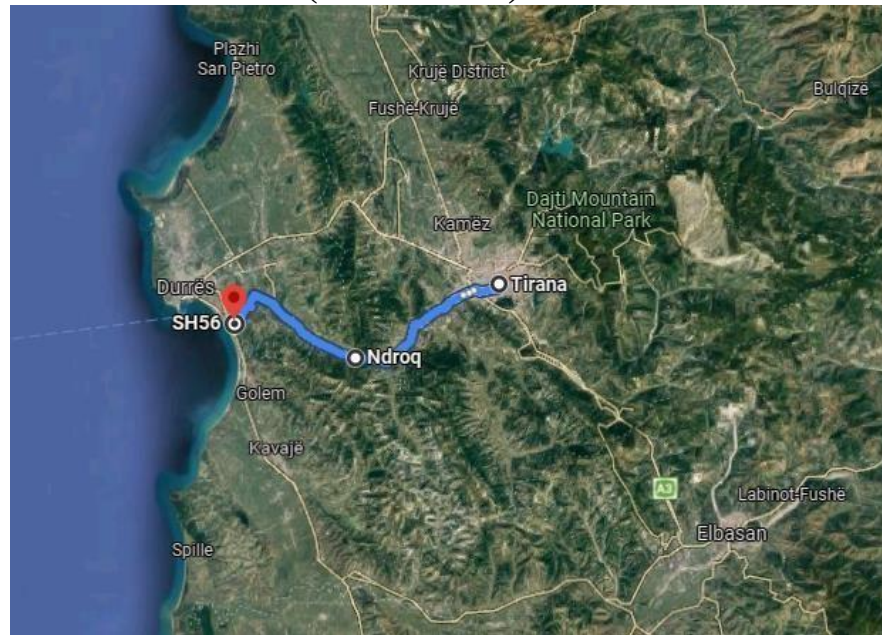


**Environmental and Social Management Plan for Beshiri Bridge
Building Resilient Bridges Project (BRB)**

ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

Building Resilient Bridges P174595

**BESHIRI BRIDGE AT THE TIRANE – NDROQ – PLEPA
ROAD (PK 3+233)**



**Prepared By
Albanian Road Authority (ARA)**

January 2025

**Environmental and Social Management Plan for Beshiri Bridge
Building Resilient Bridges Project (BRB)**

1.	INTRODUCTION.....	3
2.	DESCRIPTION OF THE PROJECT	5
	2.1 Description of the existing Bridge	6
3.	Environmental and social baseline information.....	8
	3.1 Sub-Project location	8
	3.2 Population.....	9
	3.3 Cultural Heritage Considerations	10
	3.4 Infrastructure	10
	3.5 Climate	10
	3.6 Geological Overview of Ndroq area	13
	3.7 Hydrogeology	13
	3.8 Seismic Hazardous	14
4.	Biodiversity and Natural Habitats	14
	4.1 Protected areas.....	15
	4.2 Flora and Fauna	15
5.	Air quality.....	15
6.	Waste.....	15
7.	Analysis of Possible Environmental Impacts	15
	Construction phase	16
	7.1 Air quality and noise generation	16
	7.2 Geology and soils	16
	7.3 Generation of construction waste	16
	7.4 Hydrology, surface and ground waters.....	17
	7.5 Safety and Health measures	17
	7.6 Habitat and biodiversity	17
	Operation phase	17
8.	Potential Social Impact.....	17
9.	Summary of recommended mitigation measures for the “Beshiri Bridge”	17
	9.1 Waste (recycling and disposal)	17
	9.2 Chance find items of cultural and historical interest	18
	9.3 Water contamination.....	18
	9.4 Other concerns	18
10.	Implementation arrangements for ESMP.....	19
	10.1 ESMP Capacity building.....	20
	10.2 Reporting and monitoring	20
	10.3 Public information and disclosure.....	20
	Table 1: Environmental and Social Management Plan	22
	Table 2: Environmental and Social Monitoring Plan.....	37

**Environmental and Social Management Plan for Beshiri Bridge
Building Resilient Bridges Project (BRB)**

ARA	Albanian Road Authority
CH	Cultural Heritage
EIA	Environmental Impact Assessment
EHSG	Environmental Health and Safety Guidelines
ESMP	Environmental Management Plan
ESMF	Environmental Assessment and Environmental and Social Management Framework
ESMP	Environmental and Social Management Plan
ESF	Environmental and Social Framework
ESS	Environmental and Social Standards
FS	Feasibility Study
GoA	Government of Albania
GRM	Grievance Redress Mechanism
LMP	Labor-Management Procedures
OHSE	Occupation Health Safety Environment
NEA	National Environmental Agency
MoTE	Ministry of Tourism and Environment
MoIE	Ministry of Infrastructure and Energy
MoLSA	Ministry of Labor and Social Affairs
MoHSP	Ministry of Health and Social Protection
WB	World Bank
SEA/SH	Sexual Exploitation and Abuse/Sexual Harassment
SEP	Stakeholder Engagement Plan

Environmental and Social Management Plan for Beshiri Bridge

Building Resilient Bridges Project (BRB)

1. Introduction

The Project “Building Resilient Bridges” (BRB) aims to finance the rehabilitation and/or reconstruction of priority bridges in order to enhance their reliability, operational performance and resilience to future climate change and geological hazards events. In addition, to ensure sustainability of the investments, the project will finance softer components aimed at strengthening the capacity of Albanian Road Authority at managing the bridge and culvert assets.

The Albanian Road Authority (ARA) is the Implementing Agency for the project, and the preparation of site-specific instruments has been covered by the environmental and social consultants hired from the Project Implementation Team (PIT).

Part of the BRB Project, under the proposed first year bridges is also the subproject of “Beshiri Bridge”, for which this ESMP is prepared.

The ESMP, including tailored mitigation measures addressing identified E&S risks and potential adverse impacts are guided by the national legislation, World Bank ESSs, mandatory use of World Bank Environmental, Health and Safety Guidelines (WB EHSG) and Good international Industry Practices (GIIP). In the case these sources and platforms differ, the stricter one will prevail.

This bridge is located in the Tirane-Ndroq-Plepa road segment and crosses the Erzeni River. The motivation to reconstruct the road Tirana - Ndroq – Plepa, SH56 by ARA, is in the fact that this road had a high traffic load since it connects Tirana Adriatic coast. However, due to increased damages to the road, a decrease in traffic was observed. This, in turn, overloaded the highway Tirana – Durres (SH2). This highway, and the highway Durres – Vlore (SH5), are the most critical routes in Albania.

The Beshiri Bridge as part of this road segment is going to be constructed under the BRB project and this ESMP cover only Beshiri Bridge construction.. Beshiri Bridge was constructed before the WWII/reconstructed in 1960 crossing Erzen River and is located at km 3+233 along the interurban road section (SH56) connecting the capital city Tirana to the main port, Durres via Ndroq. The existing bridge has a total length of 118 meters and width of 6 meters including the sidewalks, with one traffic lane in each direction. The structure consists of 3 spans 25 meters each (concrete arches $L=3 \times 25.5\text{m}$) with a height of around 15 meters from the river bed. Based on the visual inspection, the bridge shows evident moisture stains on the deck elements (arches) and the substructures surfaces (piers and abutments). On the arches the concrete is deteriorated and in one of them there are oxidized tie rods. The body of the arch has a width of 7.5 MAS a result of the long exploitation time, cracks and voids are visible on the walls above the arches. Damages are observable in the joints of the ties and concrete piers. The piers of the bridge are into the riverbed, without protections. Local scour is observed below the footing base. The bridge deck drainage system doesn't guarantee the proper water discharge out of the bridge. It can be observed that there are signs of previous interventions on structures, with various levels of repairs both on the bridge substructure and/or its superstructure. In addition, no measures appear to have been undertaken against the river erosion and the soil at the foundation level of the piers is significantly eroded due to the flow of water. The road (SH56) leading to the bridge is a two-lane road (<2.75m) with narrowing along the bridge and no paved shoulders. The traffic volume is moderate and the geometric parameters as well as the pavement condition along the road is considered as poor. The traffic properties of the existing road allow for the design speed of 40-60 km/h, and the longitudinal slope of the road, in general, does not exceed 6 percent.

With this in mind, the overall objective of the project is to improve the road transport infrastructure, to meet the growing needs for transport services and to contribute to the improvement of the overall economic situation. Practical benefits of the reconstruction of the road Tirana - Ndroq – Plepa (SH56) **together with the new Beshiri bridge construction** are expected when it comes to the decrease the traffic

Environmental and Social Management Plan for Beshiri Bridge Building Resilient Bridges Project (BRB)

load on SH2 and to provide an alternative route from Tirana to Durrës.

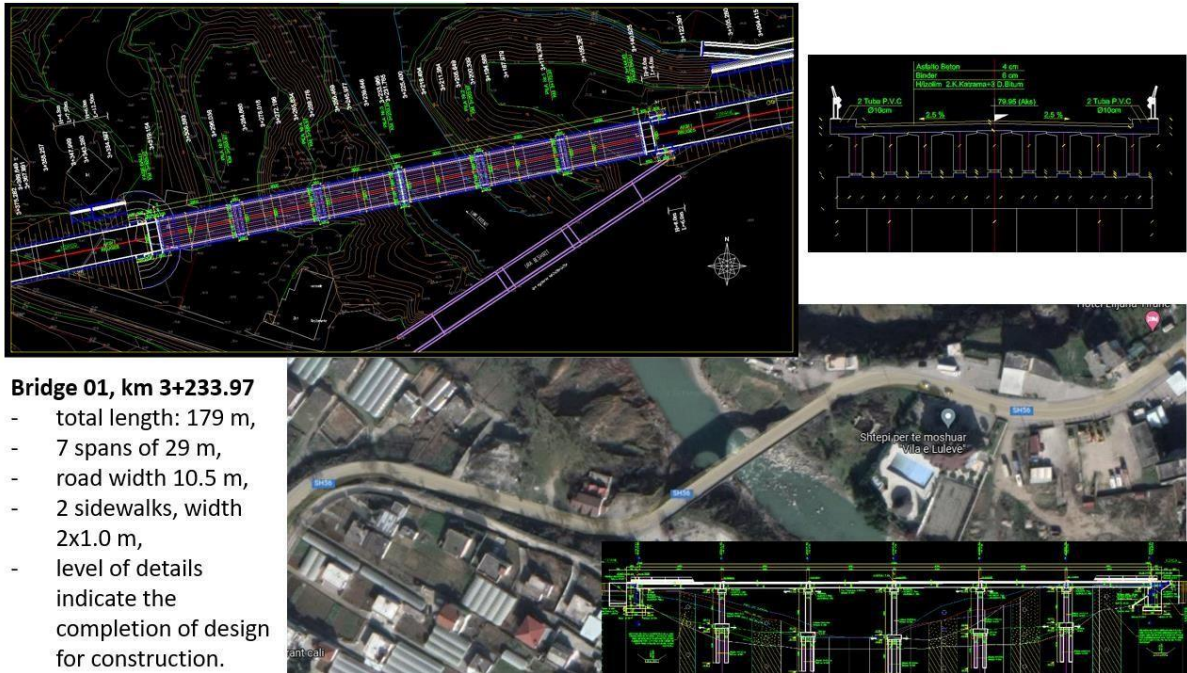


Figure 1: Technical Details of Beshiri Bridge

Environmental and Social Management Plan for Beshiri Bridge Building Resilient Bridges Project (BRB)



2. Description of The Project

Since the existing road, at the location of Beshiri bridge, has several curves and the existing bridge has serious damages, it was concluded that, for the reasons of safety and practicality, this bridge should be replaced by the new bridge, and on the slightly corrected route, Figure 3.

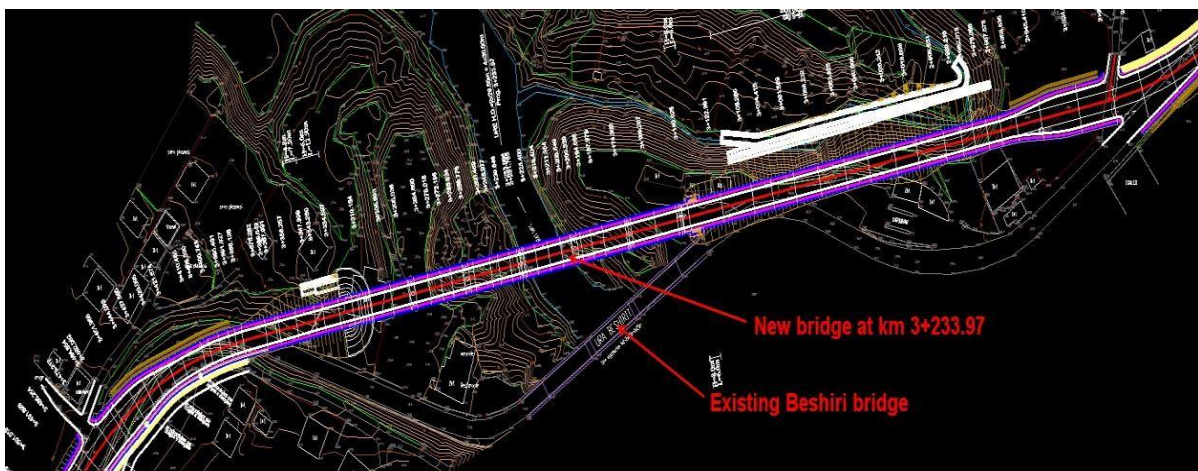


Figure 3: New bridge over the Erzeni River at km 3+233.97

ARA has conducted in 2010 a feasibility study (FS) for a proper solution to the situation. Between October 2021 and December 2022 an FS review was undertaken by an external consultant. The E&S reassessed were reflected in the ESMP, dated on October 2022.

Project activities:, New bridge construction.

The newly proposed bridge crosses the Erzeni River and will be positioned adjacent to the existing bridge on a newly improved road alignment

The new bridge, Bridge 01 at km 3+233.97 has following properties: total length of 179 m; 7 spans of 29 m; road width of 10.5 m; 2 pedestrian pathways, with width of 2x1.0 m,

Environmental and Social Management Plan for Beshiri Bridge Building Resilient Bridges Project (BRB)

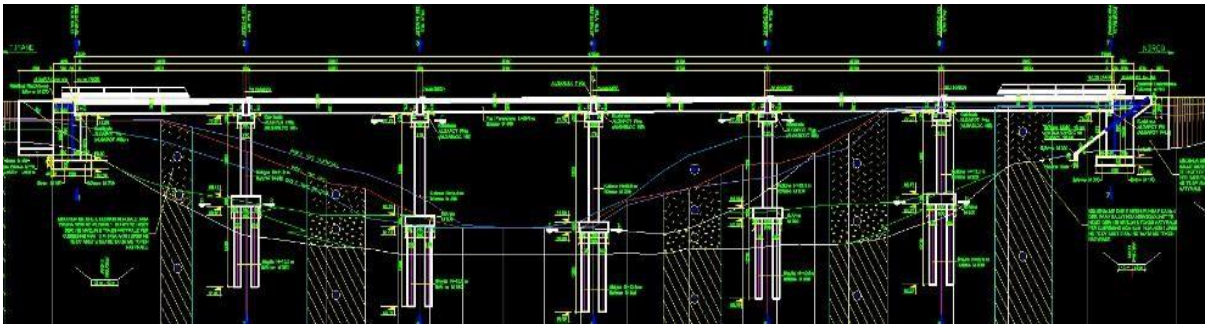


Figure 4, 5 Technical design of New bridge over the Erzeni River at km 3+233.97 – longitudinal cross-section

Analysis of Alternatives

Alternative 1: No project alternative

Now in the project area, there is only the old, damaged existing bridge, that does not meet the criteria of the road category, the function of which it performs. The road over bridge is narrow, as presented above, which makes it difficult for vehicles to move, especially during their exchange. Because of the lack of sidewalks on both sides also causes the driver to lose concentration and consequently significantly reduces its safety; Tirana - Ndroq – Plepa, SH6, is in the fact that this road had a high traffic load since it connects Tirana with Adriatic coast. However, due to increased damages to the road, a decrease in traffic was observed. This, in turn, overloaded the highway Tirana – Durres (SH2). This highway, and the highway Durres – Vlore (SH5), are the most critical routes in Albania. These corridors are vulnerable to flood events, with annual estimation of damage costs of ~13 million Euros.

As a result of this situation, since no measures were undertaken against the river erosion, the soil at the foundation level of the piers is significantly eroded due to the flow of the riverbed which has endangered the collapse of the bridge structure. The existing bridge is built with prefabricated elements and at the foundation is exposed to corrosion of steel.

Alternative 2: bridge construction in same location

The existing bridge crosses the Erzeni River which presents high risk of flooding. Erzeni River in this location, according to the hydrological study, has a flow of 1270 m³/sec for 1% safety margin. Also the existing bridge and the road itself are very old (constructed before WWII and reconstructed in the 1960s) and with heavy damage due to age, traffic and poor maintenance.

The construction of the Bridge in this same location will have an adverse Environmental and Social impacts, such as pollution of Erzeni river, and the several curves that causes risk of safety and practicality will still be present. Therefore, this alternative was ignored.

Alternative 3: Bridge construction in a different location

The alternative 3 is the implementation of the proposed project. The option of selecting another location for the bridge construction was discussed and agreed with local community, the municipality of Tirana, Environmental Agency, the Road Authority

Environmental and Social Management Plan for Beshiri Bridge Building Resilient Bridges Project (BRB)

Since the existing road, at the location of Beshiri bridge, has several curves and the existing bridge has serious damages, it was concluded that, for the reasons of safety and practicality, this bridge should be replaced by the new bridge, and on the slightly corrected route.

This alternative has the following advantages:

- Increasing the safety and comfort of traffic;
- to construct a road at the closest possible distance to the existing road, also using its segments, as well as taking into account the contemporary interventions and other projects,
- to achieve an optimal techno-economic project and the road that is in accordance with the modern technical standards of road construction,
- to minimize the environmental impact of the works, land occupation, the expropriations and/or social impacts of the road construction.

Conclusion

After reviewing the proposed alternatives, considering the environmental and social point of view, the alternative 3 was selected as the most appropriate.

After reviewing the proposed alternatives, considering the environmental and social point of view, the alternative 3 was selected as the most appropriate.

Variants and the project selected for implementation foresees that the bridge route will be slightly corrected, to avoid the several curves for the reasons of safety and practicality and to replace the existing bridge which has serious damages.

2.1 Description of the existing Bridge

Since the road SH56 has been built long ago, most of the bridges on it are built as massive concrete structures with vaults, The existing bridge on Erzen river was built by the family of the biggest traders, Beshiri. The relatively large five-arched bridge was built in 1848 in the name of five sons of Haxhi Selman Beshiri, but indeed it was built by expenses of the fourth brother, Haxhi Ali Beshiri. This bridge served that rich merchant for the transport of goods from Tirana to Durres and vice versa. After a while the bridge was ruined by the river. In 1851 Ali Beshiri financed its reconstruction. The bridge that was put into service of the public enhanced the popularity of Beshiri family. However, the adversaries of Ali Beshiri organized the latter's murder on 14 February 1852 exactly in the place where he was supervising works for its construction. Beshiri family members reconstructed the bridge for the third time in 1859 and this bridge remained there until it was destroyed during the Second World War. The new concrete bridge built in 1945 is still referred to by the area population as "Beshir's Bridge"

The perception and importance of old bridge can vary significantly based on historical, cultural, and functional factors. The old bridge might be seen as a symbol of heritage, representing local history. Older generation may have emotional ties to the bridge, viewing it as part of their community's identity.

Also the bridge has functional importance. For many the bridge serves as a critical connection for daily life, facilitating access to schools, markets, and healthcare. Its role in supporting local agriculture or trade by connecting rural areas to urban centers is significant.

For many people the old bridge is seen as an unsafe or unreliable. Limited capacity for modern traffic may hinder economic activity and connectivity.

Currently we have no information about what will happen to the bridge in the future. In the case it will be used, safety of users will be ensured.

Environmental and Social Management Plan for Beshiri Bridge Building Resilient Bridges Project (BRB)

In existing state, the road Tirane-Ndroq-Plepa, has a length of ~28km. Overall, the road passes in a plain-hilly terrain. The width of the road cross section is ~8-9 m with traffic lane width of ~7m.

The traffic properties of the existing road allow for the design speed of 40-60 km/h, and in some segments up to 80 km/h.

Since the existing road, at the location of this bridge, has several curves and the existing bridge has serious damages, it was concluded that, for the reasons of safety and practicality, this bridge should be replaced by the new bridge, and on a new improved road alignment. The longitudinal slope of the road, in general, does not exceed 6%.

The surface course of the road is generally worn out, despite the repairs that have been made from time to time. The most damaged segment is the one that belongs to the District of Durres. Asphalt has reached the end of its life time, and in significant parts, this situation damages the base layers what is reflected by sagging.

The foundations of the piers are also massive. In the existing state, it can be observed that there are signs of previous interventions on structures, with various levels of repairs both on the bridge substructure and/or its superstructure.

At km 3+000, the Beshiri Bridge over the Erzeni River is the biggest bridge. It has arches, $L=3 \times 25.5\text{m} = 118\text{m}$, with the height from the river bed of about 15 M. The bridge has a road width of 6.0m and two pedestrian pathways of 0.75m. The body of the arch has a width of 7.5 MAs a result of the long exploitation time, cracks and voids are visible on the walls above the arches, and damages are observable in the joints of the ties and concrete piers.

Since no measures were undertaken against the river erosion, the soil at the foundation level of the piers is significantly eroded due to the flow of water.



Beshiri Bridge over the Erzeni River – longitudinal view

Environmental and Social Management Plan for Beshiri Bridge Building Resilient Bridges Project (BRB)



Beshiri Bridge over the Erzeni River – side view



Bridge over the Erzeni River – top view

The basic formation in the riverbed is located at a depth of about 4 m and consists of gray to blue marl (semi-rock formation). Layers of gravel are placed on the base formation.

Main characteristics:

- Bridge substructure: the piles are built with foundations with poured reinforced concrete pillars with a diameter of Φ 1.2 m, 6 pieces for each pile with a length of 12.0 m, which are inserted in the basic semi-rock formation.
- On the pillars of the foundation, the concrete cushion is built of connecting weapons on which three round columns are erected, with a diameter $D = 170$ cm on which the superstructure supporting cushion is placed.
- Both fronts of the bridge are made of reinforced concrete with massive foundations placed in the basic formation.
- The superstructure of the bridge is foreseen to be realized with a pretensioned beam with a length $L = 29.0$ m, T-section and pretensioning before concreting, weighing about 38 Tons.

A geological study was conducted at the crossing where it was found that the riverbed of Erzeni on both sides of it, from Tirana and Ndroqi, is narrowed with deposited soil.

The river bed is located at a depth of approximately 4 m, and consists of grey to blue marl (semi-rock formation). On the existing bridge layers of gravel are placed on the base.

Environmental and Social Management Plan for Beshiri Bridge Building Resilient Bridges Project (BRB)

The newly proposed bridge crosses the Erzeni River and will be positioned adjacent to the existing bridge on a newly improved road alignment. The new bridge will significantly improve the existing road alignment and safety of motorized traffic and pedestrians.

The new structure consists of 6 spans, 2x29.5 meter + 4x30 meters, with a total length of 179 meters and will feature 2 pedestrian pathways, with width of 2x1.0m.

The superstructure is realized by prefabricated pre-stressed concrete T-beams. The height of the beams is 1.50 meters. These beams are connected by the concrete slab of 0.25 meters thickness and by transversal diaphragm beams with a width equal to 0.30 meters. The deck plan has a total width of 14.10 meters (10.50 meters of which is the carriageway). The beams are positioned next to one another with an inter-axis of 1.32 meters. The beams are simply supported and the continuity of the system consists only by the deck slab. The abutments, consisting of stem and lateral walls, have a maximum height of 10 meters (including the foundation). The spread footing foundation has dimensions equal to 12.50 x 6.50x1.40=BxLxH m. Above the piles, the concrete reinforcing girder will be constructed, consisting of three columns with circular cross section and the diameter of D=170 cm, on which a concrete girder will be constructed to support the superstructure. The foundations have dimensions 11.00x5.00x1.50=BxLxH m. The diameter of the piles is 1.20m with L=15.00 meters. The pier cap has dimensions equal to 12.00x3.00x1.20 meters. On each pier cap there are two bearing axes.

The surface runoff water of the superstructure passes from the longitudinal pipe, through the vertical metal pipe fixed to the stem wall through metal staffs, with an interaction of 3m and ends in the prefabricated manhole (0.80x0.80) in C25 / 30 concrete with manhole cover in spheroidal cast iron Ø60 class C250. After the treatment of the water, the discharge is made through a corrugated polypropylene pipe - with double wall (smooth internal) SN16 kN / m² UNI EN 1046, to the Erzen River through the existing white water treatment system.

The construction phase is as below

CONSTRUCTION PHASE

PHASE 1

- Preparation of the construction site
- Placement of sheet pile near P2 and P3
- Excavation
- Installation of large diameter drilled piles

PHASE 2

- Construction of Abutment B1 foundation
- Construction of Abutment B2 foundation
- Construction of Pier P1, P2, P3, P4, P5 foundation

PHASE 3

- Construction of front and side wall of Abutment B1 up to the support level
- Construction of front and side wall of Abutment B2 up to the support level
- Construction of Pier P1, P2, P3, P4, P5 up to the support level

PHASE 4

- Beams positioning

PHASE 5

- Construction of remaining parts of abutments, piers and walls
- Construction of reinforcement concrete slab with 25 cm thickness and diaphragm beams

PHASE 6

- Finishing of the deck with wearing surface, barrier and parapets

Environmental and Social Management Plan for Beshiri Bridge Building Resilient Bridges Project (BRB)

3. Environmental and social baseline information

3.1 Sub-Project location.

The Municipality and the actual administrative units were formed in 2015 according to the local government reform (Law 115/2014 “On Territorial and Administrative Division of Local Government Units in the Republic of Albania”).

The sub-project is located under the administrative borders of Ndroq Administrative Unit, and part of the Municipality of Tirana. The bridge is part of the road S56.

The city of Tirana is connected to the southern part of the country by two directions that meet at one point, in a place called Plepa. These two directions are called "Rruga e Durrësit", which is currently the highway Tirana - Vore - Durrës - Plepa, and "Rruga e Kavajës", which is the axis Tirana - Ndroq - Plepa. “Tirana - Ndroq – Plepa” is a road that has had a high traffic as it serves a residential area with high density and is one of the current connections of Tirana with the South and South-East of Albania. As a result of road damage, there is currently a drop in traffic.

Map illustrating the road “Tirane-Ndroq-Plepa”



Map illustrating Km 2 + 800 - km. 3 + 400, Beshiri Bridge over the Erzen River

Environmental and Social Management Plan for Beshiri Bridge Building Resilient Bridges Project (BRB)

3.2 Population

The population of the administrative unit Ndroq includes the population of its villages such as: Ndroq, Zbarqe, Kërçukje, Zhurje, Lagje e re, Pinet, Sauqet, Çalabërzezë, Shesh, Grebllesh, Mënik

According to the General Directorate of Civil Status, during 2019, Administrative unit. Ndroq with an area of 63.3 km² has a population of 9,788 inhabitants.

- 3.2.1 Population density of 155 inhabitants / km²
- 3.2.2 Average age 35 years gender
- 3.2.3 21.10% of the young population (0-14 years old)
- 3.2.4 68.30% of the population are of working age (15-64 years old)
- 3.2.5 10.50% of the elderly population (65+ years old)

3.3 Cultural Heritage Considerations

The existing bridge, though built in 19th century is not listed as protected cultural heritage in the national registers of cultural heritage. It is believed that Ndroq has existed as a settlement since Roman period. However, it is mentioned for the first time as a village of Andronikë, with 23 houses in the Turkish register of the Sanjak of Albania, drafted in the years 1431-1432.

There are two hypotheses about the name of Ndroq village:

- It originates from the word “among the roots”- “underneath the roots” or at the foot of the mountain because village is situated at the bottom of the hill of Ndroq castle.
- However, its name has an earlier memory from the Greek word “andros”, man; therefrom “Andronicus” as a proper noun, Andronikus as the emperor’s name.

Later, both names suffered phonetic transformations until the formation of the present word “Ndroq”. During the whole XX century, “Ndroqi” surname has attributed to the region individualities that have deserved and still deserve honour.

The castle of Ndroq is located on a hill 387m high and it is the nearest Cultural Heritage in this area. This castle is approximately 9 km away from Beshiri Bridge

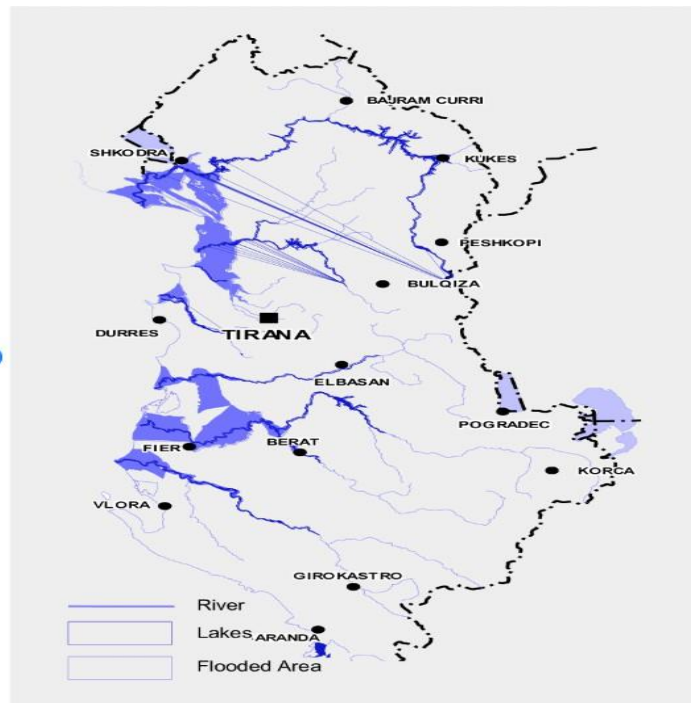
3.4 Infrastructure

Road tracking, Tirana - Ndroq - Plepa, is located in the Western Lowlands of Albania, and exactly in the district of Tirana and Durres. The beginning of the road tracing is at the exit of the Tirana Combine, passes near the village of Vaqar, at the **Beshir Bridge** (where the project financed by WB will be implemented) near the village of Peze Helmes, through the settlement Ndroq, passes to Romanat, the Pjebes crossroads, climbs the Arapaj hills, near the village Shkallnur and finally crosses level the railway line in Plepa (Durres). Although there is a drainage canal before the entrance to the bridge from Tirana- Ndroq side, the area has experienced flooding at various times.

The Erzeni River, like many rivers in Albania, has caused significant flooding in the past. The flooding has typically affected agricultural lands and residential areas in the low-lying regions. Major floods in Albania have been recorded in years such as 1962, 1971, 1979, and more recently in 2015 and 2017, when several rivers, including the Erzeni, experienced dangerous levels of overflow.

For instance, the 2015 flood caused substantial damage to properties and agricultural lands, and similar events have prompted the Albanian government and international partners to invest in flood risk management, including embankment construction along major rivers like the Erzeni. Flooding typically follows heavy rains, and these historical events highlight the ongoing flood risks in areas like Ndroq.

Environmental and Social Management Plan for Beshiri Bridge Building Resilient Bridges Project (BRB)

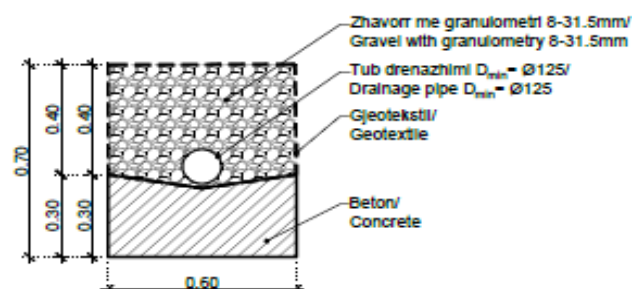


Geotextile filter drainage behind the stem walls

To protect against the effect of water on the erosion of the structure, we realize drainage behind the stem wall of the abutment. A waterproofing layer with 3 coats of bitumen is applied to the inner side of the stem wall, including the foundation of the structure. We create a concrete base, with a height of 30 cm for the support of the drainage pipe with $D_{min} = \text{Ø}125$ and length respectively on the abutment B1, $L = 43.45$ m and the abutment B2, $L = 47.40$ m.

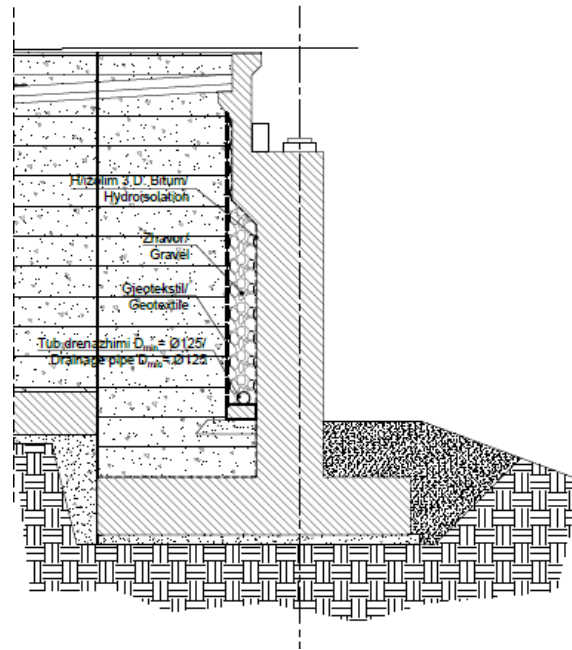
Around the drainage pipe we realise a filling with gravel with a granulometry of 8-31.5 mm, with a height of about 40 cm, which is covered by a layer of geotextile with polyester or propylene. Above this layer, we make a filling with gravel about 60 cm wide, behind the stem wall on which we applied the waterproofing layer. After filling with gravel, aiming for the natural drainage of water, we place a geotextile layer up to the level of the curtain wall. The materials to be used shall be approved by the site Engineer. The different pieces of geotextile will be sewn together to form the drainage layer; in case the seam will not be done, the pieces will overlap by at least 50 cm.

DETAJ TIP I DRENAZHIMIT Sh 1:20 DRAINAGE DETAIL TYPE Sc 1:20



Environmental and Social Management Plan for Beshiri Bridge Building Resilient Bridges Project (BRB)

DRENAZHIMI / DRAINAGE



Structure drainage system

The positioning of the collectors for collecting water on the surface of the bridge is done at a distance of no more than 15 m between them and at a distance of 60 cm from the outer side of the pavement. The water collected from the collectors is discharged through the vertical pipes of each collector, PVC pipe DN 160mm Sp.1.5mm, where it is then conveyed to the longitudinal metal pipe DN 250mm. The longitudinal tube extends along the entire length of the superstructure while maintaining its slope, the axis of which is located at a distance of 1.00 m from the quota of the outer side of the pavement

¹Title of document

Environmental and Social Management Plan for Beshiri Bridge Building Resilient Bridges Project (BRB)

3.5 Climate

Average Temperature in Ndroq

The hot season lasts for 3.0 months, from June 14 to September 12, with an average daily high temperature above 27°C. The hottest month of the year in Ndroq is July, with an average high of 30°C and low of 17°C. The cool season lasts for 3.9 months, from November 23 to March 19, with an average daily high temperature below 15°C. The coldest month of the year in Ndroq is January, with an average low of 1.5°C.

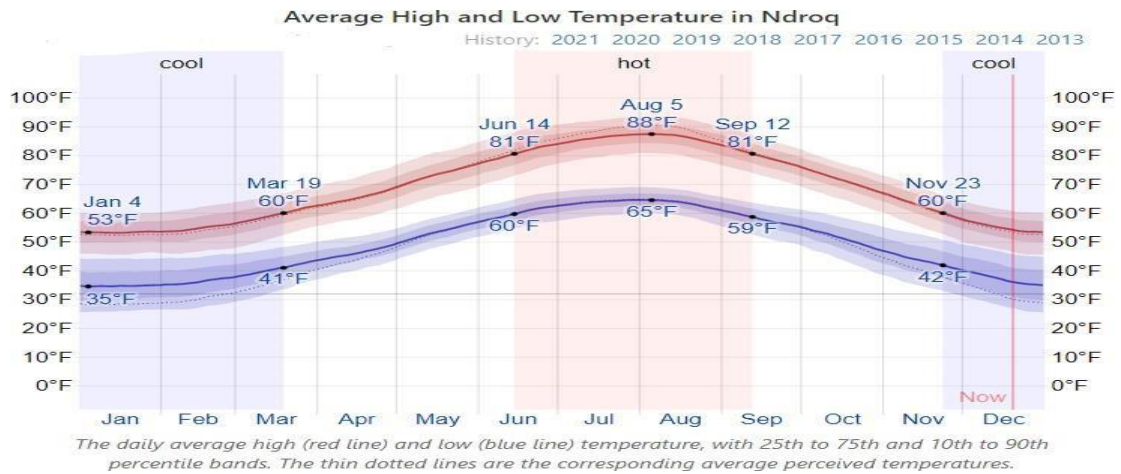


Figure 11: Climate in Ndroq (Source: [Ndroq Climate, Weather By Month, Average Temperature \(Albania\) - Weather Spark](#))

Precipitation

A wet day is one with at least 1mm of liquid or liquid-equivalent precipitation. The chance of wet days in Ndroq varies throughout the year.

The wetter season lasts 7.6 months, from September 18 to May 4, with a greater than 23% chance of a given day being a wet day. The month with the most wet days in Ndroq is December, with an average of 10.5 days with at least 1mm of precipitation.

The drier season lasts 4.4 months, from May 4 to September 18. The month with the fewest wet days in Ndroq is July, with an average of 3.0 days with at least 1mm of precipitation.

Among wet days, we distinguish between those that experience rain alone, snow alone, or a mixture of the two. The month with the most days of rain alone in Ndroq is November, with an average of 10.1 days.

Based on this categorization, the most common form of precipitation throughout the year is rain alone, with a peak probability of 37% on December 5.

Average Rainfall Ndroq (Source: [Ndroq Climate, Weather By Month, Average Temperature \(Albania\) - Weather Spark](#))

Environmental and Social Management Plan for Beshiri Bridge Building Resilient Bridges Project (BRB)

3.6 Geological Overview of Ndroq area

The geological model is of particular importance from a hydrological point of view, because it causes the collection of groundwater freshwater, which serves as a water feed source for rivers in different periods of the year. Erzeni has its origins in the area where Mirdita comes across with Krasten and partly in its final deposits. In the Erzeni catchment area, north of Kraba, there is Cretaceous limestone and partly Tortonian sand-clay deposits downstream. Near Ndroq, Neogene sand-carbonate clays can also be found at the bottom where there are Quaternary deposits.



A hydrological technical report was conducted by Politecnica on 2022¹. The purpose of this study is to provide the necessary data to identify the various climatic and hydrological problems.

The research presents the qualitative and quantitative geomorphic aspects and engineering techniques for crossings in small, medium and large water courses.

The design of the crossings in the waterways of the road track and the measures to reduce and stop the damage caused by the water flow, requires the evaluation of the factors that characterize the water course and the condition of the river bed in each place of the road crossing and the crossings located in this track road.

The importance of hydraulics or flow factors in the process of crossings is obviously influenced by the importance of road and bridge tracking as well as by the land used on the banks of the water course.

The geometry and location of crossings in water courses is of particular importance in the evaluation of the interaction between the structure and the water course as it pertains to the potential of river instability. In addition, hydraulic factors have a significant influence in the design of substructure components when taking into account the erosion and stability of the river.

Ensuring the size of the works for the drainage of water caused by the rains, in the road tracks, is to provide a safe passage during the period that the calculated rains occur.

Environmental and Social Management Plan for Beshiri Bridge Building Resilient Bridges Project (BRB)

Determining the maximum flow in the water flows

This relation analyzes the problems of a hydrological and hydraulic nature, which is finalized by determining the maximum flow of the whole and therefore also the appropriate size of the hydraulic works in such a way as to guarantee a safe pavement in the component parts of the road.

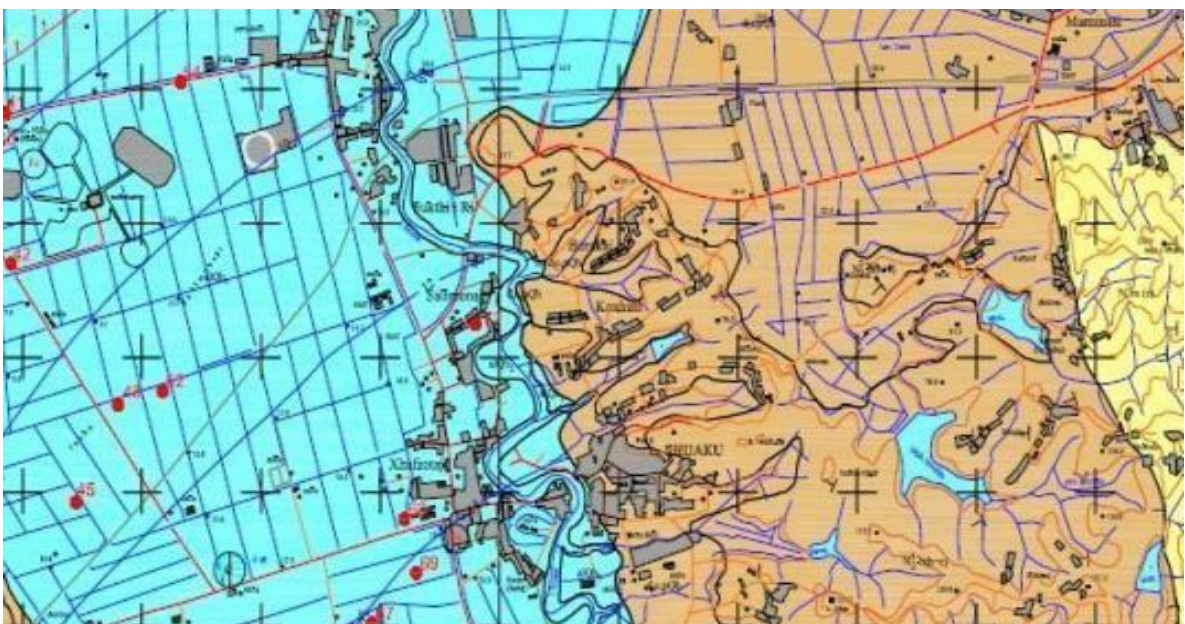
The following are the criteria and evaluation that led to the determination of the maximum flow and the sizing of the hydraulic works.

For more detailed hydraulic evaluation, refer to the specific documentation* Detailed design Beshiri Bridge (Bridge 02) Hydrological Technical Report

3.7 Hydrogeology

From a hydrogeological point of view, the catchment water basin of the Erzen River is characterized by significant changes, which is a consequence of different water holding capacities of the formations (based on their lithology), as well as complex tectonic conditions related to various hydromechanical and hydrodynamic of aquifers. The aquifers extend in six hydrogeological areas, the characteristics of which have been identified on the basis of literature existing technical:

- The Gropa Mountain area consists of Triassic limestones in which there are large springs with good water quality.
- Krasta area, consists mainly of flysch formations, very poor in groundwater, with a few important springs from some limestone formations.
- Dajti area consists mainly of Cretaceous dolomites and Paleocene limestone layers, from where significant amounts of water spring.
- The area of Tirana represents a large artesian mountain basin, where there are three water systems under terrestrial: Cretaceous-Paleocene, dealing with deep structures containing high values of groundwater mineralization; Tortonian, consisting mainly of the sandstone layer of intertwined with clayey layers and for, carry small amounts of groundwater with variable parameters of chemical components; Quaternary consisting mainly of gravel or gravel-clay layers lying on a plan, generally with considerable amounts of groundwater of good quality.
- Erzeni area, also represents an artesian pond that generally consists of water of a poor and variable quality, mainly in the Pliocene sandstone conglomerate formations in Quaternary gravel deposits.



Environmental and Social Management Plan for Beshiri Bridge Building Resilient Bridges Project (BRB)

According to the hydrological study, the Erzeni River, in this crossing, turns out to have a flow of 1270 m³ / sec for 1% safety. Then, a geological study was conducted at the crossing, where it was found that the riverbed of Erzeni on both sides of Tirana and Ndroq was narrowed because of land reclamation and construction waste dumped in the riverbanks at both sides of the existing bridge.

The construction waste that currently are there, will not be cleaned as part of these sub-projects. The new bridge will be constructed parallel with the existing one. It will be approximately 1416 m³ foundation from the construction of new bridge.

Diversion of the water flow will be required while installing bridge supporting piles in the river bed. This will cause temporary increase of water turbidity and disturbance to the aquatic life.

Diversion of the water flow should last the shortest period possible. Towards this end, installation of lines must be well prepared and undertaken quickly. Special attention will be paid to the preventive measures regarding the impact on aquatic biodiversity. Reversion should not block free movement of fish.

3.8 Seismic Hazards

Albania is characterized by shallow crustal seismicity. The different present-day tectonic regime in eastern and western Albania requires the use of separate strong motion relations. The extensional region, into which the normal faulting earthquakes are generated, is located in eastern Albania. The compressional region, into which mainly thrust faulting and much rare strike-slip faulting earthquakes are generated, is located in western part of it.

From the geological point of view, Tirana city is part of the Sinclinal of Tirana. [Aliaj, 1988]. The history of earthquakes in Tirana zone: 1617 of I₀= 8 Richter scale (MSK-64) in Krujë, in 1852 of I₀= 8 Richter scale (MSK64) in Cape of Rodon, in 1860 of I₀= 8 Richter scale (MSK-64) **in Beshiri Bridge, in 1934 of Ms= 5.6 in Ndroq, on 19.8.1970 of Ms= 5.5 and I₀= 7 Richter scale (MSK-64) in Vrapë Zone, në 16.9.1975 of Ms=**

5.3 in Cape of Rodon, 22.11.1985 of Ms= 5.5 in Drini Bay and on 9.1.1988 of Ms= 5.4 in Tirana. Thus, Region of Tirana is affected by historic earthquakes of I₀ = 8 Richter scale (MSK-64) and in the course of last century by earthquakes with M = 5.3 - 5.6 [Aliaj, 1997]. From the seismotectonic point of view, Tirana region may be hit in the future by earthquakes of M_{max} = 5.5 - 5.9 [Aliaj, 1997], whereas according to map of potential maximal earthquakes, Tirana city is included in the zone M_{max} = 5.8 - 6.4 ose M_{max} = 6.1±0.3 [Koyiu, 1986].

The new bridge will be designed in line with the Eurocode 8 which addresses design standards for earthquake resistant structures.

For the bridge design it has been taken in consideration a *Design working life* of **100 years**. According to EN 1990: EUROCODE: BASIS OF STRUCTURAL DESIGN, the Design working life of the structure is defined from the table below:

Environmental and Social Management Plan for Beshiri Bridge Building Resilient Bridges Project (BRB)

Table 2.1 - Indicative design working life

Design working life category	Indicative design working life (years)	Examples
1	10	Temporary structures ⁽¹⁾
2	10 to 25	Replaceable structural parts, e.g. gantry girders, bearings
3	15 to 30	Agricultural and similar structures
4	50	Building structures and other common structures
5	100	Monumental building structures, bridges, and other civil engineering structures
(1) Structures or parts of structures that can be dismantled with a view to being re-used should not be considered as temporary.		

- Importance class.

According to Eurocode 8 - Design of structures for earthquake resistance - Part 2: Bridges - The definitions of the importance classes for bridges in a country may be found in its National Annex. The recommended classification is in three importance classes, as follows:

During the bridge design it has been considered that the bridge belongs to importance Class III (greater than average importance), .

Importance class III comprises bridges of critical importance for maintaining communications, especially in the immediate post-earthquake period, bridges the failure of which is associated with a large number of probable fatalities and major bridges where a design life greater than normal is required.

So the value used of the importance factor γ_I is that belonging to class III, $\gamma_I=1.3$.

The values of the importance factor γ_I , are given in the table below (recommended values):

Table 2: Bridge Importance Classes

Importance Class		γ_I
Greater than average	III	1.30
Average	II	1.00
Less than average	I	0.85

The input data used for the evaluation of the seismic demand for the structures present in this report, is the reference seismic action which reflects a seismic event with a reference return period (RP), T_{NCR} , of 475 years. Such an event has a probability of exceedance (PR) of 10% for a design life of 50 years.

Therefore, in the case of our bridge it has been accepted an acceleration $a_g=0.294g$ (From the institute of GeoSciences - IGEO; <https://www.geo.edu.al/hazardmaps/PGA%20sipas%20Njesive%20Administrative.pdf>. It was taken into consideration the zone between Vaqarr and Peze).

In our approach seismic isolators have been considered. In this case the behaviour factor q , has been considered equal to 1; the dumping ratio equal to 13%. The horizontal stiffness of the isolators has been considered equal to 630 kN/m.

No removal of trees is planned.

The connection road will not be financed under the Project, only the bridge. Therefore, the works on access road construction/upgrade/alignment change will be assessed for application of Associated Facility.

Environmental and Social Management Plan for Beshiri Bridge Building Resilient Bridges Project (BRB)

4. Biodiversity and Natural Habitats

Biodiversity is a very important component of the natural resources of a country, area or region. The origins of this diversity lie in the geographic position, geological, pedologic, hydrological, relieve and climate factors. The geographic position, geological construction, climatic conditions, water resources and the soil in the territories of Ndroq have created habitats suitable for the living plant and animal world.

4.1 Protected areas

The project site is located in an urban area, outside any protected area, away from natural monuments or natural resources.

The study area is not part of the protected areas of special interest protected by international conventions such as the Convention on Wetlands of International Importance, especially as waterfowl habitats (Ramsar Convention); Convention for the Conservation of European Wildlife and Natural Habitats (Berne Convention), etc.

The following is a map of protected areas in relation to the project area, which clearly shows that the project area does not affect any of the natural monuments or protected areas both during the construction phase and during the exploitation phase.

As seen in the project footprint (red spot), there is no natural monument or protected area.

The nearest Protected Area to Ndroq is the Dajti National Park located approximately 25-30 km to the northeast of the sub-project location.

Referring to the Map of Protected Areas published by AKZM (http://akzm.gov.al/index.php?option=com_k2&view=item&layout=item&id=68&Itemid=368&lang=en), it turns out that the project area does not intersect with protected areas and natural monuments

4.2 Flora and Fauna

Description of the vegetation cover of the area where the project is proposed to be implemented.

The plant and animal world

Considering the limited study time, the most representative data of the area were recorded through the root marsh method. In the case of fuller communities, botanical surveys have also been attempted.

The project belongs to an urban area that is populated with urbanophile species which grow mainly in places with high urban intensity.

Meanwhile, to determine the vegetation, surveys were carried out mainly on the most homogeneous surfaces possible, as the area is characterized by high fragmentation.

During the brief field observation, these plant species were observed, which are an integral part of an area with a high anthropogenic impact.

The covered area lies entirely on the plant floor of the bushes. Widespread are typical Mediterranean shrubs, very rich in species and lush. An important place is occupied by evergreen species such as: the mastic tree (*Pistacia lentiscus* L), strawberry tree (*Arbutus unedo* L), myrtle (*Myrtus communis* L), narrow-leaved mock privet (*Phillyrea angustifolia*), Oleander rose-bay (*Nerium oleander*), laurel (*Laurus nobilis*), rush broom (*Spartum junceum*), holly (*Ilex aquifolium* L) wild olive tree (*Olea silvestris*) etc.

Among the deciduous shrubs we mention: Judas tree (*Cercis siliquastrum*), Cornelian cherry (*Cornus mas*), chaste tree (*Vitex agnus Castus*). These two types of shrubs are mixed with each other, so there

Environmental and Social Management Plan for Beshiri Bridge Building Resilient Bridges Project (BRB)

is no definite boundary separating them. Of the high forest trees that grow in the shrub belt, the most widespread is Vallonea oak (*Quercus vallonea*), which forms rare forest formations, but there are also cypress (*Cupressus semprevirens*).

Environmental baseline data on terrestrial fauna are collected through primary surveys, specialist studies and observations made during site visits, as well as secondary sources by literature survey, and interviews with local people (farmers) met in the field.

Secondary information for the baseline is sourced from publicly available information including current scientific literature, non-technical literature (environmental reports and articles), online databases and other secondary data sources.

Terrestrial fauna surveys were focused, but not limited in the following animal taxa:

- Bats (all species: roosting sites, foraging areas);
- Other mammals,
- Amphibians & Reptiles, such as frogs & toads, tortoise, terrapin, pond turtle, snake etc.

❖ **Bats**

Transect Surveys: Select 100 m transect routes within habitats (especially under the bridge) likely to be used by bats. Based on transect survey findings, a search during daylight for features such as, trees with woodpecker holes, other cavities etc., buildings and bunkers that occur in the project area suspected for significant roosts for bats was undertaken.

❖ **Amphibians and Reptiles**

In all project location transect survey suitable for amphibians and reptiles were undertaken. Some transects were oriented parallel to river, in searching for presence signs and breeding frogs and pond turtles.



Mammal Species

Some species of mammals, (excluding bats) are considered as present within project areas. This list includes (*Lutra lutra* (Eurasian otter), *Nyctalus noctula* (Common noctula)) that are fulfilling the criteria of the Priority Biodiversity Features, species listed in the National Red List.

Species	Common name	IUCN	
Lutralutra	Eurasian otter	NT	
Plecotus-auritus	Brown Long-eared bat	LC	
Nyctalus noctula	Common noctula	LC	

❖ **Birds species:**

Hippolais olivetorum (Olive-tree Warbleer) Barred Warbler (*Curruca nisoria*)

Species	Common name	IUCN	
Hippolais olivetorum	Olive-tree Warbleer	LC	
Barred Warbler	<i>Curruca nisoria</i>	LC	

Environmental and Social Management Plan for Beshiri Bridge Building Resilient Bridges Project (BRB)

Reptile species

The potentially present of reptiles along in the study areas are considered as species of conservation concerns as they are part of of EU Habitat Directives Annexes.

Among the threatened species, during this survey it were observed: **The European pond turtle (*E. orbicularis*) IUCN classification NT (Near Threatened), *Hermann's Tortoise (T. hermanni)* IUCN - VU (Vulnerable); *Natrix tessellata* (Dice snake) IUCN - LC (Least Concern), *Lacerta trilineata* (Balkan green lizard) LC, *Lacerta viridis* (European green lizard) LC, *Podarcis taurica* (Balkan wall lizard) LC.**

Amfibius species

Rana lessonae (Pool frog), *Hyla arborea* (European tree frog) *Triturus cristatus* (Crested newt), *Bufo viridis* (European green toad).

Fish species

The fish species are potentially present in Erzeni

English name	Common Name	IUCN
<i>Alburnoides ohridanus</i>	Ohrid spirlin	VU
<i>Alburnus scoranza</i>	Skadar bleak	LC
<i>Cobitis ohridana</i>	Ohrid spined loach	LC
<i>Gobio skadarensis</i>	Skadar gudgeon	EN
<i>Oxynoemacheilus pindus</i>	Pindus stone loach	VU
<i>Pachychilon pictum</i>	Ohrid roach	LC
<i>Squalius platyceps</i>	Skadar chub	LC

Aquatic life in Erzeni River

The geographical position and geologic composition of Erzeni basin have a specific study importance. The areas where the Erzeni flows have been areas of many changes and developments lately, influencing the aquatic ecosystem in general and mainly impacting the water quality. For the biological assessment of Erzeni water quality different groups of macro invertebrates are used. They are good indicators of biodiversity and habitat quality and their presence is closely connected with the general ecological status of the river ecosystem. (Lee N. 2003). Benthic macro invertebrates are determined as crucial elements and have a great importance in the biological assessment of water quality (Water Framework Directive -WFD). In this study the water quality results are given for two years of monitoring (2011 – 2012) in three sampling stations for Erzeni. From the analyses of data is important to mention the presence of benthic sensitive organisms (Environmental Protection Agency-USA) in the sampling stations in Erzeni River. Two other groups, benthic invertebrates with a medium tolerance toward pollution and tolerant taxons were present.*

Baseline information/data on the waterbody within the project area

The watershed for Erzen = 760 km², total length 110 km average elevation above sea level 440 m. Beshiri Bridge, Ndroq, rocky/gravel substrate with medium flow rate; grassy vegetation; situated in the inhabited area.

In Albania, the pollution of water resources and marine environment is a serious problem, mainly due to insufficient collection and treatment of wastewater, leaks in sewage canals and waste collection sites.

Environmental and Social Management Plan for Beshiri Bridge Building Resilient Bridges Project (BRB)

Sewage makes up a permanent problem in the country, where about half of the urban population is connected to sewage networks.

There is no source of drinking water in the vicinity of the project area, which could be affected by the construction phase or later.

In general it can be noticed that from the section Beshiri Bridge towards the Adriatic Sea, surface waters are characterized by pollution from organic compounds (mainly from raw urban discharges, as well as from industrial and livestock discharges) and nutrient components (N and P, mainly from scattered agricultural activities as well as from urban discharges and industrial in the field of Erzeni-Durrës). In any case the environmental condition of surface waters should be carefully assessed through more detailed monitoring and analysis, relying on a series of procedures and Regulations.

Based on https://akm.gov.al/ova_doc/raporti-per-gjendjen-e-mjedisit-2023/ the situation on this area is categorized in Class V (bad situation) after taking in consideration all parameters as O₂, pH, NBO₅, NH₄, NH₂, NO₃, from monitoring station on Ura e Beshirit -Erzen.

It is also very concerning the pollution that is coming from the leachate water from the nearby waste landfill of Tirana.

The study area is located in a part of the country heavily influenced by human activities, characterized by a high population density, concentration of industrial production and an intensive agriculture, especially in the most developed areas between Tirana and Durres, as and a part of the coastal area, with good prospects for tourism development.

No permits were issued by AMBU, regarding Fish farming and leisure fishing activity, for Ishëm-Erzeni River Basin

Fish and Aquatic Life: Rivers like Erzen are home to species affected by habitat degradation and water pollution. Limited data is available for specific species, but conservation organizations note the need for more studies. Fish species in Erzeni River include various small freshwater fish

The impact on the aquatic habitat and fish will be minimal. There will be limited disturbance to the water and fish populations. However, temporary disruptions such as sediment runoff or noise from construction may occur, affecting the local aquatic environment.

After the construction of bridge, no residual impacts will remain. The construction activities at the end of the project will not cause habitat fragmentation. No changes in the physical structure of the waterway that can isolate habitats, or making it harder for species to access food, breeding sites, or shelter. The completion of the intervention activities in the river will not result in alterations to water flow, quality, or habitat structure that could favor some species while disadvantaging others, potentially leading to shifts in ecosystem balance.

Avoiding Spawning Seasons: Schedule construction activities outside of fish spawning or amphibian breeding seasons to prevent disturbance to vulnerable species during critical life stages.

5. Air quality

The project area is located near the town, which is impacted by traffic, causing an increased air pollution within the project site, especially during spring-autumn. Sources of air pollution in Ndroq include greenhouse gases released by vehicle engines, few petrol processing units outside of town that release volatile organic substances, dust and suspended particles from vehicles and engineering works.

There is an increase in vehicle emissions (consumption of fuels) due to increased number of vehicles and large number of old vehicles used. Given that the population of the nearby village uses wood burning

Environmental and Social Management Plan for Beshiri Bridge Building Resilient Bridges Project (BRB)

as an alternative for heating and cooking, the smoke emitted is another source of pollution. Pollution from material waste often pollute rivers, beaches and coastal waters affecting the amenity value of coastal environment and ecosystems. Valuable and reusable materials instead of being pumped back into the economy are dumped in landfills or incinerated

A small but not insignificant contributor to pollution are also construction activities, although they are few in numbers due to the fact that the area mainly has low-rise buildings.

6. Waste

The urban waste issue along the segment and nearby, falls under the jurisdiction of the Municipality of Tirana and administrative unit Ndroq.

Currently, the management of waste along the segment by the Municipality consists of periodical picking up once every 2 days. Waste is collected in separate waste container. There are mainly urban waste and a few constructions waste as the area is mostly with low-rise buildings.

Proper Disposal of Construction Waste:

Set up waste management systems to properly dispose of construction debris, including concrete, metal, and other materials. Ensure that all waste is removed from the site promptly to avoid compromising the integrity of nearby areas or causing long-term damage to the environment.

The construction waste is deposited on Sharra landfill that is the principal disposal site used by the municipality of Tirana to dispose of municipal solid waste Sharra Landfill is located about 7 km southwest of Tirana center and 4.3km from Ura e Beshirit. Its total surface is about 55.000 m²

Recycling and Reuse: Where possible, recycle materials such as metals, plastics, and concrete. This reduces the environmental footprint and helps preserve natural resources.

During site visits, the situation of urban waste was not found to be problematic.

Wastewater collection and treatment service

In Albanian urban areas, wastewater is mostly collected through public sewers. Sewer systems are combined ones, hence collecting together wastewater and storm water. Due to poor maintenance of sewage canals and small dimensions of the pipes, leakage from these channels often creates risks of contamination of drinking water. In many suburban areas and rural areas of cities there is a lack of sewerage systems and wastewater is collected in septic tanks. Every house uses its own means of wastewater discharge, usually collecting them to septic tanks, and using private trucks for removing them away from the settlements. Most of the wastewater in Albania is currently not treated, only a limited number of WWTP are currently in use. In the entire Erzeni River basin there are 3 operational WWTP (two in Durres and one in Kavaje). Beyond these, all sewer pipes discharge directly into the closest water body without treatment. Regarding wastewater volumes discharged into the environment through the public utilities, only very limited information can be found in the AMBU-permit database. For Ishëm-Erzeni RBs the sewage connection rates vary greatly; from 100% for the Kamez utility to just 26% for the Kruje utility

Solid flow

Knowing the natural regime of the solid flow regime also clarifies general aspects of the erosion process, which in this basin is characterized by the presence of many foci. In the upper and middle part of the Erzen river basin, in addition to the fine alluvium, in a suspended state, a quantity of solid matter composed of thick grains in the form of bottom alluvium moves and is deposited in the bed of the Erzen river from the above it, to the area below Ndroqi.

The multi-year average turbidity of the section, as an indicator of the level of solid content in a cubic meter of water, in Ndroq is 4720 gr/m³, while the final alluvium flow has a value of 43 X 10³ tons/year.

The plant cover in the Erzen River basin is approximately 37% of its surface, it is not dense and compact, also, it is not uniformly distributed throughout the basin. This does not play an important role in preventing

Environmental and Social Management Plan for Beshiri Bridge Building Resilient Bridges Project (BRB)

the development of erosion. The development of the erosion process in the Erzen River basin is also favored by the presence of erodible flysch formations and sandy-clay formations, which represent a significant surface of the basin. As a consequence of such physical-geographical conditions, as well as significant amounts of rain, a large amount of solid material eroded from the surface of its basin is transported along the Erzen River from the network of small and large streams.

7. Analysis of Possible Environmental Impacts

The implementation of the subproject “Beshiri Bridge”, is not expected to cause significant environmental and social impacts and those that are likely to occur should be easily mitigated through good construction practices and adequate environmental mitigation measures, described in the Environmental Management (Mitigation) Plan below.

The environmental and social impacts associated with this project are presented during the construction phase as well as the operational phase, though can also be mitigated in the design phase due to the great downstream potential and impact. This section presents key potential impacts and mitigation measures to address them, while all relevant impacts will be addressed in the E&S Mitigation and Monitoring Plan of the ESMP presented in the Table 1, section 11.

Construction Phase

7.1 Air quality and noise generation

Construction activities including general construction and transport to and from the site may cause dust emissions, temporarily reducing air quality in the area during the construction works.

Noise during construction will also be mostly temporary, caused as a result of loading and discharging of vehicles and material transport, operating heavy machinery and similar. Heavy machinery are expected to be used during construction for excavation, opening of canals for installation of drainage pipes.

All negative impacts will disappear after the construction phase because the sources of emissions, noise, vibration, and pollution will no “exist”. In the operational phase, the noise will is not expected to be much different, but will be ‘relocated’ as the old bridge will be out of function.

- Noise, vibrations, and emissions from machinery and construction activities will mostly cease once the project is complete. In the case of complaints from neighboring households in the operation phase, noise from the traffic will be measured and mapped and adequate mitigation measures implemented (e.g. noise barriers) if the monitoring shows noise levels that exceed permitted noise limits (55 daytime dB and 45dB in the residential areas, according to the WB EHSB).
- Dust and debris generation will stop, and the site will likely return to a stable condition. In the operation phase, there may be decrease of the air quality at the micro-location from dust and fumes thus it is important to maintain the road regularly and keep it clean.

7.2 Geology and soils

Bridge construction interventions do not anticipate significant soil movement, thus limiting the potential for potential erosion hazards to the facility and activities to be deployed in the area. Geomechanical investigation will be carried out and appropriate measures designed to prevent larger movement of soil such as landslides, and ensure long-term soil stability. Surface soil stability will be accomplished with application of geotextiles, nets and or re-greening The latter will be carried out only with native vegetation.

Environmental and Social Management Plan for Beshiri Bridge Building Resilient Bridges Project (BRB)

Effects on the soil

Earthworks will have no noticeable effect, modifying only one small part the current site. Effects on land use and anthropic activities

The necessary works for the realization of the object do not carry any modification of the destination land use and area organization. All work will be carried out with due care, and in case they will be discovered archaeological elements, the relevant authorities will be notified.

In the operation phase, there can be impact on soil from winter maintenance. However, the dissolved salts, if used, will be collected through surface runoff collection and managed through the municipal wastewater system or sedimentation tanks. The new alignment is small in size, thus no significant impacts is expected.

7.3 Generation of construction waste

During the implementation of the works a certain amount of waste will be generated. The waste will be generated during works for site clearance, removal of inert materials, dirt, and concrete. The used asphalt will be handed over to the Municipality of Tirana/Administrative unit Ndroq, which is the final beneficiary of this proposed segment. Municipality of Tirana will dispose the waste only to licensed landfills.

This waste will have a negative visual impact if not managed or disposed of properly at a site assigned by the municipality of Tirana.

The Sharra landfill has given a final solution to the treatment and collection of aggregates, which were previously dumped on river banks, roads or waste collection points.

From 2019, the deposition of construction and demolition waste is carried out in the landfill “Sharra” of Tirana with the procedures as required by regulation in place. In case the companies are interested in using the soil deposited in the Sharra landfill, the company has the obligation to provide it free of charge if the interested companies have consent from the Municipality of Tirana.

Proper Disposal of Construction Waste: Set up waste management systems to properly dispose of construction debris, including concrete, metal, and other materials. Ensure that all waste is removed from the site promptly to avoid compromising the integrity of nearby areas or causing long-term damage to the environment.

Recycling and Reuse: Where possible, recycle materials such as metals, plastics, and concrete. This reduces the environmental footprint and helps preserve natural resources.

➤ **Leftover materials**

- Construction materials leftover from the civil works
- Excavated earth materials

Mitigations:

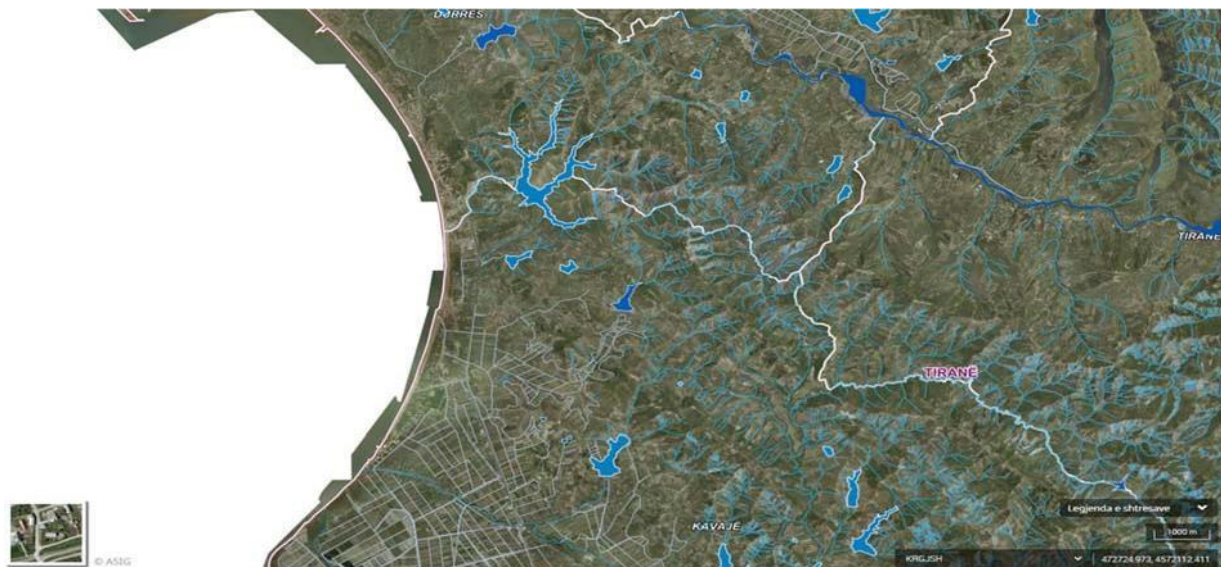
- Apply the principles of Reduce, Recycle, Reuse and Recover whenever feasible through the following actions:
- Excavated earth materials will, as much as possible, be re-used for back filling purposes to reduce waste. As the river is marked as polluted and soil deposits can contain heavy metals, pesticides and hydrocarbons, the soil cannot be sold to private persons and needs to be tested for pollutants before reuse.
- The incineration/burning of all waste at site or unlicensed plants and locations is prohibited

Environmental and Social Management Plan for Beshiri Bridge Building Resilient Bridges Project (BRB)

- Discarding waste to the nature, watercourses, illegal dumping and littering is also strictly prohibited
- Ensure that the required amounts of construction materials are delivered to site to reduce the possibility of the occurrence of excess material
- According to the regulations, waste management, landfilling and processing shall be done by licensed entities

7.4 Hydrology, surface and ground waters

In this region, groundwater is found in gravel deposits. The groundwater level is 0.5-1.2 m from the ground surface. The situation of the permanent groundwater level fluctuates according to precipitation. In the area where the project will be implemented, it is noticed that there are no surface resources at close distances that will be negatively affected by the project. In and around the exploitation area, there are navigable areas and there is the Erzeni river in which there is a segment of the Beshir Bridge therefore during the exploitation, the sea waterways or the coastal shores etc. will not be violated. In the lateral contour of the area and in the eastern part of the properties and around it in the study, the former drainage channels that existed for these arable lands and plots were noticed. From the hydrological and hydrographic point of view, the required facility is in good condition. Within the boundaries of the area required in the quotas below, the presence of any water source was not noticed, as a source for potable water supply or as an irrigation canal for the community. Within the surface where the excavation/mining permit is required, if it will be necessary for the reconstruction of the bridge according to the policies that the local government has for public projects, streams may be created from erosion. For this reason, it is required to evaluate with an environmental study the facilitation projects, such as if they have different depths and in the dry season no water flows in them. When there is rain, due to the very steep slope of the terrain, surface water flows through them, etc.



Map of the water sources around the project area

This activity may damage and contaminate water of the sources in surface water pollution include runoff from construction site with heavy sediments loads, spillage of fuels, chemicals & lubricants and construction wastewater. However, the impact, if occurs, will be temporary and restricted to the duration of construction and rehabilitation. In the case of contamination of water and soil from spilling the hazardous liquids or materials, the spill will be immediately curbed, collected and removed from the

Environmental and Social Management Plan for Beshiri Bridge Building Resilient Bridges Project (BRB)

site. The collected contaminated materials/liquids will be treated as the hazardous waste or hazardous liquids. As large quantities of chemicals or fuels will not be kept at the site, these incidents are expected to be minor and localized.

Altered Water Flow:

Changes to water flow caused by temporary structures or debris can lead to erosion of riverbanks and loss of habitat. Temporary construction barriers may restrict the movement of aquatic species, disrupting migration or feeding patterns.

Minimizing Disruption to Existing Water Flow

- **Temporary Water Flow Management:** In cases where construction activities may affect water flow, install temporary cofferdams or bypass channels to divert water around the construction site, preventing flooding and protecting the bridge's foundation. If water becomes turbid, the flow will be filtered or otherwise cleaned.
- **Bridge Foundation Protection:** Ensure that activities near the bridge foundation, such as excavation or pile driving, are done carefully to avoid damages. Use vibration monitoring to prevent excessive shaking of the surrounding soil.

7.5 Occupational Health and Safety (OHS)

Risks:

- Worksite related accidents can result in body harm, injuries and casualties.
- Workers may be exposed to unsafe and/or unfavorable working environment due to storage, handling and transport of hazardous construction material.
- The construction activities and vehicular movement at construction sites and access service roads may also result in roadside accidents particularly inflicting local communities who are not familiar with presence of heavy equipment and machinery.
- Injuries typical for civil works can take place, caused in traffic accidents, operating heavy machinery, tripping, falling, falling from heights,

Mitigations:

- Contractor should strictly follow WB EHS Guidelines and ESMP defined measures- workers shall wear adequate protective clothes and equipment at all times (helmets, boots, goggles, harnesses when working at heights, fenced when working on the bridge, etc.
- Provide OHS services (first aid, eye-wash station)
- First aid kit is available at the site and workers are trained to use it.

Fire Hazards

- Fires may be resulted from bonfires, burning materials, sparks in the dry seasons, and other sources or activities and this can lead to serious health and safety hazards.

Mitigations:

- Set up a mustering point in event of fire
- Open fires are strictly prohibited.
- Cutting metal and any other activity that produces sparks, welding, etc. is strictly prohibited in the summertime.

Environmental and Social Management Plan for Beshiri Bridge Building Resilient Bridges Project (BRB)

- All employees are acquainted with firefighting and other accidental procedures. There is a sufficient firefighting equipment at the site (fire extinguishers, etc.)
- Contractor should develop an emergency preparedness and response plan (EPRP) following the WB EHS Guidelines.
- Emergency plan and plans in the case of accidents are in place and communicated to all employees.

7.6 Habitat and biodiversity

No specific positive or negative effects on site vegetation are expected. There will be clearing of vegetation during works,

The area does not present such features that it can constitute a place where the fauna can find ideal conditions for life and reproduction. This is mainly due to the extent and anthropic activities. The occasional presence of any wildlife is not considered significant in terms of effects as the area is an unnatural habitat for their life.

To protect biodiversity during the rehabilitation of a bridge, the following mitigation measures should be implemented

Design of the bridge will ensure sufficient space to provide undisturbed passage for animals (wildlife corridors).

Protection of Aquatic Ecosystems

- **Sediment Control:** Implement silt curtains, sediment barriers, or coffer dams to prevent sediment from disturbing aquatic habitats. This minimizes the impact on fish spawning grounds and other sensitive areas. No earthworks near banks and works in the water will be done during the spawning season, especially for vulnerable species such as *Alburnoides ohridanus* (spawns May and June), *Oxynoemacheilus pindus* (Its life history has not been studied, but the diet is likely to comprise small benthic invertebrates) and *Gobio skadarensis* (skadar gudgeon; (the annual reproductive period is extend from late spring to early summer).
- **Reduced Water Flow Disruption:** Minimize changes in water flow patterns by using temporary bypass channels or cofferdams, ensuring the natural flow and habitat of aquatic species remain undisturbed. Also to be avoided during the spawning season.

Riparian and Vegetative Management

- **Pre-Clearing Vegetation Assessment:** Prior to clearing any riparian or adjacent vegetation, assess the area for any rare or protected plant species and relocate them if possible.
- **Native Plant Replanting:** After rehabilitation is complete, replant the disturbed riparian zones with native species to restore natural habitats and provide food and shelter for local wildlife.
- **Buffer Zones:** Establish buffer zones around sensitive habitats to prevent damage from construction activities, ensuring that these areas remain intact and undisturbed.
- The working site will be inspected for dens and wildlife before start of earthworks. All animals found will be safely removed form the site and released.
- The site will be fenced off during works as much as possible.
- Disturbance of animals is strictly prohibited. No unnecessary lights will be left on during the night at the site.

Protection of Bat Populations

- **Bat Habitat Surveys:** Perform surveys to identify bat roosting areas under the bridge or nearby structures.
- **Roosting Relocation:** If bat roosts are present, relocate the bats to suitable alternative roosting sites before construction begins. Provide temporary roosting structures if necessary

. Noise and Vibration Control

Environmental and Social Management Plan for Beshiri Bridge Building Resilient Bridges Project (BRB)

- **Noise Reduction:** Use quieter equipment and tools to reduce the impact of construction noise on wildlife and avoid noisy works, particularly during sensitive periods (e.g., breeding seasons for birds or amphibians).

Preventing Invasive Species

- **Invasive Species Management:** Prevent the introduction or spread of invasive species by ensuring that all equipment is cleaned before entering the worksite and by monitoring plantings for non-native species after replanting.

Post-Rehabilitation Monitoring: After construction, regularly monitor the area to ensure that invasive species do not establish themselves in disturbed areas

To minimize the impact on aquatic habitats **during the construction of a new bridges. Sediment and Erosion Control**

- **Silt Curtains:** Install silt curtains around the construction area to prevent the spread of sediments into the water, protecting aquatic plants and preventing smothering of fish habitats.
- **Sediment Traps and Filters:** Use sediment traps or filters to capture suspended particles before they can reach the water, especially during excavation and demolition activities.
- **Erosion Control Matting:** Use eco-friendly matting or erosion control fabrics along disturbed riverbanks to prevent soil erosion during and after construction.

2. Water Quality Management

- **Regular Water Testing:** Monitor water quality regularly for pollutants like oils, chemicals, and suspended solids. Implement immediate response plans if contamination occurs.
- **Pollution Prevention Plans:** Store construction materials, chemicals, and fuel away from water bodies to prevent accidental spills. Use spill containment measures to reduce the risk of contamination. Only small amounts of chemicals and fuel can be present at the site. There will be no production of asphalt or concrete at the site. River water will not be used in construction.

3. Minimizing Disruption to Aquatic Species

- **Fish and Wildlife Relocation:** Before construction begins, assess the area for important aquatic species, such as fish or amphibians, and relocate them if necessary to avoid harm.
- **Temporary Bypass Channels:** If construction activities will disrupt water flow, install temporary bypass channels or pumping systems to maintain the natural flow and allow fish and other aquatic species to move freely.
- **Avoiding Spawning Seasons:** Schedule construction activities outside of fish spawning or amphibian breeding seasons to prevent disturbance to vulnerable species during critical life stages.

4. Habitat Preservation

- **Buffer Zones:** Establish buffer zones around the water body to minimize human disturbance to aquatic habitats. Limit construction activities to the minimum necessary areas.
- **Riparian Vegetation Protection:** Avoid damaging riparian vegetation that provides shelter and food for aquatic organisms. If vegetation must be cleared, perform it in a way that minimizes habitat loss and ensure replanting with native species after construction.
- **Bank Stabilization:** Use natural or bioengineering methods to stabilize riverbanks and prevent erosion after the construction of the bridge is complete. This helps maintain the integrity of aquatic habitats.

5. Noise and Vibration Mitigation

- **Noise Barriers:** Install noise barriers or use quieter machinery to minimize the disturbance caused by construction noise, particularly to sensitive aquatic species such as fish or amphibians.
- **Vibration Monitoring:** Monitor and limit vibrations caused by heavy machinery, as they can disrupt aquatic life, particularly those in sensitive habitats like spawning beds or submerged vegetation.

6. Monitoring and Adaptive Management

Environmental and Social Management Plan for Beshiri Bridge Building Resilient Bridges Project (BRB)

- **Ongoing Monitoring:** Continuously monitoring and sampling by authorized agency and visual inspection, of water quality, and habitat conditions throughout the construction process to identify any negative impacts as early as possible.
- **Adaptive Management:** Adjust by the contractor and supervisor to the construction methods if monitoring shows unanticipated environmental impacts, ensuring that mitigation strategies remain effective throughout the project.

Operation phase:

During the operation phase, minor environmental impacts are foreseen.

All impacts foreseen to occur during the operation phase are detailed in the Environmental and Social Management Plan. Impact will mainly consist in noise disturbance to local population and workers caused by regular and scheduled maintenance works on the road.

8 Potential Social Impact

8.1 Social Impacts and Mitigation Measures

The proposed project is anticipated to have two key impacts: land acquisition and the proximity of the bridge to residential buildings.

Regarding land acquisition, approximately 850 m² of land will be affected by the implementation of the project. The land is currently vacant, unused, and not designated for residential or other livelihood-related purposes. The Albanian Road Authority (ARA) and the Project Implementation Team (PIT) will prepare a Resettlement Action Plan (RAP) for the land to be expropriated as part of the project implementation.

Concerning the proximity of the Bridge and road to residential buildings. The residential buildings are situated at the following distances from the project components:

- Object No. 1 is 13 meters from the road body and 17.1 meters from the bridge abutment.
- Object No. 2 is 26 meters from the road body and 44 meters from the bridge abutment.

As part of the project implemented by ARA "Reconstruction of the old Road Kombinat-Ndroq-Plepa, Lot 1", the construction of a reinforced concrete wall is planned to stabilize the slope and prevent soil erosion, thereby safeguarding the nearby structures. Specifically, the wall at the bridge exit will be 20 meters in length, with a variable height ranging from 3 to 5 meters.

To ensure the safety of residents living in proximity to the bridge, a comprehensive set of traffic safety measures will be implemented in accordance with the project specifications. The traffic safety infrastructure will be carefully designed, manufactured, and installed to provide optimal protection for all road users, reducing the risks associated with construction activities and the ongoing flow of traffic. The safety measures will include the installation of guardrails, New Jersey concrete barriers, crush cushions, safety fences (against wild animals), glare-screening fences, and warning devices. These measures will be strategically positioned to protect both the local community and vehicular traffic, thereby ensuring a safe and controlled environment around the construction site.

During the construction phase, noise emissions from the activities are expected to affect the nearby residential properties. To mitigate these impacts, noise restrictions and working hour limitations will be enforced. Furthermore, effective noise control measures will be implemented in accordance with Albanian legislation.

These measures will include:

Environmental and Social Management Plan for Beshiri Bridge Building Resilient Bridges Project (BRB)

- Best practices should be followed, including proper maintenance of equipment and a commitment to minimizing noise generated by site activities.
- All machines and mechanical equipment shall be fitted with effective silencers and maintained in proper working condition throughout the entire duration of the contract.
- The compressors shall be noise-reducing models, equipped with properly installed and securely closed acoustic covers, which shall remain closed during the working period. All pneumatic tools shall be fitted with silencers.
- The machinery that has been used continuously shall be turned off or its speed reduced to a minimum during periods of inactivity.
- Any equipment, such as generators or pumps, that must be used before and after the legal working hours, shall be surrounded by acoustic enclosures or portable sound barriers.

8.2 Community Health and Safety

The bridge will be fenced off sufficiently to prevent accidental falling (pedestrians and cyclists) in the use phase. Aligned road must include sidewalk.

8.3 Grievance Redress Mechanism (GRM)

Although the construction of the Beshiri Bridge is not expected to lead to the displacement of residential structures or significant land acquisitions, the project will still affect a small portion of land. As such, the potential for disputes is considered to be limited. Nonetheless, to address any concerns related to resettlement, compensation, or other project-related impacts, a Grievance Redress Mechanism (GRM) has been established. This mechanism will allow affected persons and communities to raise complaints or grievances in an organized and transparent manner.

The grievance procedure is outlined in detail within the Resettlement Action Plan (RAP) report, which is a key deliverable of the project. Affected individuals will be able to submit complaints through a standardized grievance statement form, which will be made readily available to all stakeholders. This procedure ensures that any grievances are addressed promptly, effectively, and in full compliance with social standards, fostering transparency and accountability throughout the implementation of the project. The grievance mechanism is designed to safeguard the rights and interests of affected individuals and to facilitate an equitable resolution of any concerns raised during the course of the project.

9 Summary of recommended mitigation measures for the “Beshiri Bridge”

In addition to the impacts identified in the ESMP table and detailed corresponding mitigation measures, below are highlighted the mitigation measures that are considered most important due to the specificities of this project, based on the detailed design

9.1 Waste (recycling and disposal)

- ✓ Designation of temporary site for construction waste or arrangements for transportation need to be provided and in place before works commence as this will have impact on communities around the road and the local transportation mode;
- ✓ Prior to start of works, all urban and domestic waste along the segment, including slopes, must be cleaned up by the contractor.

Environmental and Social Management Plan for Beshiri Bridge Building Resilient Bridges Project (BRB)

9.2 Chance find items of cultural and historical interest

- ✓ According to the Albanian law, in case of any chance findings during excavation and general works, the works will cease immediately, the area will be secured and the relevant authorities will be informed within three days of said finds. The authorities will have fifteen days to respond and indicate what measures need to be taken to proceed with the works. Excavations during the construction phase will be supervised by archaeologists of the Institute of Cultural Monuments.

9.3 Water contamination

- ✓ Disposal of construction wastewater into water bodies is strictly prohibited
- ✓ Soil erosion should be avoided in the project area to protect water resources
- ✓ Surface run off from construction site should be diverted to contained area.
- ✓ Provision of septic tanks for construction camps.
- ✓ Prevent dumping of hazardous materials especially near Rivers and seasonal nullah.
- ✓ Contractor to prepare Emergency Response Plan to address the accidental spillage of fuels and hazardous goods.
- ✓ Follow WB EHS Guideline for any effluent generated from the project related activities

Other concerns

Health and safety issues for the work force and the community are part of the Environmental and Social Management Plan for this subproject, tackling the issues identified and mitigation measures, as follows:

- ✓ Labor and working conditions
Issues:
 - ✓ Disease prevention and health examinations
 - ✓ Creation of additional workplaces
 - ✓ Workforce accommodation
 - ✓ Workers safety on site

Mitigation measures for labor and working conditions include:

- Preventative health examinations for workers, training on disease prevention, provision of education/ information and health related to reduce sexually related disease.
- Informing of local population on vacancies. Maximum possible involvement of local labor
- Accommodation needs will be assessed in all worker camps. Ensure standard for accommodation
- provide workers with safety instructions and protective equipment (glasses, masks, helmets, boots, etc);
- Provision of construction workers training
- Organization of bypassing traffic warning signs installed, number of accidents recorded,

Environmental and Social Management Plan for Beshiri Bridge Building Resilient Bridges Project (BRB)

regarding vehicle and pedestrian safety when there is no construction activity

The terrain for the road construction is in the vicinity of water presence and will require specific Occupational Health and Safety aspects to be covered/implemented by the contractor and monitored by ARA).

The Environmental and Social Management Plan also includes a monitoring plan, which details monitoring indicators specifically for health and safety, in addition to environmental issues.

10 Implementation arrangements for ESMP

All mitigation measures listed in the ESMP table at the end of this document will be monitored during implementation of works.

This ESMP will be part of bidding documents and the works contract. It will apply equally to contractors and subcontractors.

The measures foreseen in the ESMP will be implemented by the contractor and will be regularly and frequently checked and reported to ARA by the supervisor (at least once a month). The compiled monitoring report will then be submitted to the World Bank on semi-annual basis, unless differently requested and agreed. All incompliances must be addressed immediately, while failure to address incompliances can cause cease of works and even cease of payments, until E&S compliance is reestablished.

The Albanian Road Authority, will be the contracting authority for the implementation of this subproject, which will be funded by the World Bank. The responsibilities of ARA during implementation include, among others, the fulfillment of the criteria set out in the Environmental and Social Management Plan. The PMT unit consisting of dedicated environmental and social specialists will monitor the work site monthly and provide a check list for each site visit on the fulfillment of criteria as set out in the ESMP plan. An environmental statement is required by Albanian Law and therefore periodical monitoring and reporting must be prepared and submitted to the National Environmental Agency, as specified in the statement.

Construction works will be supervised by a licensed supervisor for this type of works, as well as by the Municipality of Tirana/Administrative unit Ndroq. The supervisor's staff will include also an environmental, health and safety specialist who will check the implementation of the ESMP, weekly.

However, since environmental and social instruments are considered an integral and important component during implementation of World Bank financed projects, monitoring and reporting will be performed as requested.

10.1 ESMP Capacity building

The construction operator and/or supervisor must be fully aware of the ESMP provisions and trained regarding its implementation. The ARA staff will provide training on ESMP implementation and reporting, in line with the World Bank guidelines and the Environmental and Social Management Framework.

10.2 Reporting and monitoring

The supervising engineer/contractor will report on the implementation of the ESMP to the ARA monthly as well as on the implementation of works. The report must include a chapter on environmental performance, based on ESMP items. The content of the report will be agreed with ARA. In case of accident or negative impact on the environment (not predicted by the ESMP) the supervising engineer will report to ARA within 24 hours.

Environmental and Social Management Plan for Beshiri Bridge Building Resilient Bridges Project (BRB)

10.3 Public information and disclosure

The right of the public to be informed is a mandatory process requested by the Aarhus convention, of which Albania is a signatory party.

Public consultation will be organized in the administrative unit of Ndroq to disclose the documents.

This project requires an environmental approval, but public consultation for EIA is not mandatory by Albanian law. However, in line with the World Bank ESF, the draft ESMP will be disclosed in local language in Ndroq also (Tirana municipality and ARA website). Feedback that is gathered based on the public consultation, will be taken into account in the latest version of the ESMP.

In conclusion, this subproject falls under Category B projects and “Substantial Risk”(B2) according to the World Bank guidelines projects, since its environmental and social impacts can be managed through implementation of adequate mitigation measures described in the following Environmental and Social Mitigation Plans and Monitoring Plans.

Section 11 Environmental and Social Management Plan (Table 1)

A. Environmental and Social Mitigation Plan

Phase	Issue	Mitigating measure	Cost (in EUR)		Institutional responsibility		Comments (e.g. secondary impacts)
			Install	Operate	Install	Operate	
<u>Design Phase</u>	<i>Protection of trees</i>	Carefully plan design to avoid tree cutting. In the case it is necessary obtain a permission from the competent authority.	Designer contract		Designer/ARA	Designer/ARA	No trees will be cut
<u>Design phase</u>	<i>Increase of traffic, access difficulties</i>	Prepare traffic management plan. The plan is to be approved by the competent authority (e.g. Ministry of Interior or local traffic police)	Designer contract		Designer/ARA	Designer/ARA	
<u>Deign phase</u>	<i>Seismic resistance</i>	Design is compliance to EU Eurocode 8	Designer contract		Designer/ARA	Designer/ARA	
<u>Deign phase</u>	<i>Biodiversity preservation</i>	Design of the new bridge (and works whenever possible) will allow uninterrupted migrations of animals in the operational phase (wildlife corridors).	Designer contract		Designer/ARA	Designer/ARA	
<u>Deign phase</u>	<i>Biodiversity preservation</i>	Lighting during works and in use phase shall be designed in the way to minimize light pollution.	Designer contract		Designer/ARA	Designer/ARA	
<u>Deign phase</u>	<i>Safety in traffic</i>	Fencing and protection rails at the new bridge is sufficient to ensure safety of pedestrians and cyclists as well as traffic in the use phase. New road (alignment) sections, if any, will also include sidewalks.	Designer contract		Designer/ARA	Designer/ARA	
<u>Pre-construction</u>	<i>Prevention of waste dumping</i>	Prepare the Waste Management Plan that predicts waste streams, quantities, separate collection, apply waste hierarchy and identifies licensed landfills and processing.	Included in the project cost		ARA/Designer/municipality		ARA/designer to prepare resettlement plan and municipality to follow up
<u>Pre-construction</u>	<i>Involuntary resettlement</i>	Preparation of Resettlement Action Plan in case involuntary resettlement is needed	Included in the project cost		ARA/Designer/municipality		ARA/designer to prepare resettlement plan and municipality to follow up
<u>Pre-construction</u>	<i>Accidental situations</i>	Prepare an Emergency and Evacuation Preparedness Plan (that includes procedures in the case of spills, fires and accidents)	Included in the project cost		ARA/Designer/municipality		ARA/designer to prepare resettlement plan and municipality to follow up
<u>Pre-construction</u>	<i>Waste management</i>	Identifying licensed landfills for major waste streams – hazardous and nonhazardous waste	Included in the project cost,		ARA/Designer/municipality		ARA/designer to prepare resettlement plan and municipality to follow up

<u>Pre-construction</u>	<i>Cleaning up of the work site from inert materials, dirt, concrete, old asphalt, etc</i>	In consultation with the Municipality of Tirana/ Adm Unit Ndroq, provide an appropriate method for recycling construction materials and scrap metal materials. Waste from cleaning of site will be separated and transported and processed/disposed on the licensed landfills.	NA		ARA/Municipality of Tirana/Adm Unit Ndroq	Contractor	As provided in BOQ
<u>Design</u>	<i>Permits</i>	All legally required permits (construction, environmental and other) have been obtained before works commence. Contractors and subcontractors have valid operating licenses.	NA	Included to project cost	ARA, Municipality and contractor		

Phase	Issue	Mitigating measure	Cost (in EUR)		Institutional responsibility		Comments (e.g. secondary impacts)
			Install	Operate	Install	Operate	
<u>Design</u>	<i>Organization of traffic during construction</i>	Traffic has been organized through the temporary Traffic Management Plan so that there is minimal interference and maximized safety of participants. Traffic signalization and safety measures are prepared. Safe pedestrian passages are provided.	NA		ARA, Municipality and contractor		
<u>Design</u>	<i>Notification of public and relevant institutions</i>	All relevant institutions (e.g. traffic police, construction, environmental and H&S inspectorate, etc.) has been notified on the upcoming works. The public has received timely and relevant information through appropriate means and its geographical and temporal scope.	NA	Included to project cost	ARA, Municipality and contractor		
<u>Design</u>	<i>Materials supplied from illegal or unauthorized sites may exert pressure on the natural resources</i>	use existing and licensed stones quarries; requirement for official approval, environmental permit and/or valid operating license (whichever is required within the national regulation)	NA	NA	stone quarry	Contractor to obtain all permits	As required in the environmental permit To be specified in bid documents.
<u>Design</u>	<i>Landscape and nature protection</i>	No trees are foreseen to be cut. Special permission from ARA/WB will be required in case of unavoidable tree- cutting	Included to project cost	Included to project cost	Contractor	Contractor	
<u>Design</u>	<i>Water and soil protection, accidents</i>	Emergency Preparedness Plan that includes spill/leak control action plan and procedures for accidents and accidental spilling/leaking.	Included to project cost	Included to project cost	Contractor	Contractor	
<u>Design</u>	<i>Biodiversity protection</i>	Arrange for earthworks and other that may impact wildlife to occur outside breeding (hatching) season of vulnerable or endangered species – late spring to early summer (May - June in the case of European pond turtle, Alburnoides ohridanus (reproductive cycle that begins late spring and early summer.; if the works have not started before that period, consequently they cannot start before October to prevent destroying eggs; alternatively, the area can be inspected for nests/eggs). Any road does not enter marshland; works that impact river water quality and other important features or riverbed will not take place in the	Included to project cost	Included to project cost	Contractor	ARA	

		<p>period of spawning (May&June).</p> <p>Works will be organized to ensure free movement of fish at any time (if necessary, the contractor will construct/install fish passages).</p> <p>Advise Mote and other competent authorities if any specific measures need to be included e.g. construction of animal passages.</p>					
<u>Design</u>	<i>Public participation</i>	The relevant comments from (i) preliminary design and (ii) ESMP public consultations	Included to project	Included to	ARA, designer	ARA	

Phase	Issue	Mitigating measure	Cost (in EUR)		Institutional responsibility		Comments (e.g. secondary impacts)
			Install	Operate	Install	Operate	
		will be addressed in the final design and revised ESMP.	cost	project cost			
<u>Design/Construction</u>	<i>Damage to infrastructure</i>	The works on sections transecting utility infrastructure will be coordinated with utility services providers (electricity, sewerage, water supply, telecommunications, etc.). Precise positions of present infrastructure/installations will be determined before works on a particular section commence.	Included to project cost	Included to project cost	Contractor	Contractor	
<u>Design/ Construction</u>	<i>Soil stability</i>	Appropriate geotechnical studies are carried out.	Included to project cost	Included to project cost	Contractor	Contractor	
<u>Construction Phase</u>							
<u>Construction</u>	<i>Dust generated during transport of stone, aggregate or other materials</i>	wet or covered truck load. Unload trucks while preventing dusting, e.g. avoid free-falling and use dust protection sheets. Sites must be maintained in tidy condition, Keep drop height to the minimum.	NA	NA	Construction Contractor	Construction Contractor	As required in the environmental permit To be specified in bid documents.
<u>Construction</u>	<i>Dust generated during construction works</i>	Water construction site and material storage sites as appropriate. Use dust screens if needed. Adjust the speed During pneumatic drilling/compaction dust shall be suppressed by ongoing water spraying and/or installing dust screen enclosures at the site. The surrounding environment (at last one road line) shall be kept free of debris to minimize dust. Speed of vehicles is limited to 40km/h. Road is kept clean.	NA	NA	Construction Contractor	Construction Contractor	As required in the environmental permit To be specified in bid documents.
<u>Construction</u>	<i>Air pollution and noise from machinery on site, transport and</i>	Do not allow vehicles or machinery to idle on site.	Minimal, included in	Minimal, included in the	Construction Contractor	Construction Contractor	

Phase	Issue	Mitigating measure	Cost (in EUR)		Institutional responsibility		Comments (e.g. secondary impacts)
			Install	Operate	Install	Operate	
	combustion on site	Use attested and proper equipment only. No open burning or combustion of any sort is allowed on site.	the project cost	project cost			
<u>Construction</u>	<i>Noise disturbance</i> to humans and animals	<p>Check that noise emitted during rehabilitation of the road does not exceed the national norms set out in regulations (85 dB for urban environment, outside as defined in the national legislation).</p> <p>During operations, the engine covers of generators, air compressors and other powered mechanical equipment shall be closed, and equipment placed at site camp.</p> <p>No night work will be carried out unless with a special permission from competent authorities and for a limited period of time. Night works in protected areas need permission from the NAPA.</p>	minimal, included in the project cost	Minimal, included in the project cost	Construction Contractor	Construction Contractor	To be specified in bid documents.
<u>Construction</u>	<i>Traffic</i> that may create noise, vehicle exhaust, road congestion on and around the site	Arrange for material transport at hours of minimum traffic. Use alternative routes to minimize traffic congestion. Works to be performed alternatively on half of the road length or in batches in order to allow access to pass	NA	minimal, included in the project cost	Construction Contractor: Transport manager and Truck operator	Construction Contractor: Transport manager and Truck operator	
<u>Construction</u>	<i>Traffic disruption</i> during construction activity	Traffic management plan with appropriate measures to redirect traffic and is easy to follow (signs and signaling); in cooperation with the local authorities, include traffic police. Regularly inform the local communities and traffic informational agencies of traffic disruptions. Ensure alternative access to the key locations (schools, hospitalists.)	as specified in bidding documents, included in the project cost	minimal, included in the project cost	Construction Contractor	Construction Contractor	Measures to be included in the Traffic management Plan (Bid documents)
<u>Construction</u>	<i>Vehicle and pedestrian safety</i>	Appropriate lighting and well-defined safety signs. Timely announcement in the media when construction will take place. Safety passages for pedestrians are ensured if needed.	as specified in bidding documents, included in the project	minimal, included in the project cost	Construction Contractor	Construction Contractor	

Phase	Issue	Mitigating measure	Cost (in EUR)		Institutional responsibility		Comments (e.g. secondary impacts)
			Install	Operate	Install	Operate	
			cost				
<u>Construction</u>	<i>Depletion in non-renewable resources and producing stress to the environment</i>	Use raw materials (sand, gravel, stone) only from suppliers that have valid licenses and concessions issued by the competent authorities.	Included to project cost	Included to project cost	Contractor	Contractor	
<u>Construction</u>	<i>Risk from surface soil erosion and landslides</i>	<p>Inspect the site for potential landslides and surface erosion.</p> <p>Topsoil from the work's area will be stripped and stockpiled at the site or location approved by the municipality, for later use in landscaping the site. Soil will be located away from impact from flooding;</p> <p>The surface runoff management will be applied in the entire length of the road;</p> <p>Cleaning the channels, culverts/ box culverts and having a good maintenance of drainage system will ensure effective protection of the road from erosion and sedimentation;</p> <p>Slope's systematization will be carried out in a way that will not affect the effectiveness and efficiency of protection from erosion.</p> <p>Where works are necessary, they will be undertaken in such a way to minimize the occurrence of soil erosion, even for short periods. They will be rehabilitated (greened) as soon as possible. Stockpiles will not be placed on these lands.</p> <p>During the works necessary measures preventing erosion and landslides will be taken (use of silt fences, hay bales and other appropriate).</p> <p>Vehicles and machinery manipulation and movement space will be defined in advance and clearly marked.</p> <p>In the case of risk form landslides, apply adequate measures, such as geotechnical</p>	Included to project cost	Included to project cost	Contractor	Contractor	

Phase	Issue	Mitigating measure	Cost (in EUR)		Institutional responsibility		Comments (e.g. secondary impacts)
			Install	Operate	Install	Operate	
		<p>assessment and design, installation of gabions, reinforcement measures, etc.</p> <p>In the case of blasting, the contractor will ensure the areas is clear of people and the police is present. All legally required permit and conditions will be obtained and adhered to. Blasting will be carried out in safe manner and only by a licensed company. No new quarries will be opened for the construction.</p>					

<p><u>Construction</u></p>	<p><i>Water and soil pollution</i> from works, management and usage of construction machines</p>	<p>Isolate all works from the watercourses. Where necessary use water pumps, filters and other equipment to prevent turbidity. Working site run-offs with possible charge with suspended matter should be filtered before discharging to natural flows.</p> <p>Care is taken not to mix topsoil and subsoil during stripping. Topsoil must be reused where possible. Soil stripping is carried out only in necessary areas.</p> <p>Install leak control equipment Have a leak control mechanism in place (bunds, leak proof containers, containment systems, etc.) and emergency interventions/procedures to control spills.</p> <p>The site will establish appropriate water and sediment control measures such as e.g. silt fences to prevent water sediment from moving off site and causing excessive turbidity in the channel.</p> <p>Collectors will be temporary adapted to avoid surface water dispersion in case of watering of sand or gravel to control the dusts.</p> <p>There will be no spray painting or anticorrosion treatments at the site. Painting at the site can be done only manually and with prevention of dripping and spilling to water and soil.</p> <p>Construction equipment and vehicles (regular maintenance and checkups of oil and gas tanks, machinery and vehicles will be performed) can be parked (manipulated) and washed only on asphalted or concrete surfaces with surface runoff water collecting and treatment system.</p> <p>There will be no discharge of wastewaters to natural recipients without a prior treatment and in a water protected area,</p>	<p>as specified in bid documents, included in the project cost</p>	<p>50 / month, included in the project cost</p>	<p>Construction Contractor</p>	<p>Construction Contractor</p>	<p>It is recommended that stones and other materials that will be removed, to be reused and recycled at the advice of the Institute of Cultural Monuments and the municipality.</p>
-----------------------------------	--	--	--	---	--------------------------------	--------------------------------	---

Phase	Issue	Mitigating measure	Cost (in EUR)		Institutional responsibility		Comments (e.g. secondary impacts)
			Install	Operate	Install	Operate	
		<p>there will be none.</p> <p>On site painting or applying protection coatings should be done in the way that annuls the risk of leaking or spilling to waters (e.g. using trays).</p> <p>Sanitary facilities will be provided for workers and no wastewater will be discharged to the natural recipient without an appropriate treatment.</p> <p>There will be no unauthorized use of water resources. The exploitation will require obtaining a special permit from the competent authorities.</p>					
<u>Construction</u>	<i>Pollution</i> from improper disposal of waste materials	<p>Temporarily dispose earth and mineral waste material at appropriate designated location protected from runoff, in cooperation with and approved by the municipality of Tirana/Adm Unit Ndroq</p> <p>The mineral waste (topsoil and other) should be reused or landfilled/processed in the licensed locations/plants. No waste can remain on temporary or working site upon the completion of works. Removed soil (either from the river or banks, which can be contaminated) will be tested for heavy metals, pesticides, hydrocarbons and other relevant parameters before decision on the potential use (depending on compliance to GIIP and national legislation).</p> <p>For temporary, short storage of wastes, select an area on impermeable surface with the runoff collection system, away from any potential leaking into the watercourse. Sufficient number of waste containers for separate collection and of adequate volumes/capacity is provided.</p> <p>All waste, including construction debris and excavated materials will be regularly and timely transported off site and managed through a licensed agency/company and disposed of at a licensed landfill/processing plant for the type of waste.</p>	minimal, included in the project cost	As specified in BOQ, included in the project cost	Construction Contractor	Construction Contractor	Most of the waste generated can be recycled.

Phase	Issue	Mitigating measure	Cost (in EUR)		Institutional responsibility		Comments (e.g. secondary impacts)
			Install	Operate	Install	Operate	
		<p>Waste collection and disposal pathways and sites will be identified for all major waste types expected from demolition and construction activities.</p> <p>General refuse, recyclables, organic, liquid and chemical wastes by on-site sorting and stored in appropriate containers.</p> <p>Whenever feasible, the contractor will reuse and recycle appropriate and viable materials</p> <p>All hazardous and toxic wastes (e.g. oil and oiled materials) will be separately collected, in bins which are leak-proof, and will be handled over to the authorized management and disposal to the licensed landfill/processing company, receipts for which shall be kept.</p> <p>Waste manifests/records that inform on disposal/processing location, amounts, waste type and other will be kept.</p> <p>All waste types will be separately collected and not mixed (hazardous with non-hazardous and different hazardous waste types). Disposing any type of liquid or solid waste to the natural surrounding (water particularly) is strictly forbidden.</p>					

Phase	Issue	Mitigating measure	Cost (in EUR)		Institutional responsibility		Comments (e.g. secondary impacts)
			Install	Operate	Install	Operate	
<u>Construction</u>	<i>Potential contamination of soil and water from improper maintenance, improper material storage, and fueling of equipment</i>	<p>Organize and cover material storage areas; Proper handling of lubricants, fuel and solvents by secured storage; ensure proper loading of fuel and maintenance of equipment; collect all waste and dispose to permitted waste recovery facility or licensed landfills. In the case of leakage, the contaminated soil should be collected and as hazardous waste disposed as hazardous waste. The waste should be collected in separate and leak proof containers. Have a leak control mechanism, procedures and equipment (e.g. absorbents, impermeable bags, spill fences, etc.) in place and emergency interventions to control spills.</p> <p>Store all materials in original containers in adequate locations, which allow for leak-proof storage (e.g. use of bunds).</p> <p>Ensure workers are familiar with safety regulations and storage requirements for each product. Hazardous substances (including hazardous waste) must be kept in appropriately labelled leak-proof containers during temporary storage. Either the container or the storage room must be equipped with the secondary containment system.</p> <p>No large amounts of fuel will be kept on the site. In the case of re-fuelling on site, precautionary measures will be taken to prevent accidental spilling (e.g. use of trays).</p> <p>In the case of any run-off coming from works area possibly contaminated by hazardous substances, it shall be collected on site to a temporary retention basin and transported to an adequate treatment plant. Soil work and management will take into</p>	minimal, included in the project cost	minimal, included in the project cost	Construction Contractor	Construction Contractor	The municipality of Tirana/Adm Unit Ndroq must provide a written permission for an appropriate waste landfill before the construction works may commence. The selected landfill must be licensed in lien with the national regulation and hold all required permits (construction, environmental, etc.).

Phase	Issue	Mitigating measure	Cost (in EUR)		Institutional responsibility		Comments (e.g. secondary impacts)
			Install	Operate	Install	Operate	
		<p>account metrological data and conditions when planned and carried out (e.g. avoid works during heavy rains).</p> <p>No water can be discharged to the surrounding nature without prior treatment.</p>					
<u>Construction</u>	Protection from flooding	<p>Clean culverts, ditches and other drainage elements to ensure sufficient uptake capacity.</p> <p>If possible, in cooperation with other relevant agencies and institutions remove other causes for flooding (e.g. clogged canals).</p>	minimal, included in the project cost	minimal, included in the project cost	Construction Contractor	Construction Contractor	
<u>Construction</u>	Interruption of surface and underground drainage patterns during construction, creating of standing water.	In line with approved design, maintain natural drainage pattern.	minimal, included in the project cost	minimal, included in the project cost	Construction Contractor	Construction Contractor	
<u>Construction</u>	Workers health and occupational safety	<p>Provide workers with safety instructions and protective equipment (glasses, masks, helmets, boots, etc.) complying with the H&S international best practices. The protective equipment is worn at all times. When working at heights, workers will either wear harnesses or the working platform must be fenced to ensure safety.</p> <p>Workers are adequately trained/certified and experienced in using dangerous equipment and for higher risk positions/work.</p> <p>All work will be carried out in the safe and disciplined manner designed to minimize the impacts and risks for workers, surrounding communities and the</p>	minimal, included in the project cost	minimal, included in the project cost	Construction Contractor	Construction Contractor	

Phase	Issue	Mitigating measure	Cost (in EUR)		Institutional responsibility		Comments (e.g. secondary impacts)
			Install	Operate	Install	Operate	
		<p>environment.</p> <p>In case of accidental disruption, immediately stop all works and remove the cause of accident (e.g. stop the leakage), notify proper authorities and emergency remediation of damaged network in line with the requirements of Law on civil emergencies. Any incident will be reported to the project manager immediately and regularly to supervising engineer. During cleaning, ensure workers are equipped with protective equipment. Workers will avoid direct contact with contaminated sites. In the case of soil or water pollution, the contaminated soil or water should be collected and taken for the appropriate treatment/disposal (as hazardous waste).</p>					
<u>Construction</u>	Works site organization	<p>Construction sites are fenced off or protected by barriers, tape-marks and informational posts and warnings. Construction site is equipped with proper sanitary facilities (chemical toilets) and resting areas for workers; medical kit and fire equipment is present at the site with use trained employees. The site and construction camp remain inaccessible to public.</p> <p>Fire safety is a part of Emergency and Evacuation Preparedness Plan. All workers are acquainted with the fire safety, emergency and evacuation procedures.</p> <p>Appropriate sign postage is in place informing workers of key rules and procedures to follow.</p> <p>Potentially hazardous areas (trenches, manholes, excavations and other) must be protected/covered and clearly marked.</p>	Included in the project cost	Included in the project cost	Construction Contractor	Construction Contractor	
<u>Construction</u>	Impacts on flora and fauna	The working zone must be reduced to space that is necessary. The clearing of vegetation shall be kept to a minimum, with replacement planting planned and conducted, and shall be done in coordination with the measures for	NA	, included in the project cost	Construction Contractor; Forestry Directorate, Municipality of Tirana/AdmNdroq		<p>As specified in the environmental permit and technical specifications</p> <p>According to the national environmental regulations, for 1 tree that is cut, 3 must be planted</p>

Phase	Issue	Mitigating measure	Cost (in EUR)		Institutional responsibility		Comments (e.g. secondary impacts)
			Install	Operate	Install	Operate	
		<p>protection of habitats and river banks.</p> <p>Project activities will not include use of pesticides.</p> <p>There will be no disturbance of any kind of animals.</p> <p>Collection of timber, firewood, herbs, forest products and poaching is strictly forbidden.</p> <p>Hunting is strictly forbidden.</p> <p>Only native species are used in greening and site rehabilitation;</p> <p>Site is restored to previous condition.</p>					
<u>Construction</u>	Chance finds items of cultural/historical interest.	In the case of chance findings, ensure all works are stopped, the area will be secured and the relevant authorities (Ministry of Culture/Regional Cultural Directorate) will be informed within three days of said finds. The authorities will have fifteen days to respond and indicate what measures need to be taken to proceed with the works.	NA	In case of chance finds, the project owner will pay for all required investigations	Construction Contractor, ARA, municipality of Tirana/Adm Unit Ndroq		Albanian legislation details necessary actions in case of chance find items.
<u>Construction</u>	Labor and working conditions a) Disease prevention and health examinations b) Creation of additional workplaces c) Workforce accommodation	a) Preventative health examinations for workers, training on disease prevention, provision of education/ information and health related to reduce sexually related disease. b) Informing of local population on vacancies. Maximum possible involvement of local labor. c) Accommodation needs will be assessed in all worker camps. Ensure standard for	As specified in BOQ, included in the project cost	minimal, included in the project cost	Contractor, ARA	Contractor	It is a legal requirement to provide protective equipment for safety at work

Phase	Issue	Mitigating measure	Cost (in EUR)		Institutional responsibility		Comments (e.g. secondary impacts)
			Install	Operate	Install	Operate	
	d)Workers safety on site	accommodation. d) provide workers with safety instructions and protective equipment (glasses, masks, helmets, boots, etc); b) Provision of construction workers training. c) Grievance mechanism for workers to raise reasonable workplace concerns (comments or complaints).					
<u>Construction</u>	<i>Grievance issues</i>	Establishment of a grievance redress mechanism			ARA	Municipality	
<u>Construction</u>	<i>Damage to electricity, water, sewerage and other infrastructure</i>	During works near and on utilities' installations (e.g. electricity, water supply, sewerage, etc.) the services may be shut down or limited. Local population will be informed and, in the case of longer periods of shutdown, alternative supply will be ensured. When working in vicinity of electrical and other installation, to avoid damages, the works will be manual with light equipment and using no machinery and in consultations with the owner of utilities (e.g. water company, electricity company, IT, etc.).	Included to project cost	Included to project cost	Contractor	Contractor	
<u>Operation/ Maintenance/</u>	<i>Noise disturbance to local population and workers caused by regular and scheduled maintenance works on the road</i>	Limit activities to daylight working hours (as agreed with local authorities.)	Minimal, included in the project cost	minimal, included in the project cost	Maintenance Contractor/LGU	Maintenance Contractor/LGU	to be specified in maintenance contract documents-Technical Specifications for realization of maintenance works
<u>Operation/ Maintenance</u>	<i>Safe use of existing infrastructure</i>	<i>The existing (old) bridge will not be put in use until stability safety and other aspects of safety (condition of the superstructure, fence, etc.) is checked and provided.</i>	ARA	ARA	ARA	ARA	
<u>Operation/ Maintenance</u>	<i>Water quality</i>	<i>No collected water will be released before prior treatment</i>	ARA	ARA	ARA	ARA	
<u>Operation/ Maintenance</u>	<i>Safety</i>	<i>Bridge maintenance and safety checks plan will be prepared before the use phase of the bridge. Deposits will be regularly removed.</i>	ARA	ARA	ARA	ARA	

<u>Operation/ Maintenance</u>	Water and soil quality	Winter maintenance will be done optimally – excessive use of salts will be avoided.	ARA	ARA	ARA	ARA	
-----------------------------------	------------------------	---	-----	-----	-----	-----	--

Climate Change Adaptation and Mitigation Measures

Flood Risk Management	Since climate change can increase the risk of river flooding, design elevated bridge foundations and abutments to accommodate extreme water level fluctuations. Install real-time water level monitoring sensors to detect and respond to sudden changes.	Contractor, ARA/ PIT, Supervisor
Erosion Control	Due to increased rainfall and potential flood events, use bioengineering techniques like planting native vegetation along riverbanks and installing riprap around the foundations to prevent erosion.	Contractor, ARA/ PIT, Supervisor
Sustainable Materials	Use low-carbon, sustainable materials (e.g., recycled steel, green concrete) to reduce the carbon footprint of construction; however, not at the expense of structural safety. Additionally, sourcing materials locally helps reduce transportation emissions.	Contractor, ARA/ PIT, Supervisor
Energy-Efficient Equipment	Utilize electric or hybrid machinery and equipment to limit emissions. Solar panels or other renewable energy sources can be installed on-site to power smaller tools and lighting.(If it possible). If electric and hybrid machinery are used, this is calculated in the fire-risk and fire-safety/fighting measures.	Contractor, ARA/ PIT, Supervisor

Water Management and Conservation	wastewater from the river will not be used in construction or for cleaning. This is especially important to protect river ecosystems, which may be more sensitive under climate change stress.	Contractor, ARA/ PIT, Supervisor
Environmental Restoration Post-Construction	After construction, restore any disturbed habitats and plant climate-resilient, with native vegetation to enhance ecosystem resilience.	Contractor, ARA/ PIT, Supervisor. EPA

Weather-Related OHS Protocols for Worker Safety

Heat Protection Measures	With rising temperatures, especially in summer months, implement heat safety protocols. Provide shaded rest areas, cooling stations, and ensure workers stay hydrated (provide water and isotonic drinks). Schedule heavy labor during cooler parts of the day. In the case of heat-stroke, immediately call the ambulance.	Contractor, ARA/ PIT, Supervisor
Cold and Wet Weather Precautions	For cold or rainy days, provide workers with insulated, water-resistant clothing. Ensure they have warm rest areas and avoid exposure during extreme cold or high winds.	Contractor, ARA/ PIT, Supervisor
Wind and Storm Safety	Install on-site wind speed monitors to assess safe working conditions for equipment like cranes. Secure all parts that could be easily lifted by the wind. Halt high-risk activities (e.g., working at heights) during high winds or storms to prevent accidents.	Contractor, ARA/ PIT, Supervisor
Flood and Flash Flood Preparedness	Develop and train staff on an emergency evacuation plan in case of sudden river level rise or flash floods. Designate safe zones for evacuation that are out of reach from potential flooding.	Contractor, ARA/ PIT, Supervisor
Air Quality Monitoring	On extremely hot days or during any local fire events, monitor air quality and ensure workers have masks or respirators if necessary to reduce exposure to poor air conditions.	Contractor, ARA/ PIT, Supervisor
Regular Weather Updates	Use reliable weather forecasting tools to monitor conditions in real-time, enabling adjustments to the construction schedule to avoid adverse weather impacts on worker safety.	Contractor, Supervisor

Emergency Response and Training	Conduct regular safety drills and training sessions to ensure that all workers are prepared to respond to weather-related incidents, including high winds, extreme heat, or flooding.	Contractor, Supervisor
Prevention of forest-fires	No open fires are allowed at the site and no burning of materials. No welding at the site will take place near flammable materials, including trees, grass and bush, and during dry months.	Contractor, Supervisor

Table 2: Environmental and Social Monitoring
Plan

Phase	What activity/impact is to be monitored?	Where will be monitored?	How is to be monitored?/ type of monitoring equipment	When is to be monitored? (Frequency of measurement or continuous)	Why is the parameter to be monitored? (optional)	Indicators	Cost		Institutional responsibility	
							Install	operate	Install	Operate
Pre-Construction	All permits are obtained before works start. Possession of official approval or valid operating license for stone quarries and other material supply subjects (e.g. gravel and sand exploitation companies).	on location of stone quarry, minerals exploitation companies	inspection of all necessary documents	before work begins	to ensure sustainable use of materials	possession of official approval or valid operating license and concession	NA	NA	Quarry Operator	Quarry Operator
Pre-Construction	Public and relevant institutions are notified of works.	Contractor's premises	inspection of all necessary documents	before work begins	To ensure public awareness	Announcements in the media and direct information dissemination	Included to project cost	Included to project cost	Supervising engineer, ARA	Supervising engineer, ARA
Pre-Construction	Emergency Preparedness Plan and traffic organization plan have been prepared. Position of existing infrastructure at relevant sections has been determined. Traffic Management Plan is prepared	Contractor's premises	inspection of all necessary documents	before work begins	To reduce risks and impacts of accidental situations and damage to the infrastructure.	Plans and blueprints in place	Included to project cost	Included to project cost	Supervising engineer, ARA	Supervising engineer, ARA
Pre-Construction	Works organized and scheduled to avoid disturbance of animals in important lifecycle periods.	Contractor's premises	inspection of all necessary documents	Once before work begins	To reduce risks and impacts to biodiversity	Plans in place	Included to project cost	Included to project cost	Supervising engineer, ARA	Supervising engineer, ARA
Construction	Covering or wetting down transported materials that can generate dust, such as stone, sand or gravel, keeping the site wet and protected from dust spreading. Protection from dust while unloading. There is no burring at the	job site – each vehicle	supervision	continuously	ensure minimal disruption to air quality	Covered truck load Report from the supervising engineer	NA	minimal, included in the project cost	ARA	Supervision Contractor Supervision Contractor

	site.									
Construction	Congestion on site, disruptions to traffic patterns, complaints on traffic management. Safe passages for pedestrians are provided.	On the site	Visual supervision	regularly by supervision	To ensure minimal disruptions to the local traffic, prevent accidents and ensure safety	Number of complaints received		minimal, included in the project cost	a) ARA	Supervision Contractor
Construction	Damage to soil structure, landslides and slips, embankments. Soil erosion and landslides prevention measures in place (e.g. silt fences, hay bales, geotechnical studies, reinforcement and other measures needed).	work site	supervision	unannounced inspections during work, after heavy raining; regularly before and during earth works on a particular section	To ensure minimal impacts on soil	land slips, erosion, damaged embankments, measures in place, studies completed before the works on the affected area	NA	minimal, included in the project cost	ARA	Minimal
Construction	Noise disturbance to human and animal population, and workers on site	job site; nearest homes	noise meter and analyzer, inspection	once for each machine and equipment when works start. In the case of in compliance - regularly. On complaint or negative inspection finding	assure compliance of performance with environment, health and safety regulation and standards	incompliance (>85dB), complaint, negative inspection finding	minimal, included in the project cost	minimal, included in the project cost	ARA	Supervision Contractor
Construction	Air pollution parameters of dust, particulate matter	At and near job site	Sampling by authorized agency	Upon complaint or negative inspection finding	To ensure no excessive emissions during works	Incompliance, complaint	minimal, included in the project cost	100/ month	ARA	Supervision Contractor

Construction	water and soil quality (suspended solids, oil and grease)	At and near work site (upstream and downstream)	Sampling by authorized agency Visual inspection of leaks, turbidity and contamination	Upon complaint or noticed spill/leak/spill/turbidity into the river/water body or soil near the water body.	To ensure no excessive emissions during works	Incompliance, No of grievances recorded.	Minimal, included in the project cost	minimal, included in the project cost	ARA	Supervision Contractor
Construction	Traffic safety, signaling and accessibility	In the wider area of the working site	Visual inspection, consultations with the traffic police, consultation with the local residents	Upon the start of works on a particular section, upon complaints.	To prevent accidents and ensure access to services and livelihood	No of grievances recorded	Included to the project cost	minimal, included in the project cost	Supervising engineer, ARA	ARA
Construction	Safety signage and procedures in place. Fence is in place. Warning signs in place.	At and near work site	Visually by supervisor	Regularly	To ensure clear posting of safety signs	Number of signs	Minimal, included in the project cost	ARA	Supervision Contractor	ARA
Construction	Disposal of waste materials at licensed landfills/process plants, transported by the licensed transport companies.	On site for timely collection and disposal on final disposal site	Documents check (licences, waste records), site visit,, visually	Before start of works and regularly	To ensure proper waste management thus prevent contamination	Licenses issued by the competent bodies, amounts of waste removed	, included in the project cost	ARA	Supervision Contractor	ARA
Construction/waste	Separate waste collection	On site	Visually, number, labelling and capacity of containers, waste mix, containers safety	Regularly	Prevent pollution	No of containers, waste mix, labelling, procedures	included in the project cost	minimal, included in the project cost	Supervision Contractor	ARA
Construction / hazardous substances (including waste) management	Containers are leak-proof and with secondary containment system. Containers are accessible only to authorized personnel. During use, spill protection systems are in place.	On site	Visual	Regularly	Prevent pollution	No. and size of spills, amount of contaminated soil or water, leaks	included in the project cost	minimal, included in the project cost	Supervision Contractor	ARA

	Containers are adequately labeled. Check tanks, machinery and vehicles for leaks.									
Construction / Workers safety	Protective equipment (glasses, masks, helmets, boots, et) worn at all times, safety warning and instruction are on site; organization of bypassing traffic, other Health and Safety (H&S) measures. Workers are adequately trained and certified for positions and work they perform. Emergency Preparedness Plan and emergency procedures are available on site and communicated to all workers through H&S training.	job site	inspection	unannounced inspections during work	Prevent accidents	number of on-job accidents recorded, procedure available, protective equipment available	NA	minimal, included in the project cost	Supervision /ARA	NA
Construction / Site organization	Site is well organized: fences, warnings, sign postage in place. Dangerous areas fenced and marked. Sanitary facilities available in sufficient number. Camp inaccessible for public.	Work site, camp	inspection	unannounced inspections during work	Prevent accidents	number of on-job accidents recorded	NA	minimal, included in the project cost	Supervision , ARA	NA
Construction/ Destruction of crops, trees meadows etc	loss of/impact on vegetation	job site	Supervision, photographic reports	during material delivery and construction	Landscape value protection	Reports of frequent visits on site by the Env. Expert	NA	minimal, included in the project cost	Supervision Contractor , ARA	ARA

<p>Construction/impact to biodiversity and nature</p>	<p>Only native species are used in greening and site rehabilitation.</p> <p>Site is restored to previous condition.</p> <p>Disturbance of animals and collection/destruction of flora is not present.</p>	<p>Working site</p>	<p>Visual inspection of a site, inspection of documents;</p>	<p>Regularly, permissions before works commence.</p>	<p>Landscape value and nature protection.</p>	<p>Complaints</p>	<p>minimal, included in the project cost</p>	<p>minimal, included in the project cost</p>	<p>Supervision Contractor, ARA</p>	<p>ARA</p>
<p>Construction/Chance find items</p>	<p>Cultural properties. chance findings clause is applied</p>	<p>Job site, documentation</p>	<p>Expert visits from Institute for Cultural Monuments, regular supervision</p>	<p>Continuous, in the case of findings</p>	<p>Cultural heritage preservation</p>	<p>Catalogue of items found, including photographic and textual documentation; chance findings report</p>	<p>Should be part of the regularly scheduled activities</p>	<p>minimal, included in the project cost</p>	<p>Supervision Contractor, ARA, ICM</p>	<p>Supervision Contractor, Cultural Directorate, ARA</p>
<p>Construction/ <i>a)Disease prevention and health examinations</i> <i>b)Creation of additional workplaces</i> <i>c)Workforce accommodation</i> <i>d)Workers safety on site</i></p>	<p>1) Health examinations for workers, 2) training on disease prevention, including STD</p> <p>1) Informing of local population on vacancies 2) Involvement of local labor 1)Accommodation needs will be assessed 2) standard for accommodation</p> <p>1) safety instructions and protective equipment (glasses, masks, helmets, boots, etc); safe 2) organization of bypassing traffic</p> <p>3)Availability of grievance mechanism and grievance</p>	<p>At or near job site</p>	<p>visits on site and communication with workers and community</p>	<p>Once a week by ARA</p>	<p>To ensure proper implementation of health and safety requirements</p>	<p>Knowledgeable workforce on procedures, Equipped with safety equipment</p>	<p>Should be part of the regularly scheduled activities</p>	<p>minimal, included in the project cost</p>	<p>ARA, supervisor, contractor</p>	<p>supervisor, contractor</p>

	focal point									
<i>Operation/ Vehicle and pedestrian safety</i>	visibility and appropriateness of signage	at and near job site	observation	once per week in the evening	Safety	Number of warning signs installed, appropriate ness, number of accidents recorded	minimal	minimal, included in the project cost	ARA	maintenance Contractor, ARA
<i>Operation/ Increase of domestic solid waste due to increased number of visitors to the site</i>	Visual impact	At and near job site	visits on site and communication with local authorities	Once per every two days by the LGU for maintenance reasons	For aesthetical reasons	Lack of waste on the ground, empty waste bins	Should be part of the regularly scheduled activities by the LGU		LGU	LGU

