activity was performed at the bridge sites and generally work slowed down due to winter weather conditions. Hence, overall the construction activities are not impacting the water quality of the rivers. Shown below are the monthly results for the water quality testing.

⁶ Resolution of the Government of Kazakhstan on January 18, 2012 №. 104: On approval of the Sanitary Rules "sanitary and epidemiological requirements for water sources, water intake for drinking purposes, potable water supply and places of cultural and domestic water use and safety of water bodies"

⁷ http://www.meteo.ktnet.kg/environment_water.php

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Table 4: Water Quality (in mg/l) Measurements for Jul – Aug 2013

Substance	MPC	July										August					
		Karabalta1	Karabalta2	Aksu1	Aksu2	Shorgo1	Shorgo2	Shu 1	Shu 2	Sandwash1	Sandwash2	Karabalta 1	Karabalta2	Aksu1	Aksu2	Shu 1	Shu 2
pH	6,5-8,5	7,5	7,5	8,1	8,15	7,3	7,4	7,2	7,4	7,16	6,9	6,9	6,95	7,05	7	7,9	7,85
Na+K	200	142,4	150,3	76,8	75,6	126,1	130,6	80,6	79,5	77,6	67,1	223	215	76,1	75,8	76,1	75,88
K		2,9	3	3,07	2,88	3,4	3,8	1,8	2	2	1,6	2	1,7	1,2	1	1	1,3
Ca	180	158,3	155,1	122,9	119,3	105,3	112,2	133,6	142,3	144,3	138,3	134,7	130,3	51,4	50,8	51,4	52
Mg	50	47,4	48,2	40,6	39,4	37,4	40,1	42,4	47,1	47,1	40,5	132,8	125,4	32,3	33	32,3	31,8
Cu	1	0,005	0,007	0,051	0,048	0,06	0,066	0,005	0,006	0,007	0,005	0,06	0,06	0,06	0,06	0,005	0,005
Zn	5	0,09	0,1	0,15	0,13	0,09	0,102	0,11	0,15	0,18	0,14	0,104	0,112	0,12	0,12	0,17	0,166
Pb	0,03	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mn	0,5	0,16	0,17	0,122	0,108	0,12	0,12	0,13	0,16	0,16	0,14	0,12	0,12	0,107	0,11	0,07	0,07
As	0,05	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
P	5	8,3	8,8	16,4	15,7	13,4	15,2	15,3	15,8	14,9	14	10,6	10	9,22	9,35	11,3	10,5
Cr	0,05	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fe	0,3	0,29	0,281	0,241	0,236	0,207	0,226	0,206	0,227	0,238	0,221	0,206	0,2	0,188	0,206	0,246	0,24
Cl	350,5	13,4	15,2	10,6	9,74	19,4	20,7	11,9	13,08	12,7	11,9	11,4	11	9,34	9,8	9,22	9,18
S	500	202,3	216,1	163,4	157,9	186,1	203,1	109,4	114,1	132,4	124,1	179,2	181,5	150,3	151,2	94,8	95
Ammonia nitrogen	2	0	0	0,22	0,2	0	0	0,12	0,22	0,13	0,15	0,55	0,66	0,42	0,45	0,34	0,35
Nitrates	45	0,37	0,4	0,75	0,67	0	0	5,22	6,07	5,83	4,8	1,02	1,22	1,03	1,08	4,65	5
F	1,2	0,6	0,63	0,77	0,7	0,8	0,93	0,68	0,72	0,77	0,66	0,61	0,64	0,68	0,66	0,55	0,54
Oil	0,1	0,07	0,09	0,08	0,073	0,09	0,095	0,05	0,07	0,08	0,08	0,05	0,07	0,05	0,05	0,08	0,06
Suspended solids	0,25	0,48	0,63	0,032	0,35	0,43	0,67	0,25	0,38	0,88	0,75	0,33	0,36	0,27	0,3	0,21	0,22
COD	30	10,7	11,3	9,3	10,3	11,8	12,6	9,77	10,2	9,45	10,22	12	11,55	10	10,5	10,5	10,6
BOD	6	5,1	5,4	4,2	4,9	5,2	5,7	4,4	5,3	4,2	5,7	5,6	5,2	5,2	5,3	5,3	5,5

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Table 5: Water Quality (in mg/l) Measurements for Sep - Nov 2013

Substance	MPC	September						October						November							
		Karabalta1	Karabalta2	Aksu1	Aksu2	Shu 1	Shu 2	Karabalta1	Karabalta2	Aksu1	Aksu2	Shu 1	Shu 2	Karabalta1	Karabalta2	Aksu1	Aksu2	Shu 1	Shu 2	Shorgo 1	Shorgo 2
pH	6,5-8,5	6,5	6,6	8,1	8,2	8	8,1	8,06	6,77	6,65	7,95	8,05	8,1	8,1	8,14	7	7,15	6,5	6,5	7,9	7,9
Na+K	200	189	188,7	82	83,1	77,3	80	193,4	196,5	88,1	65,9	68,4	72,8	194,2	192,6	80,22	81,6	79,3	80,5	141,1	140,3
K		2,07	2	1,6	1,5	1,6	1,7	1,8	2	2	1,8	1	1,2	2,2	2	1,02	1,2	0	0	2	1,8
Ca	180	110,3	105,8	55,8	50,9	45,2	46,5	88,7	90,9	58,2	77,6	42,08	43,5	177	176,4	66,5	68,9	160	166,2	110,2	111,5
Mg	50	70,8	75,1	36,9	33,5	40,8	42,1	55,7	58,3	42,1	39,9	39,7	40,2	46,1	48,3	44,8	45,04	44,5	43	44,3	0,002
Cu	1	0,008	0,008	0,008	0,008	0,007	0,007	0,005	0,006	0,005	0,006	0,009	0,008	0,003	0,003	0,001	0,001	0,0008	0,0008	0,002	0,008
Zn	5	0,145	0,14	0,09	0,09	0,11	0,12	0,11	0,13	0,13	0,11	0,15	0,16	0,02	0,02	0,16	0,15	0,12	0,11	0,008	0
Pb	0,03	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mn	0,5	0,09	0,09	0,13	0,12	0,05	0,05	0,04	0,05	0,09	0,07	0,03	0,03	0	0	0,05	0,05	0,06	0,06	0	0
As	0,05	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10,6
P	5	20,6	20,8	18,09	20,2	20,2	20,48	15,2	15,5	18,7	18	18,4	18,7	15,5	15,3	14,5	14,8	10,53	10,7	10,44	0
Cr	0,05	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0,21
Fe	0,3	0,24	0,244	0,255	0,26	0,203	0,211	0,136	0,14	0,169	0,176	0,188	0,193	0,155	0,15	0,15	0,144	0,21	0,204	0,201	31,5
Cl	350,5	19,3	19,6	6,12	6,08	10,8	10,5	15,6	16	6,38	6,45	12,5	11,8	10,05	9,98	10,86	11,02	17,1	17,5	30,8	246
S	500	130,8	139,4	221,2	207,3	741,9	725	114,8	120,2	196,4	207,4	152,3	145,9	422,6	436,8	122,6	125,1	75,88	76,12	244	0
Ammonia nitrogen	2	0,64	0,72	0,36	0,35	0,43	0,51	0,4	0,6	0,65	0,6	0,38	0,33	0,55	0,58	0,8	0,77	0	0	0	0
Nitrates	45	5,63	5,89	0,8	0,8	0,5	0,42	3,1	3,5	1,02	1,18	1	0,79	6,88	7,18	0,74	0,7	1,5	1,47	0	0,55
F	1,2	0,55	0,57	0,71	0,69	0,37	0,35	0,66	0,68	0,64	0,62	0,63	0,63	0,34	0,4	0,36	0,36	0,35	0,33	0,5	0,55
Oil	0,1	0,005	0,005	0,04	0,05	0,04	0,06	0,08	0,09	0,09	0,08	0,08	0,09	0,04	0,04	0,008	0,007	0,008	0,007	0,007	0,007
suspended solids	0,25	0,39	0,41	0,31	0,33	0,57	0,55	0,86	1,07	1,08	1,24	0,81	0,68	0,2	0,18	8	7,5	16	15,5	0,15	0,16
COD	30	12,7	13	13	13,2	13,2	13,6	11,88	13,2	15,3	15,5	11,8	13	5	6	12,6	12	5	5,2	6	6,2
BOD	6	5,8	6	6,2	6,2	6	6,3	5,5	6,3	7,3	7,5	5,7	6,4	2,2	2,6	5,8	5,5	2,2	2,3	2,6	2,8

3.3. Contractor's Health and Safety Management

In the aspect of health and safety the main Contractor requires all subcontractors to assign personnel to be:

1. "responsible person for performance of construction and assembly works "
2. "responsible person for fire protection"
3. "responsible person for safety work performance of an erecting crane"
4. "responsible person for gas supply"
5. "responsible person for electricity supply"
6. "responsible person for provision special cloths and other facilities for individual protection of workers"

In case of accident, the Contractor is to submit brief summary about the accidents as part of the monitoring activities for the previous month. A listing of the road accident for the previous six months along the project road is shown below:

Table 6: List of Accidents in Jul. to Dec. 2013

Occurrence Date/Time	Description
30.07.2013 / 2:30 AM	Road accident along "Blagoveshenka-Aspara" km 279+300; this involves a car (Mercedes 05 KZ 768 BMA) in which the driver appeared to have fallen asleep and hit the concrete barrier at the RHS. For unknown reasons, the driver left the accident site and later the police towed the vehicle to the police station.
09.08.2013 / 2:30 AM	This accident involves two vehicles at km 286+200: car (Daewoo Nexi H040 DTM) and truck (Kamaz A 367 VLM) working for the Contractor KCC. The truck driver claimed that he has not see the flagman waving the flag signaling him to stop. So the car driver from Almaty side drove through a hit the truck at the latter entered the main road
15.08.2013 / 05:40 AM	Road accident at km 279+300 involving a truck (Gazal 988 CWA 13) in which the driver appeared to have fallen asleep, crossed the into the opposite lane, hit the HOWA travelling at the opposite direction and without stopping fell into the ditch.
16.08.2013 / 5:30 PM	Road accident at km 291+820 involving a car (Audi B4 with plate number removed). The car travelling from Almaty side burst its tire, got out of control, veered into the center area between the carriage ways.
01.11.2013 / 7:00 AM	Road accident at km 294 involving a car (Mercedes E320 with plate number A55XAM). The car travelling from Taras to Almaty ran into the embankment at the bypass, due to high speed and low visibility.
04.09.2013 / 3:00 PM	Road accident at km 286 involving 2 cars (BMW with plate number 898ACA02 and Mercedes truck with plate number 856AEA08). The car travelling from to Almaty crosses into the opposite direction and crashed into the truck bound for Taraz. A Camry car behind the truck was partially damaged.

In addition the following safety issues need to be monitored:

- **Use of PPE (including replacement, according to climatic conditions)** - Winter personal protective equipment (PPE) has been provided for the period while replenishment for summer wear were being distributed at the time of inspection. The Contractor was reminded that supervisors must control strictly and observe closely on that the workers were wearing certified special clothes and PPE, which includes the usage, and wear-out date of clothes. Violations on PPE non-usage, alcohol and drug intoxication would result to immediate dismissal of worker.
- **Dust and noise exposure** – As the temperature rose for the summer additional water-carriers were engaged to reduce the dust. Prolonged exposure to harmful conditions should be minimized consisting of poor air quality, mechanical vibrations (noise, vibration, ultra-sound and others) and emissions (ionizing, electromagnetic, laser, ultra-violet and others) on work places.
- **Operations of Equipment and trucks** - All equipment of the site should have necessary copies of documents and testing certificates. Working dump trucks should have their vehicle registration certificate and drivers should have driving license. Every day drivers are to be checked on alcohol drinking and blood pressure levels. The Contractor checks technical status of vehicles that transport people and carries out systematic trainings to drivers for Road traffic regulations and safety road.
- **Construction Hazards (heights, electric shocks, etc.)** - The subcontractor's supervisors should be given instructions or orders on safety compliance. Protection to workers should be provided such as for electrical protection, electric tool, gas protection, harnesses and safety belts.
- **Emergency procedures / Coordination with outside Medical Facilities** – During emergency an action plan for first aid and delivery of injured person to Korday's hospital is to be operationalized. In case of fire the evacuation action plan is to be carried out. Telephone numbers of the Emergency department and ambulance service should be readily available.

3.4. Environmental Audit of the Engineer

Environmental Monitoring is among the major tasks of the construction supervision team. Likewise, under the construction contract, the Contractor is obligated to ensure that construction has no or minimal adverse impact to the environment and the communities. The Engineer and the Contractor should have a close collaborative coordination in performing environmental monitoring of activities to be effective in the minimization and avoidance of impacts.

For the purpose of the Bi-annual Environmental Monitoring the CSC Environmental Specialist came to the project site in January 2014 to consolidate monitoring activities in the previous period. The worksite was covered with snow and the work has slowed down due to weather condition. Nevertheless, site inspection was done to assess the general environmental situations and discovered a number of observable situations where the Contractor can improve in providing added environmental mitigation measures and precautionary measures to improve safety at the workplace.

The output of the environmental inspection of the local environmental specialist is included in the Table below entitled “**Observed Issues and Corrective Actions**”.

PART III: ENVIRONMENTAL MANAGEMENT

4. ENVIRONMENTAL MANAGEMENT PLAN (EMP)

The main objective of the Environmental Management Plan (EMP) during the implementation and operation of the project to avoid, reduce, or at least minimize the adverse environmental impacts that could result from the activities. Accordingly, the EMP considers all phases of the Project cycle, namely the detailed design, construction and operational phases of the Project. It consists of various mitigation measures needed to be undertaken in the course of the Project cycle

During the construction phase, certain situations can arise which may not have been anticipated by the Contractor. It is for this reason that the project EMP is considered as a dynamic document which need to be revised by the Contractor as the need arises. The EMP will be continuously updated to include issues unforeseen during the formulation of the IEE. In this period, the Contractor was reminded to update their EMP to include Borrow Pit Reinstatement Plan.

5. OBSERVED ENVIRONMENTAL IMPACTS

During the periodic field mobilization and inspection of the International Environmental Specialist⁸ in January 2014 as part of the CSC (the Engineer) Team, the work scope undertaken in coordination with Contractor (KCC) for the project road consisted of the following:

- Field inspection of the remaining worksites in including facilities and ancillary work areas. Field investigation included worksites along the project road sections, borrow pit area, access roads, bridges and canals, and Contractor's work camp.
- Joint field assessment on the current situation of the material sources activities at the following: (i) Sand borrow pit near km 261 (Left Hand Side); (ii) Gravel-Sand Quarry with washing equipment at (km) 262+300; (iii) Embankment Borrow pit at km 269+500 (Right Hand Side).
- Detailed inspection was done on the former sand-gravel washing site near bridge no. 1 (Shu River).
- Discussion on the permit for the reinstatement of the borrow pit at km 261.
- Discussion on road safety and updating of the Contractor's Environmental Action Plan (CEAP) or EMP and supplemental plans.

Presented below are the environmental, health and safety issues observed at the vicinity of project worksites during the actual monitoring of the CSC personnel, and field reconnaissance of the CS international environmental specialist.

⁸ Mr. Samuel E. Sapuay, Kocks Consult International Environmental Specialist was at the project site in Jan 2014 to consolidate Environmental Monitoring activities for the previous period (Jul-Dec 2013)

Table 7: Observed Issues and Corrective Actions

No.	Observations ⁹	Description of Proposed Corrective Actions or Measures	Responsible Entities	Target Deadlines
1	<u>Silt Contamination at the former gravel and sand washing equipment</u> – The sand/gravel washing process produced considerable silt materials stored in ponds. These ponds need to be closed and the sealed to be incorporated in natural soil [Photo No. 1].	Ponds should be covered with soil and the area reinstated in accordance with a reinstatement plan	Contractor to produce reinstatement plan for the area and implement plan CSC to supervise and inspect final work	March 2014
2	<u>Need stabilization of berm of siltation pond</u> – The siltation pond holding silt needs stabilization [Photo No. 2].	The siltation pond holding silt from sand/gravel washing process has to be stabilized and vegetation planted over the berm.	Contractor to produce a scheme to stabilize the berm and implement CSC to supervise and inspect final work	March 2014
3	<u>Restoration of the pond area initiated without plan</u> – The restoration works for the siltation pond has been initiated without approved plan [Photo No. 3].	Prior to commencing any work a reinstatement plan has to be formed and approved by the engineer	Contractor to produce reinstatement plan for the area and implement plan CSC to supervise and inspect final work	March 2014
4	<u>The flow in Shorgo River needs to be inspected</u> – Since the flow of the river is covered with snow, it was not apparent if the flow has been affected by the construction. [Photo No. 4].	In spring time, it is important to inspect the flow of Shorgo River to find out if there were changes in its natural flow	Contractor and Engineer to inspect to determine if there were any hydrologic impacts	March 2014
5	<u>The slope protection at Aksu River needs to be inspected</u> – Since the banks of the	In spring time, it is important to inspect the slope of Aksu River to	Contractor and Engineer to inspect to determine the	March 2014

⁹ Observed Issues on January 2014

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No.	Observations ⁹	Description of Proposed Corrective Actions or Measures	Responsible Entities	Target Deadlines
	river are covered with snow, it was not apparent if the side banks are adequately stabilized in the construction. [Photo No. 5].	find out if were adequately stabilized	stability of the slope	
6	<u>The flow in Karabalta River needs to be inspected</u> – Since the flow of the river is covered with snow, it was not apparent if the flow has been affected by the construction. [Photo No. 6].	In spring time, it is important to inspect the flow of Karabalta River to find out if there were changes in its natural flow	Contractor and Engineer to inspect to determine if there were any hydrologic impacts	March 2014
7	<u>No issue at km 296+400 box culvert</u> [Photo No. 7].	None	None	-
8	<u>The slope protection at km 306+602 box culvert</u> – Since the banks of the irrigation canal are covered with snow, it was not apparent if the side banks are adequately stabilized in the construction. [Photo No. 8].	In spring time, it is important to inspect the slope of irrigation canal to find out if were adequately stabilized	Contractor and Engineer to inspect to determine the stability of the slope	March 2014
8	<u>The slope protection at km 306+602 box culvert</u> – Since the banks of the irrigation canal are covered with snow, it was not apparent if the side banks are adequately stabilized in the construction. [Photo No. 8].	In spring time, it is important to inspect the slope of irrigation canal to find out if were adequately stabilized	Contractor and Engineer to inspect to determine the stability of the slope	March 2014

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No.	Observations ⁹	Description of Proposed Corrective Actions or Measures	Responsible Entities	Target Deadlines
9	<u>Reinstatement of the km 269 borrow pit area initiated without plan</u> – The reinstatement works for the borrow pit at km 269+500 (Right Hand Side) has been initiated without approved plan [Photo No. 9].	Prior to commencing any work a reinstatement plan has to be formed and approved by the engineer	Contractor to produce reinstatement plan for the area and implement plan CSC to supervise and inspect final work	March 2014
10	<u>The borrow pit is covered with snow but needs to be inspected</u> – The borrow pit at km 261 (Left Hand Side) needs to be inspected and the necessary reinstatement plan need to be produced. [Photo No. 10].	Prior to commencing any work a reinstatement plan has to be formed and approved by the engineer	Contractor to produce reinstatement plan for the area and implement plan CSC to supervise and inspect final work	March 2014
11	<u>Workers not wearing protective work clothes</u> – At the worksite, workers are not wearing the required protective clothing. [Photo No. 11].	Workers should at all times wear their protective clothing and should be checked by immediate supervisor at all times	Contractor to instruct their workers to wear protective clothing. Engineer to inspect and monitor	Immediately

6. NOTICES AND LETTERS

During the six-month period, the CS Consultant had been actively monitoring the Contractor's performance in the environmental and social aspects. Issues were identified and communicated formally to the Contractor in the form of official letters. A listing of such letters on the environmental aspects and their status is shown below:

Table 8: Letters on Environmental Issues and Concerns (Jul. to Dec. 2013)

Letter No.	Dated	Ref.	Content	To/From
1	13.07.2013	130713-PD-754	Submission of Information and performance of necessary measures for environmental protection	to KCC/ from Kocks
2	15.07.2013	130715-PD-754	Mobilization of Engineer's Staff – Mr. Sam Sapuay / Environmental Specialist	to SAI/ from Kocks
3	31.07.2013	130731-PD-754	Bi-annual Environmental Monitoring Report – First Half of 2013	to SAI/ from Kocks
4	31.07.2013	130731-PD-755	Submission of Bi-annual Environmental Monitoring Report – First Half of 2013	to MOTC/ from Kocks
5	27.12.2013	Kocks 550/2013	Suspension of Environmental Monitoring	to Kocks/ from KCC
6	27.12.2013	Kocks 549/2013	Accident Report at km 266+240 and request for payment	to Kocks/ from KCC
7	09.12.2013	Kocks 537/2013	Submission of the Plan on maintenance of road at winter time	to Kocks/ from KCC
8	09.12.2013	Kocks 536/2013	Submission of the Plan for opening of 2 lane traffic at the period of winter maintenance	to Kocks/ from KCC
9	09.12.2013	MOTC 176/2013	Plan on opening of the traffic winter time	to MOTC/ from KCC
10	04.11.2013	Kocks 518/2013	Traffic Accident	to Kocks/ from KCC
11	04.09.2013	Kocks 478/2013	Traffic Accident at km 286 of motorway 03.09.2013	to Kocks/ from KCC
12	07.08.2013	Kocks 452/2013	Contractor's Semi-annual statement on environmental monitoring	to Kocks/ from KCC

7. CORRECTIVE ACTION PLANS

Within July - December 2013 environmental monitoring was performed on the road under construction contract of Kocks Consult GmbH, namely the **Aspara-Blagoveshenka Section in Zhambyl Oblast: Investment Program Project 4**. This yielded a number of observable issues which the Contractor had to mitigate. This report also presents recommended mitigation

measures which can be implemented by the Contractor to mitigate the observed situation and should be inspected by CSC Inspectors.

The issues encountered in this periodic inspection were in the aspect of safety, environmental documentary requirements, borrow pit management, dust control, and campsite solid waste management and oil contamination. Work related environmental, health and safety concerns were encountered during the period. Validation of the measures was done during the visit of the International Environmental Specialist during his site inspection in January 2014. The environmental concerns focused on the following:

- (i) Reinstatement of borrow areas
- (ii) Validation on mitigated hydrological impacts at waterways
- (iii) Safety provisions
- (iv) Documentary requirements

As the work winds down and the project nearing completion, the environmental requirements for the project need to be fully addressed. Prior to closure of the environmental aspects of the project, a final audit will have to be done and with corresponding “punch-list” on every provisions in the Contract – GCC/PCC/Technical Specifications.

ANNEXES

Annex A: Environmental Monitoring PHOTOS



Photo No. 1 : Formerly washing water containment pond



Photo No. 2 : Siltation pond berm Vicinities of Shu River



Photo No. 3 : Restoration of sand and gravel area was started



Photo No. 4 : Flow of Shorgo River has to be inspected



Photo No. 5 : Need to inspect the slope of Aksu River



Photo No. 6 : Vicinities of Karabalta River



Photo No. 7 : Vicinities of Box culvert at km 296+400



Photo No. 8 : Vicinities of Box culvert at km 306+602



Photo No. 9 : Initial reinstatement of borrow pit at km 269+500 (Right Hand Side)



Photo No. 10 : Borrow pit near km 261



Photo No. 11 : Workers not wearing required protective clothing