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Biodiversity Management Plan

Zgosht to Cerenec road scheme; Albania National and Regional Roads Project

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Project manager

Dr J Nightingale

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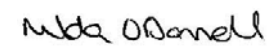
Date:

17/7/2020

Updated 27/10/2020

Technical reviewer

Nikki O'Donnell



Signature



Date:

21/07/2020

Updated 27/10/2020

**Reviewer
Specialist of
Environmental
and Social Unit
ADF**

Nertis Mero



Signature

Date:

29.10.2020

**Reviewer Head of
Environmental
and Social Unit
ADF**

Blerta Duro




Signature

Date:

29.10.2020

**Director of
Infrastructure
Department
ADF**

Arben Skënderi



Signature

Date:

29.10.2020

**Project Manager
ADF**

Dritan Mehdi Agolli



Signature

Date:

29.10.2020

**Director of Projects
Management
Department
ADF**

Ermir Omari



Signature

Date:

29.10.2020

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Acronyms	Definition
ADF	Albanian Development Fund
BIA	Biodiversity Impact Assessment
BMP	Biodiversity Management Plan
CHA	Critical Habitat Assessment
EBRD	European Bank for Reconstruction and Development
ESMP	Environmental and Social Management Plan
IPA	Important Plant Area
PA	Project Area
PBFs	Priority Biodiversity Features
PDA	Project Development Area
PPNEA	Protection and Preservation of Natural Environment in Albania
RoW	Right of way
SJNP	Shebenik-Jabllanicë National Park
WW	Working width

1 INTRODUCTION

1.1 Overview

This Biodiversity Management Plan (BMP) has been prepared by RSK for the rehabilitation of the road that lies between Zgosht and Cerenec Bridge (here after ‘the Project’) on behalf of the Albanian Development Fund (ADF). This BMP forms part of the Environmental Impact Assessment (EIA) documents for the Project and has been prepared in accordance with Albanian legislation as well as relevant international best practice and guidelines.

This BMP details the Project’s biodiversity management initiatives, commitments and obligations. The aim of the BMP is to safeguard and promote the viability of priority species and habitats associated with the Project. A key priority for the Project is the continued support for the conservation of the Shebenik-Jabllanicë National Park and the ancient beech forests in the Rrajca basin which is part of a transboundary UNESCO World Heritage Site called Primeval Beech Forests of the Carpathians and Other Regions of Europe.

This BMP provides a framework for the implementation of the Project’s biodiversity mitigation and management measures during the pre-construction / construction and operation phases that will be followed by ADF and the Project contractors. An outline biodiversity monitoring and evaluation strategy has been included to evaluate the efficiency and success of biodiversity management measures and to enable adjustments to be made if required. It is envisaged that this will be developed further by ADF prior to the pre-construction / construction phase.

Implementation of this BMP will ensure the Project’s alignment with best practice, legislative requirements and the Project’s commitments to biodiversity, including European Bank for Reconstruction and Development (EBRD) Performance Requirement 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources.

This BMP is a dynamic document that will be adapted and updated as and when new information becomes available throughout the lifespan of the Project to ensure its relevancy.

1.2 Project Description

1.2.1 The Proposed Road Alignment

The Project is located in East Albania, approximately 41 km from Tirana at the closest point, within the municipalities of Bulqizë and Librazhd and the districts of Dibër and Elbasan. The existing road currently spans 47.1 km and connects Zgosht to Ura e Cerenec Bridge and is a predominantly unsurfaced two-way road located in a rural, mountainous area. Approximately 13.5 km of the road crosses the western border of the Shebenik-Jabllanicë National Park (IUCN Category 2; national park category 2). This nationally protected area is also designated as a Candidate Emerald Site, Key Biodiversity Area and an Important Plant Area. The beech forests in Rrajca basin area of the National Park are part of the Ancient Beech Forests of Europe UNESCO World

Heritage site called Primeval Beech Forests of the Carpathians and Other Regions of Europe.

1.2.2 Justification

Road improvement works were undertaken along this section of the road in 2012 by the Albanian Road Authority (Feasibility Study, February 2015). These included:

- widening of the road
- widening section (preparation of the carriage way e.g. filling the site with raw material)
- construction of roadside channels and ditches
- construction of the retaining walls
- installation of streetlamps
- construction of drainage culverts and structures
- laying of sub-base gravel layer.

According to the Feasibility Study (ADF, February 2015, the road is currently considered to be of an inadequate standard to support existing and predicted levels of vehicle traffic and to meet road safety requirements. The existing Zgosht and Cerenec roadway supports approximately 325 vehicle units per 3 days and is expected to support 1500 vehicle units per 3 days following completion of the Project. Sections of the road have been heavily impacted by surface water runoff resulting in severe localised erosion due to the poor condition of the current drainage system. The poor condition of the road limits vehicle movement and access across the districts of Dibër and Elbasan, which in turn is limiting economic development within these districts (Feasibility Study, February 2020).

The Project aims to improve access for residents to basic services and increases the possibilities for economic, agricultural and tourism development for the benefit of the rural population. It is anticipated that rehabilitation of this section of the road will:

- facilitate access for community, farmers and other economic enterprises
- facilitate access for tourists to mass tourism destinations in eastern Albania
- enable vehicle access to Dibër and Elbasan regions with a specific focus on Librazhd, Bulqize and Dibër municipalities
- facilitate access between Dibër, Bulqizë and Librazhd to the nearby urban centres.

The Feasibility Study (ADF, February 2015) predicts that the investment into the rehabilitation of the road will lead to economic development, agriculture development and tourism development through facilitating access to new touristic areas such as Parku Shebenik Jabllanicë in Librazhd and access to cultural, natural and historical areas in the Dibra region. The General Local Plans of Librazhd and Bulqize (draft in progress) highlight the importance of this development.

1.2.3 The Proposed Road Works

The road is currently in the design phase; however, it is anticipated that the Project is likely to entail the following road works:

- localised habitat clearance and topsoil removal within some areas of the working width
- construction of the sub-base and base layers along the length of the entire road
- construction of the asphaltic layers (6 cm thick binder course and 4 cm wearing course layer)
- cleaning and improvements of the existing drainage system (including concrete channels and culverts). Currently some culverts also serve as animal crossings.
- construction of additional concrete retaining walls
- installation of road safety barriers
- bioengineering works to stabilise and protect escarpments
- installation of traffic signs (i.e. pedestrian and vehicle signage)
- the addition of road markings
- installation of streetlighting along sidewalks in urban areas
- upgrading existing areas of paving
- constructing new areas of paving in urban areas
- the installation of pipes for the optical fibre network in urban areas
- the rehabilitation of several bridges

The road will pass along the existing right of way.

1.2.4 Road Design

The Project is currently in the early stages of the design phase, hence many of the design details are not finalised. The road designers are however currently taking the following improvement measures into consideration:

- pedestrian safety – e.g. the inclusion of pavements / sidewalks, lighting, signage in urban environments
- road safety – e.g. traffic signage, retaining walls, stabilisation works
- engineering requirements to address erosion issues– e.g. maintenance and enhancement of the existing drainage system and stabilisation of escarpments.

The overall length of Zgosht and Cerenec spans 47.166 km. The proposed road works will result in a road width measuring 8 m with asphalted traffic lanes measuring 2 x 3.25 m and gravel shoulders measuring 2 x 0.75 m (Figure 1.2).

The following road pavement layers have been selected based on the forecast volume of traffic, in particular the percentage volume of heavy goods vehicles, which have a greater damaging effect and determine the overall required pavement thickness.

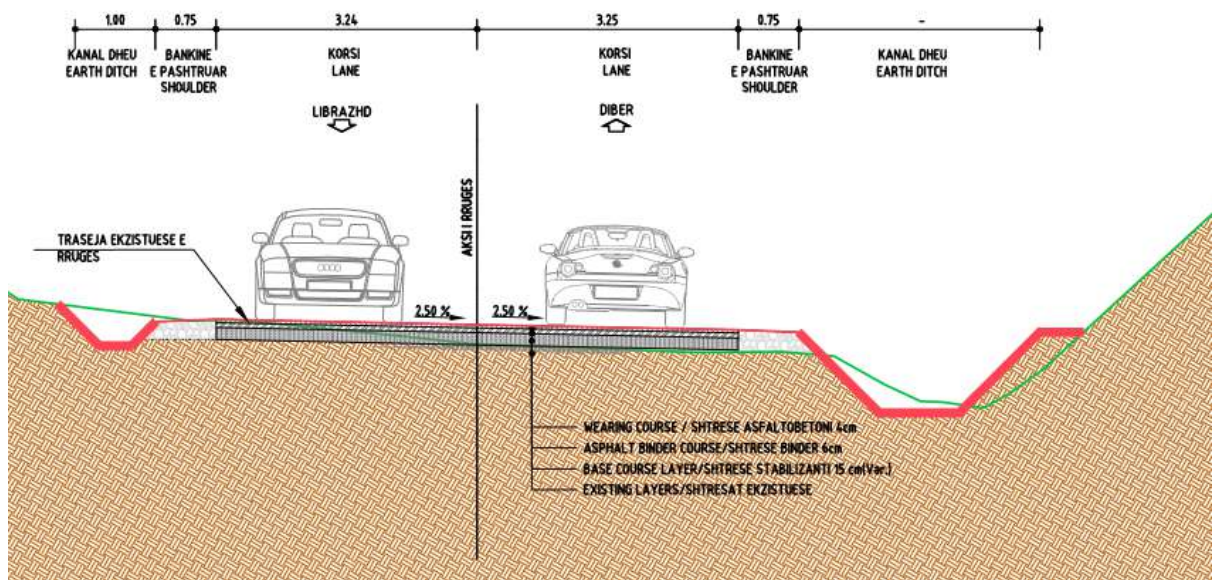
- surface course: asphalt concrete 40 mm
- binder course: asphalt 60 mm
- base Course: crushed stone base 150 mm

- sub-base: granular material 150 mm
- regulating layer: granular material 0-30 0mm is already completed

Where the road passes through hilly or mountainous areas the proposed road, when traversing the sidelong ground, would be supported by concrete retaining walls, when necessary, on the lower side. On the higher side, the excavated slope would be supported by construction of concrete retaining walls to the height necessary for stability.

The road is located in mountainous terrain characterised by a steep gradient and loose rockface. To protect the road and vehicle traffic from rockfalls the rockface within this section of the road will be stabilised using bio-engineering (a safety net that will support the establishment of vegetation), instead of concrete.

Figure 1.2: Cross section of the road



1.2.5 Construction Approach

Whilst there is much uncertainty regarding the detailed methods of construction at this stage in the Project development, some key aspects of the approach have been confirmed.

For example, habitats and topsoil will only be cleared within key sections of the working width using graders or bulldozers, jackhammers and trucks. The exact area of habitat clearance beyond the road footprint is uncertain but is likely to be a small area and potentially localised. Small excavators, pneumatic drills, jackhammers and trucks will also be used during grading of the road to remove the existing road surface.

The excavated material (i.e. topsoil and rocky substrate) will be stockpiled and reused for construction and landscape restoration. The stockpile areas will be located near the proposed road alignment and will include temporary waste disposal sites for storing inert materials. Habitats within the stockpile areas will be rehabilitated following use. The exact locations of the stockpiling sites and borrow pits are unknown at this stage in the project development.

Other machinery used to construct a new gravel and asphalt layer include compactors, bitumen spreading machines, asphalt laying machinery, road rollers and brushes.

Public utilities (i.e. telephone, electricity and water) are unlikely to be temporarily disrupted during the installation of new pipes and cables to the existing network. There is currently no existing underground infrastructure such as telephone cables, electricity or piping system.

The materials used for road construction will be supplied by a licensed company. Contractors will be required to use or buy material from existing asphalt plants, stone quarries and borrow pits operating with valid environmental and other permits and licenses.

Contract provisions shall require that asphalt and hot-mix plants will be located at least 500 m away from the nearest sensitive social and biodiversity receptor.

Equipment and materials will be transported to site using the existing road network. Truck operators will be required to cover or wet truck loads, avoid hauling materials on public roads during the morning peak traffic hour (8:00am to 9:00am) and to use alternative routes wherever possible to minimize traffic congestion. The contractor will be required to prepare and submit to the works supervisor and municipality a Traffic Management Plan showing routes and times to be used for materials delivery off and on site. Contractors will prepare a traffic management plan with appropriate measures to control and direct traffic and pedestrians.

The waste materials will be deposited in accordance with the official process and the approach will be approved by the local authorities. Waste management and the location of deposit sites will be confirmed together with the Engineer and ADF's Environmental Unit who will also systematically follow the process during construction, in accordance with the approved ESMP.

Solid waste clean-up will be entrusted to licensed operators, with provisions in their contract to carry out visual inspections for toxic materials before handling and segregating waste fractions as necessary, use safety measures while handling and transporting the wastes and dispose of waste at authorized dump sites with approval of the local authorities. The waste disposal site will be at least 100 m away from the road, not near any surface waters nor in a vegetated area. The waste disposal site will be selected in cooperation with the supervisor and the contracting authority. It is preferable to recycle the inert materials or to use the regional landfill.

Contractor will be required to properly organize and cover material storage areas; isolate concrete, asphalt and other works from any watercourse by using sealed formwork; isolate wash down areas of concrete and asphalt trucks and other equipment from watercourses by selecting areas for washing that are not free draining directly or indirectly into any watercourse. Contractor will further ensure proper handling of lubricants, fuel, and solvents by using secured storage; ensuring proper loading of fuel and maintenance of equipment; collecting all waste and disposing to permitted waste recovery facility. Special care must be taken during the bridge rehabilitation works, since this project foresees the reconstruction of several bridges.

Construction works will not be carried out at night (not between 7 p.m. and 7 a.m. or as agreed with the public and authorities). Hence, security fencing and artificial lighting will be erected around machinery and plant at night along the proposed alignment. Water

from waterbodies located in the project area and the National Park will not be extracted for construction activities (e.g. drilling) or for consumption by the workforce. Water for civil works will be supplied to the Project area using water trucks / tankers.

Personnel facilities such as a portable office and cabins for storage of personal items and equipment will also be installed within the project area but the exact location will be known when the design is finalised. The power supply to the office will be accessed through the existing network. It is anticipated that the workforce will use existing accommodation located close to the Project. The workforce will be defined once the detailed design is finalised and the Bill of Quantities has been defined. The project will follow the Gender Diversity Action Plan to promote women's rights and involvement during the construction phase. This will be monitored by ADF during construction.

1.2.6 Habitat Restoration

A Reinstatement and Landscaping Plan for the Project will be prepared and implemented by the Contractor. ADF will approve and monitor the implementation of this Plan. This plan will provide a clear methodology for the reinstatement of the physical environment within the Project footprint, the working width, borrow pits, stockpiling areas and contractor facility area (i.e. arising from habitat clearance, grading etc) in addition to the progressive rehabilitation and restoration of habitats and vascular plant species within the Project Development Area (PDA).

As part of this plan, the Project will develop a planting scheme using vascular plant species of local provenance. This will entail plug planting and seeding along the escarpments and embankments adjacent to the road alignment as part of the bioengineering works.

1.2.7 Operation

Maintenance road works will be undertaken on an annual basis or when required. The maintenance responsibility of the Zgotsh - Cerenec road after the project implementation lies with the Albanian Road Authority. The contractor has the responsibility to make repairs to any road defects and to maintain the road for a period of two years of the Defect Liability Period. ADF will monitor maintenance work for the first 2 years of operation including the establishment of the landscaping scheme. ADF will retain a quality assurance role for monitoring the establishment of habitats and species as part of the Reinstatement and Landscaping Plan and Biodiversity Management Plan.

The establishment of the planting scheme, as specified in the Reinstatement and Landscaping Plan and Biodiversity Management Plan, will be monitored for the first 5 years or until the successful establishment of the vascular plants has been achieved. Over this period, ADF will retain responsibility for closely monitoring the status of the planting scheme and maintenance works (including watering) for the first 2 years of operation. Any dead vascular plants will be replaced by the Contractor as 'like for like' during the maintenance timeframe and will be monitored by ADF.

Following this period, the Albanian Roads Authority will take over the responsibility for maintenance (including watering) and monitoring work for the following 3 years, as specified in the maintenance contract. Over this period, ADF will retain a quality assurance role to ensure that these works are completed and any dead vascular plants will be replaced as 'like for like' during this timeframe.

1.2.8 Timeline

The project will have a 2-year time span from the loan approval. The following main activities are envisaged to be undertaken by ADF:

- preparation of the Detailed Design
- procurement of the civil works
- construction and supervision.

It is anticipated that the road works will take 6 months to complete and the start date will be determined by the Investor according to the procurement process.

1.3 The Project's Approach to Biodiversity and Natural Resource Management

A summary of the Project's approach and commitments to achieving best practice biodiversity management are listed as follows:

- identification and characterisation of biodiversity baseline conditions for the Project based on primary and secondary data sources
- identification of important biodiversity features (priority species and habitats) of high conservation value and relevance to the Project based on critical habitat screening
- application of the mitigation hierarchy to avoid, minimise and rehabilitate Project-related impacts to these biodiversity features during Project construction and operation
- compensation of significant residual impacts to biodiversity receptors
- adherence to national regulatory requirements.

The proposed Zgosht to Cereneq Road Scheme forms part the Regional and Local Roads Connectivity Project. This project focuses on the role that improved roads can play in enabling connectivity-driven economic gains, particularly in the agricultural and tourism sectors, both key drivers of growth and employment in Albania.

1.4 Scope

This BMP is a framework for managing Project risks and impacts to biodiversity and to identify and prioritise appropriate impact management actions. BMPs and Biodiversity Action Plans are recommended as global leading practice by bodies such the UN Global Compact and are a requirement for EBRD Performance Requirement 6 compliance. Specifically, a BMP:

- collates diverse biodiversity management measures in one place, despite various departmental responsibilities for their implementation
- provides a summary of all biodiversity actions planned by the Project, supporting institutional memory
- facilitates communication about sound project biodiversity risk management to external audiences such as regulators
- provides reassurance that risks and impacts are being managed, and ensures investment is prioritised towards actions that most cost-effectively tackle highest risks / impacts
- provides a basis for planning and tracking progress.

This BMP fits within the impact assessment process and is a core component of the Project's Environmental and Social Management and Monitoring Plan.

The scope of this BMP includes:

- management measures to mitigate adverse impacts during pre-construction, construction, operation and closure phases
- a description of the ecological monitoring and reporting commitments including location, frequency and key performance indicators for adaptive management
- a definition of roles and responsibilities
- a presentation of the proposed schedule of works.

1.4.1 The Mitigation Hierarchy

The Project has applied the steps of the mitigation hierarchy so that adverse potential Project-related impacts are avoided, minimised and restored or rehabilitated where feasible. The mitigation hierarchy is a framework for managing biodiversity and ecosystem services risks as well as direct and indirect project-related impacts to biodiversity receptors and important ecosystem services (CSBI, 2015). The Project's adherence to the steps of the mitigation hierarchy is a requirement of EBRD Performance Requirement 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources. The steps of the mitigation hierarchy are presented in Figure 1.3 and are defined by BBOP (Forest Trends Association, 2019) as follows:

- **Avoidance:** this is the first step in the mitigation hierarchy and is defined as measures taken to avoid causing direct and indirect project-related impacts from the outset. Examples of avoidance measures include the spatial or temporal relocation or removal of infrastructure, to completely avoid impacting key components of biodiversity (i.e. particularly priority species, habitats or ecosystem services). Avoidance is often regarded as the most effective way of reducing potential negative impacts to biodiversity and ecosystem services.
- **Minimisation:** this is the second component of the mitigation hierarchy. Minimisation measures (or mitigation measures) are designed to reduce the duration, intensity and / or extent of direct, indirect and cumulative project-related impacts that cannot be completely avoided, as far as is practically feasible. Robust and pragmatic minimisation measures can be effective in reducing biodiversity impacts below significance thresholds.
- **Rehabilitation / Restoration:** this third step in the mitigation hierarchy should be applied to rehabilitate or restore biodiversity and / or ecosystem services that are impacted by project activities that cannot be completely avoided and / or minimised. An example includes rehabilitating degraded habitats or restoring cleared habitats to reduce residual project-related impacts.
- **Offset:** Biodiversity offsets are measures taken to compensate for any residual significant, adverse impacts that cannot be avoided, minimised and / or rehabilitated or restored, to achieve no net loss or a net gain of biodiversity. Biodiversity offsets are measurable positive conservation outcomes on priority biodiversity features that are attributed to project activities, and whose magnitude outweighs that of the residual adverse biodiversity impacts arising from the project development. Offsets require investments in conservation management protection where the results of these investments can be quantified. Offsetting is based on systematic biodiversity accounting based on the explicit calculation of biodiversity losses and gains at matched impact and offset sites.

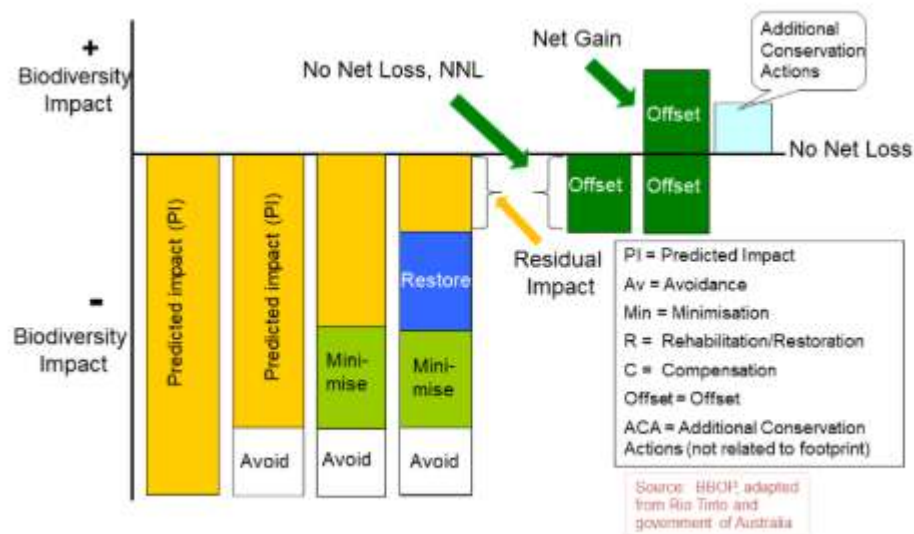


Figure 1.3: The Mitigation Hierarchy (BBOP, 2019)

1.4.2 Stakeholder Consultation and Engagement

In the context of this BMP, stakeholders are individuals, groups or organisations (government and non-government organisations (NGOs)) that either affect, are affected by, or have an interest in biodiversity management. Stakeholder consultation and support is integral to the design and implementation of any BMP and it is important that stakeholders are engaged in this Project's BMP process. This has been partly achieved through consultation with biodiversity related stakeholders as part the Project's Habitat Regulations Assessment (RSK, 2020c and the preliminary Priority Biodiversity Feature Screening and Critical Habitat Assessment was undertaken as part of the Biodiversity Baseline Assessment (RSK, 2020a).

Due to the current restrictions associated with the COVID-19 pandemic, a questionnaire was prepared and disseminated to key stakeholders in June 2020 by ADF and RSK for their feedback. Stakeholders are listed as follows:

- National Agency for Protected Areas
- Protection and Preservation of Natural Environment in Albania (PPNEA)
- Albanian Society for the Protection of Birds and Mammals (ASPBM)
- Albanian Ornithological Society (AOS)
- University of Tirana
- Institute of Nature Conservation
- Albaglobal
- EcoAlbania
- Individual ecological specialists

The questionnaire invited feedback regarding the current biodiversity in the region of the Project and the Shebenik-Jabllanicë National Park, any key information gaps, key priority features for the Project, perceived opportunities, risk for the Project and recommendations for mitigation and management measures. Feedback was collated and

used to inform both the Habitat Regulations Assessment (RSK, 2020c) and the Biodiversity Impact Assessment (RSK, 2020b).

1.5 Important Document Linkages

There are important linkages between this BMP and other Project documentation as follows:

- the Biodiversity Baseline Assessment (RSK, 2020a) which includes the following relevant information:
 - an overview of the relevant legislation and guidance
 - biodiversity baseline characterisation of the project area
 - identification and prioritisation of biodiversity features for the Project based on priority biodiversity / critical habitat screening.
- the Biodiversity Impact Assessment (RSK, 2020b), which will be used to inform the development of an environmental and social impact assessment and characterises Project-related impacts to biodiversity features in the project area
- The Habitat Regulations Assessment (RSK, 2020c) assesses Project-related impacts on the candidate Emerald site's conservation objectives to ensure that the integrity of the site is not adversely affected. This assessment entailed stakeholder consultation.

Additional information related to the management of potential biological impacts, and proposed monitoring and mitigation measures, are provided in the following reports and assessments:

- Albania Regional and Local Roads Connectivity Project: Operational Manual (Albanian Development Fund, August 2018)
- Albania's Improvement of the Management and Conditions of the Secondary and Local Roads Project; Environment Safeguards Framework (Albanian Development Fund, 2008)
- Project for Rehabilitation of Regional and Local Roads in Albania: Environmental and Social Management Framework (December 2017). This is a tool for ensuring that sub-projects comply with existing laws, regulations and procedures in Albania. An account of the legislation and practices relevant to the EIA and permitting process is explained in detail in this document.
- Albania's Improvement of the Management and Conditions of the Secondary and Local Roads Project; Environment Safeguards Framework, 3rd Draft (March 10, 2008)

2 PRIORITY HABITATS AND SPECIES

2.1 Identification of Priority Habitats and Species

The biodiversity baseline of the Project area is described in the Biodiversity Baseline Assessment (RSK, 2020a). This assessment characterises the existing biodiversity features within the Project footprint and surrounding environs based on the following components:

- habitat mapping
- site visit and rapid biodiversity walkover survey
- targeted ecology surveys
- literature review.

The report also identifies the Priority Biodiversity Features (PBFs) and critical habitat-qualifying features for the Project based on screening. These features are of high conservation importance for the Project. This process of prioritisation ensures that mitigation actions present within this BMP are focused on the highest biodiversity values and risks within the zone of influence.

A summary of the Critical Habitat-qualifying features and PBFs are presented in Table 2-1 and Table 2-2 respectively, and a more detailed account is presented in the Biodiversity baseline assessment (RSK, 2020a).

Table 2-1: Summary of critical habitat-qualifying features for the Project

EBRD PR6 Criteria	IFC PS6 Criterion Threshold Numbers	Critical Habitat-qualifying Features	Justification
Highly threatened or unique ecosystems	4a	No critical habitat qualifying features	–
	4b	Shebenik-Jabllanicë National Park	Protected area status Priority Annex 1 Habitat
Habitats of significant importance to endangered or critically endangered species	1a	Balkan lynx	Balkan lynx meets the threshold
		European eel	Precautionary due to the paucity of data
	1b	Pindus stone loach	Precautionary due to the paucity of data
	1c	Balkan lynx	Balkan lynx meets the threshold
		European eel	Precautionary due to the paucity of data

EBRD PR6 Criteria	IFC PS6 Criterion Threshold Numbers	Critical Habitat-qualifying Features	Justification
Habitats of significant importance to endemic or geographically restricted species	2	Balkan lynx Chamois Heldreich's pine Serpentine false brome Mountain tea	Precautionary due to the paucity of data
Habitats supporting globally significant (concentrations of) migratory or congregatory species	3a	No critical habitat qualifying features	-
	3b	No critical habitat qualifying features	-
Areas associated with key evolutionary processes	N/A	Ancient and Primeval Beech Forests of the Carpathians and Other Regions of Europe	-
Ecological functions that are vital to maintaining the viability of biodiversity features described (as critical habitat features)	N/A	Ancient and Primeval Beech Forests of the Carpathians and Other Regions of Europe and waterbodies/courses within the AOA	Precautionary basis assuming the presence of the critical habitat-qualifying species listed above

Table 2-2: Summary of priority biodiversity features for the Project

EBRD PR6 Criteria	Priority Biodiversity Features
Vulnerable Species	Plants x 7; insect x 2; fish x 2; mammals x 9; birds x 23
Threatened Habitats (EU Habitats Directive Annex 1 priority habitats)	<ul style="list-style-type: none"> Species-rich Nardus grasslands, on silicious substrates in mountain areas (and submountain areas in Continental Europe)
Significant Biodiversity Features Identified by a Broad Set of Stakeholders or Government	<p>Protected areas within the area of analysis:</p> <ul style="list-style-type: none"> Shebenik-Jabllanicë National Park (national park category 2, IUCN Category II, Important Plant Area and candidate world heritage site) Koturman Managed Nature Reserve (IUCN Category IV) Mali Me Gropa-Bize-Martanesh Protected Landscape (IUCN Category V) Mali I Dajtit (IUCN Category II).

<p>Ecological Structure and Functions Needed to Maintain the Viability of Priority Biodiversity Features</p>	<p>Project falls within Pindus Mountains mixed forests ecoregion (category Palearctic) which covers Greece, Macedonia (FYROM) and Albania. This ecoregion covers 15,300 square miles and is categorised by WWF as Critical / Endangered.</p>
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2.2 Overview of The Biodiversity Characteristics Within the Project Development Area

2.2.1 Protected Area status

Approximately 13.5 km of the existing Zgosht to Cerenec road crosses the western border of the Shebenik-Jabllanicë National Park (IUCN Category 2; national park category 2). This nationally protected area is also designated as a Candidate Emerald Site (Figure 2.1). The Emerald Network is an ecological network of Areas of Special Conservation Interest (ASCIs), which were established to conserve the species and habitats of the Bern Convention requiring specific protection measures.

The Shebenik-Jabllanicë National Park is one of 14 National Parks in Albania and was designated as a National Park in 2008. The park covers 33,928 ha and is located within a mountainous area of East Albania, near the border of Macedonia. The majority of the National Park is situated within the Librazhd District of the Elbasan Region, whilst the northern portion of the National Park falls within the Bulqizës District of the Dibër Region. The Shebenik-Jabllanicë National Park overlaps parts of seven communes for which the total area is 77,450 ha and the total population comprises 44,677 inhabitants (PROGES and Sapienza University of Rome, 2015).

The National Park ranges in altitude from 300 to 2,200 m above sea level and supports a diversity of climatic conditions, geological types, landscapes, habitats and species including nationally and globally rare and threatened species. The Shebenik-Jabllanicë National Park is thought to potentially have important habitat linkages for large ranging fauna species with other protected areas nearby in Albania and Macedonia (PROGES and Sapienza University of Rome, 2015).

The Shebenik-Jabllanicë National Park, is divided into 4 sub-zones for protection and administration namely the Central Zone (Zone Qendrore), Sustainable Use Zone (Zone Perdormini Quendrueshon), Recreation Zone (Zone Rekreative) and the Zone of Traditional use (Zone Perdorimi Traditional; PROGES and Sapienza University of Rome, 2015). The proposed Project passes through the border of the zones of traditional use and recreation use.

The World Heritage site is entitled Ancient and Primeval Beech Forests of the Carpathians and Other Regions of Europe. It is a transboundary site, and it incorporates 12 countries throughout Europe and 82 components parts. These components comprise sufficiently sized stands of ancient and primeval beech forest with maximum integrity, that represent the outstanding universal values of the World Heritage Site. There are two component sites of the World Heritage Site in Albania and one component, namely Rajca, falls within the Shebenik-Jabllanicë National Park (Figure 2.2). Based on publicly

available information, this component of the World Heritage Site appears to fall within the Central Zone of the National Park and does not overlap the footprint of the Project area.

A portion of the Shebenik-Jabllanicë National Park is designated as a Key Biodiversity Area; site name Rrajca. The site's central coordinates are 41° 12' 58" North (41.220), 20° 29' 9" East (20.490) and the location is illustrated in Figure 2.3 (PROGES and Sapienza University of Rome, 2015; BirdLife International, 2020).

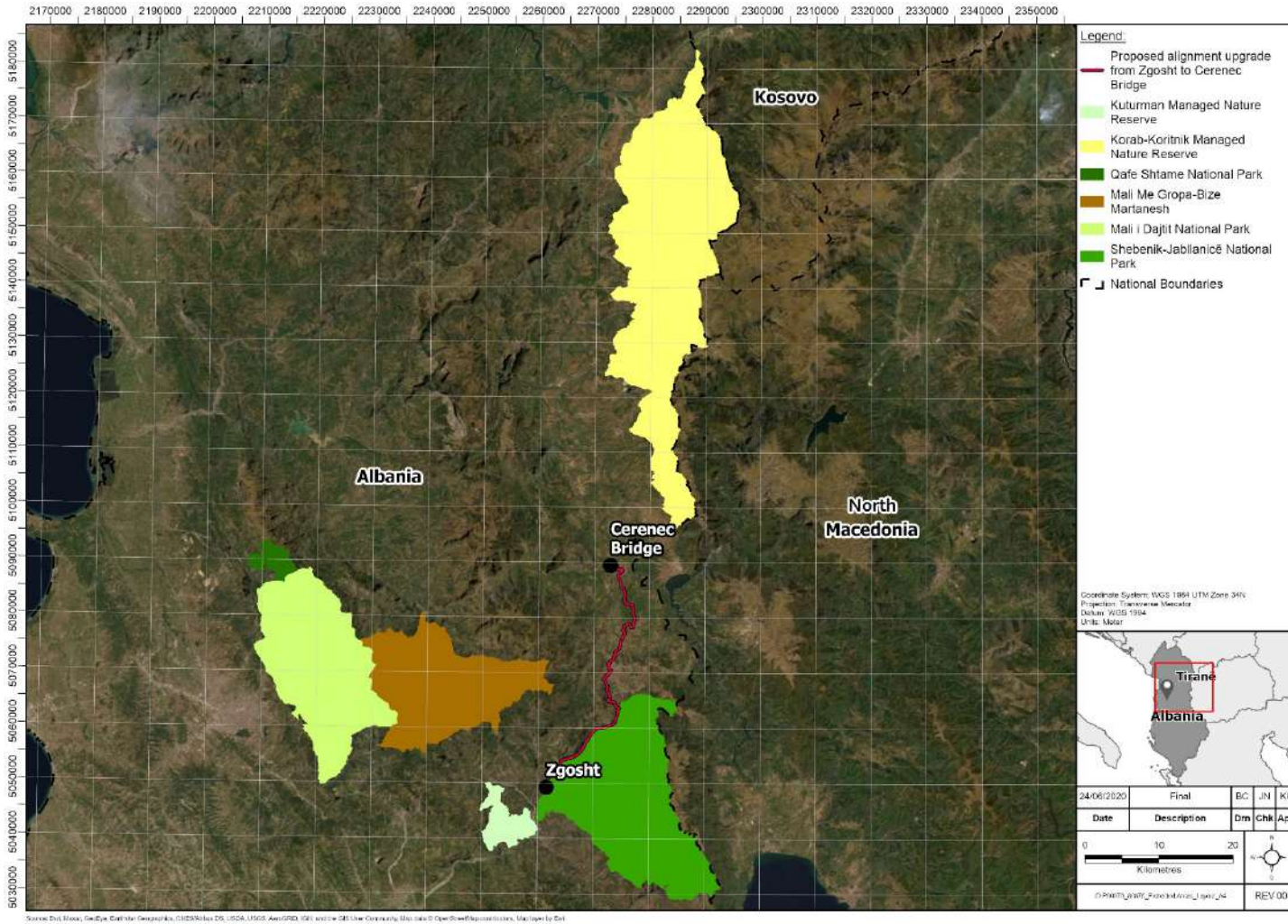


Figure 2.1: Location of the Project in proximity to the Shebenik-Jabllanicë National Park and other protected areas

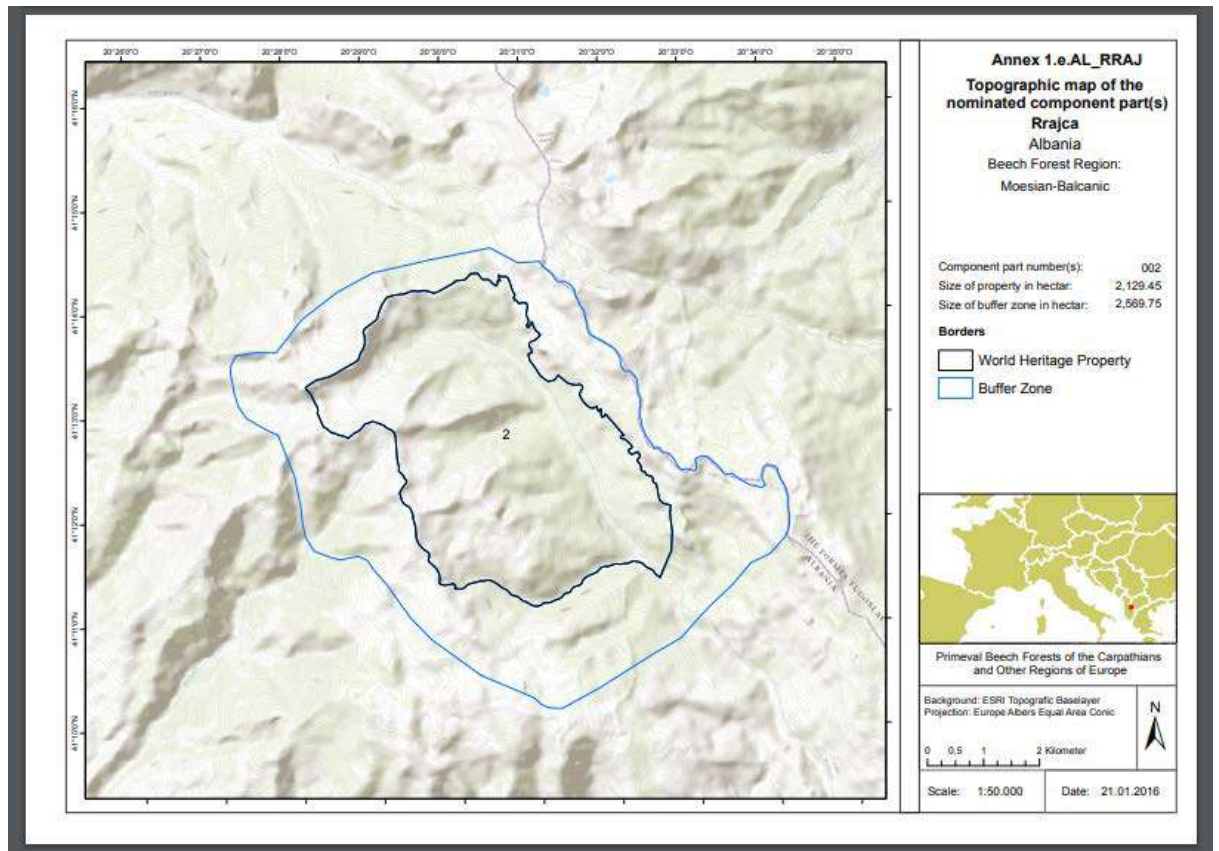


Figure 2.2: Location of the Rrajca component of the Ancient and Primeval Beech Forests of the Carpathians and Other Regions of Europe World Heritage Site (Source UNESCO 2020)

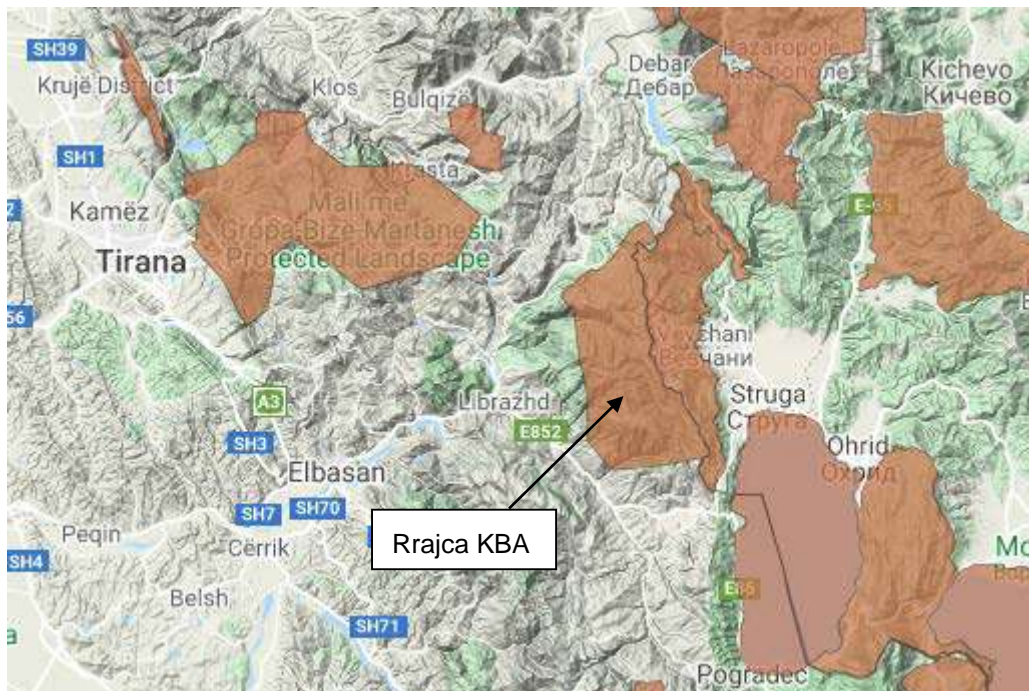


Figure 2.3: Location of the Rrajca Key Biodiversity Area (KBA) (Source BirdLife International (2020))

The transboundary Rrajcë-Shebenik-Jabllanica Important Plant Area (IPA; number AL08)) overlaps the boundary of the SJNP and adjoining habitats in Macedonia. This is one of 45 IPAs identified for Albania and covers 3900 ha (Shuka and Malo, 2010).

The high diversity of ecosystems and habitats located within the eastern transboundary Albanian IPAs (i.e. rivers, broadleaf, conifers and mixed forests, alpine and subalpine pastures and meadows, and high mountain ecosystems) are floristically rich in nature. The Rrajcë-Shebenik-Jabllanica IPA is known to support plant species and habitats of conservation importance (Shuka and Malo, 2010).

A number of protected areas are located within the wide region of the project, outside of the Project Development Area (Figure 2.1). These are listed as follows:

- Kuturman - Managed Nature Reserve (Category IV IUCN)
- Mali Me Gropa-Bize-Martanesh - Protected Landscape (Category V IUCN)
- Mali I Dajtit - National Park (Category Ii)

The closest protected area to the project and the Shebernik Jabllanice National Park is the Kuturman. This nature reserve is located approximately 5 km from the Project and 500 m from the Shebenik-Jabllanicë National Park at the closest points.

2.2.2 Ecoregion and Habitats

The project falls within WWF's Pindus Mountains mixed forests ecoregion (category Palearctic) which covers Greece, Macedonia (FYROM) and Albania. This ecoregion covers 15,300 square miles and is categorised by WWF as Critical / Endangered (Regato, 2020).

The Zgosht to Cereneç road is currently surrounded by a mosaic of modified and natural habitat types. The distribution and coverage of these habitat types are illustrated by the habitat map, presented in Appendix 1, in which habitats have been mapped within the project footprint and the study area (a 50 m buffer either side of the centre of road alignment). The habitat map indicates that modified habitats (i.e. agro-pastoral land, black pine plantations, fallow land, bare-ground / disturbed land, settlements and areas of hard standing) have a higher coverage in the study area than natural habitats. Natural habitats within the study area comprise:

- broadleaf woodlands and forests dominated by oak species (i.e. *Quercus petraea*, *Q. frainetto*, *Q. cerris*) or European beech (*Fagus sylvatica*)
- exposed screes with limited vegetation
- deciduous thickets
- aquatic habitat types (i.e. alpine streams, reservoir, ponds).

These habitats are described in detail in Table 6.1 (Appendix 1). All the natural habitats located within the study area are common and widespread in nature and as such do not qualify as EU Habitats Directive Priority Annex 1 habitats.

Approximately 13.5 km of the Zgosht to Cereneç road traverses the western periphery of the Shebenik-Jabllanicë National Park. Sections of the western periphery of the National Park has been subject to habitat loss and degradation due to the expansion of grazing pasture, cultivated land and settlements. Hence, a significant portion of this section of the 50 m buffer comprises modified habitat (i.e. agro-pastoral land and housing), particularly near settlements such as Fushë Studë. Natural habitats are relatively fragmented in nature and comprise beech woodland, oak woodland, scrub, pine woodland and grassland. One Annex 1 priority habitat reportedly occurs within the Shebenik-Jabllanicë National Park, namely species-rich *Nardus* grasslands, on silicious substrates in mountain areas (and submountain areas in Continental Europe (code 6230) (PROGES and Sapienza University of Rome, 2015)). Annex I priority habitats are of particular conservation importance. Priority habitats are a sub-set of the Annex I habitats, identified by the Habitats Directive, as habitats "in danger of disappearance" in the European Union (Article 1d). The importance of Annex I priority habitats are discussed in the Directive in Articles 4, 5, 6, 11 and Annex III. Conservation intervention is required in order to halt the expected decline of these habitats.

2.2.3 Flora

The walkover botanical scoping assessment undertaken for the Project in June 2020 identified *Junicperus oxycedrus* which is listed on the Albanian Red List as Vulnerable (VU), within the study area. It is however important to acknowledge that this was a rapid survey over a 2-day period and as such only a very small proportion of the habitats was surveyed and assessed.

According to the Shebenik-Jabllanicë National Park Management Plan, 20 plant species that inhabit the National Park are of conservation importance at the national scale (PROGES and Sapienza University of Rome, 2015). The statuses of these species range from Low Risk to Endangered in accordance with the Albanian Red Data List (2013). Furthermore, 7 plant species of conservation importance in Albania are known to inhabit the Rrajcë-Shebenik-Jabllanica IPA. There is potential for these Albanian Red Listed plant species to occur in natural habitats located outside of the National Park and IPA, within the PDA.

Table 2-3 Plant species recorded within the Shebenik-Jabllanice National Park

Key: LC = Least Concern; LR = low Risk; NT = Near Threatened; NA = not assessed; VU = vulnerable; EN = Endangered

Scientific Name	Common Name	IUCN Status (2020)	Albanian Red Data List
<i>Agrimonia eupatoria</i>	Agrimony	LC	Not listed
<i>Alkanna scardica</i>	-	NA	LRcd
<i>Alyssum bertolonii</i>	-	NA	LRcd
<i>Anthyllis vulneraria</i> subsp. <i>bulgarica</i>	-	NA	Not listed
<i>Bornmuellera baldaccii</i>	-	NA	EN
<i>Centaurea candelabrum</i>	-	NA	EN
<i>Cistus sintenisii</i> (synonym <i>Cistus albanicus</i>)	-	NA	EN
<i>Dryopteris filix-mas</i>	Common male-fern	LC	Not listed
<i>Festucopsis serpentini</i>	Serpentine false brome	LC	VU
<i>Genista hassertiana</i>	-	NA	Not listed
<i>Gentiana lutea</i>	Great yellow gentian	LC	EN
<i>Hypericum perforatum</i>	St. John's-wort	LC	EN
<i>Juniperus communis</i>	Common juniper	LC	VU
<i>Juniperus oxycedrus</i>	Prickly juniper	LC	VU
<i>Lilium albanicum</i>	zambaku shqiptar / Albanian lily	LC	EN
<i>Narthecium scardicum</i>	-	NA	VU
<i>Pedicularis graeca</i>	-	NA	LRcd
<i>Pinus heldreichii</i>	Heldreich's pine	LC	VU
<i>Pinus peuce</i>	Balkan pine	NT	EN
<i>Ramonda serbica</i>	Српска рамонда	LC	VU
<i>Satureja montana</i>	-	NA	VU

Scientific Name	Common Name	IUCN Status (2020)	Albanian Red Data List
<i>Saxifraga scardica</i>	-	NA	VU
<i>Sedum serpentini</i>	-	NA	Not listed
<i>Trifolium pilczii</i>	-	NA	LRnt
<i>Trifolium wettsteinii</i>	-	NA	Not listed
<i>Veronica saturejoides</i> <i>subsp. munellensis</i>	-	NA	VU

Table 2-4 Plant species recorded within the Rrajcë-Shebenik-Jabllanica IPA

Key: LC = Least Concern; LR = low Risk; NT = Near Threatened; NA = not assessed; VU = vulnerable; EN = Endangered

Scientific Name	Common Name	IUCN Status (2020)	National Red Data Book Status (2013)	Distribution
<i>Alyssum markgrafii</i>	Basket of gold	NA	EN	-
<i>Cistus sintenisii</i> (synonym <i>Cistus albanicus</i>)	-	NA	EN	Albania, Corsica & Greece (Endemic)
<i>Oxytropis prenja</i>	-	NA	LRcd	Albania, Greece & Yugoslavia
<i>Pinus heldreichii</i>	Heldreich's pine	LC	VU	Albania; Bosnia and Herzegovina; Bulgaria; Greece (Greece (mainland)); Italy (Italy (mainland)); Montenegro; North Macedonia; Serbia
<i>Pinus peuce</i>	Balkan pine	NT	EN	Albania; Bulgaria; Greece (Greece (mainland)); Montenegro; Serbia
<i>Ramonda serbica</i>	Српска рамонда	LC	VU	Albania; Bulgaria; Greece (Greece (mainland)); Montenegro; North Macedonia; Serbia
<i>Sedum serpentini</i>	-	NA	Not listed	Albania
<i>Silene schwarzenbergeri</i>	-	NA	Not listed	Albania, N-Greece, Macedonia

Scientific Name	Common Name	IUCN Status (2020)	National Red Data Book Status (2013)	Distribution
<i>Haplophyllum boissieranum</i>	-	NA	EN	Albania, Bosnia & Hercegovina, Serbia & Kosovo, Greece

2.2.4 Mammals

The Shebenik-Jabllanicë National Park is known to support a high diversity of fauna species (PROGES and Sapienza University of Rome, 2015), including some nationally and globally rare and threatened species of mammals. These include the following species:

- Balkan lynx (*Lynx lynx balcanicus*; IUCN Critically Endangered (CR), Albania CR)
- Eurasian otters (*Lutra Lutra*; IUCN NT, Albanian VU)
- brown bears (*Ursus arctos*) - IUCN LC at the global scale; IUCN VU in the Mediterranean; Albanian Red List VU
- wolf (*Canis lupus*) - IUCN LC and Albanian Red List NT
- wild cat (*Felis sylvestris*) - IUCN LC, Albania EN
- Eurasian badger (*Meles meles*) – IUCN LC; Albanian Red List EN
- European roe deer (*Capreolus capreolus*) - IUCN LC; Albanian Red List VU
- beech marten / stone marten (*Martes foina*) - IUCN LC; Albanian Red List Low Risk / near Threatened (LRnt)
- red squirrel (*Sciurus vulgaris*) – IUCN LC; Albanian Red List LRnt
- chamois (*Rupicapra rupicapra*) – IUCN LC; Albanian Red List VU
- golden jackal (*Canis aureus*) – IUCN LC; Albanian Red List VU
- pine marten (*Martes martes*) – IUCN LC; Albanian Red List VU
- wild boar (*Sus scrofa*) - IUCN LC; Albanian Red List LRnt.

Shebenik-Jabllanicë National Park provides important habitat within one of the primary remaining ranges of the Balkan lynx. This species is categorised as Critically Endangered by the IUCN Red List of Threatened Species (2020) and the Albanian Red List (2013) and triggers critical habitat. The Balkan lynx population in Albania is estimated to comprise approximately 10 mature individuals, with at least 4 individuals occupying the Munella area (PPNEA, 2018).

The existing Zgosht to Cerenec road traverses some well-known habitats for medium to large mammals in Albania. During the scoping assessment undertaken for the Project in June 2020, tracks of brown bears were observed on the north-western shore of a lake 119 m from the road (at UTM 450704.99, 4574620.87) indicating that the area is used by brown bears for foraging and as a water resource. Potential brown bear denning habitat was also identified during the assessment in close proximity to the 50 m buffer. Eurasian otter evidence was recorded beneath a bridge that crosses the alpine stream approximately 39 m from the road (at UTM 451190.95, 4578237.59) and on the stream associated with the hydropower system that begins from the village of Borovë and extends to Moglica village. A grey wolf print was recorded 37 m from the road within

pasture (at UTM 451100.97, 4579483.7). Large carnivores are known to frequently use modified habitats for commuting and foraging. Brown bears are frequently reported to wander into agropastoral lands and into plantations in Albania in search of food (often causing situations of conflict with local residents). Grey wolves are also reported to move across the wider landscape of natural and modified habitats in the area and even near villages in search of livestock or dead animals to feed on. The scoping assessment identified that the 50 m buffer offers potentially suitable habitats (in terms of foraging and commuting and, to a lesser extent, for breeding) for species of high conservation importance. The major exceptions are areas where the buffer crosses inhabited areas and settlements (i.e. Fushë-Studë, Borovë, Sebisht, Cerenec), and in areas where major landscape modifications have been made due to construction works (i.e. the hydropower development near Borovë and the road widening works between point e.g. between UTM 451547.64, 4582498.05 and 451676.3, 4583985.84).

The fauna scoping assessment identified that currently there are areas with good habitat connectivity that are likely to facilitate the movement of fauna species inside and outside of the National Park. Although the construction of this road has contributed to some habitat fragmentation, in its current condition, the road was not considered to be a major barrier for large mammal species. This is primarily linked to the poor condition of Zgosht to Cerenec road (i.e. gravel road surface, unpaved, unmarked and unfenced with no artificial lighting and large sections of the road have no safety barriers) which limited the speed and volume of vehicle traffic (with a few exceptions e.g. at Shkalla e Lunikut).

2.2.5 Bats

No specific bat survey was carried out during the fauna scoping assessment in June 2020, however several features that may be suitable for roosting bats were identified:

- mature beech trees at UTM 447859.5, 4572393.11
- several small caves associated with the canyon at Shkalla e Lunikut (at UTM 444165.84, 4569530.41)
- an old abandoned farmhouse in Llanga village
- caves located in the rocky slopes of the Okshtuni stream valley, between UTM 26 451649.7, 4578203.88 and 36 450575.58, 4581448.64 (Figure 2-4).

Bat activity surveys, mist netting and roost inspections would be required to establish whether bats are using any of these features for roosting or hibernation.



Figure 2-4: Photograph of caves along the Zgosht to Cerenec road corridor with potential for roosting bats (observed from UTM 451100.98, 4579438.22)

Of the 32 bat species known to inhabit Albania (Théou and Đurović 2015), mist netting undertaken by the Dutch Mammal Society in the National Park in 2015 confirmed the presence of the following 10 bats species in the Shebenik-Jabllanicë National Park (Hunia *et al.*, 2016):

- lesser horseshoe bat (*Rhinolophus hipposideros*) – IUCN LC global, NT in Europe and the Mediterranean; Albanian Red Listed LRnt; Included in Annex II (and IV) of EU Habitats and Species Directive
- greater mouse-eared bat (*Myotis myotis*) – IUCN LC; Albanian Red Listed LRcd; Annex II (and IV) of EU Habitats and Species Directive
- lesser mouse-eared bat (*Myotis blythii*) - IUCN LC global, NT in Europe and the Mediterranean; Annex II (and IV) of EU Habitats and Species Directive
- Daubenton's bat (*Myotis daubentonii*) – IUCN LC; not include don the Albanian Red List; Annex IV of EU Habitats and Species Directive
- Natterer's bat (*Myotis nattereri*) – IUCN LC; Albanian Red List DD; Annex IV of EU Habitats and Species Directive
- Brandt's bat (*Myotis brandtii*) – IUCN LC; Not listed on the Albanian Red List; Annex IV of EU Habitats and Species Directive
- common long-eared bat / Brown long-eared bat (*Plecotus auritus*) – IUCN LC; Albanian Red List DD
- grey long-eared bat (*Plecotus austriacus*) – IUCN LC; Albanian Red List DD; Annex IV of EU Habitats and Species Directive
- lesser noctule / Leisler's bat (*Nyctalus leisleri*) – IUCN LC; Albanian Red List DD; Annex IV of EU Habitats and Species Directive
- Savi's pipistrelle (*Hypsugo savii*) – IUCN LC; Not listed on the Albanian Red List; Annex IV of EU Habitats and Species Directive.

Bat activity surveys undertaken by the Dutch Mammal Society in 2015 indicated that Schreiber's bent-winged bat (*Miniopterus schreibersii*), common pipistrelle (*Pipistrellus*

pipistrellus), Kuhl's pipistrelle (*Pipistrellus kuhlii*), Leisler's bat (*Nyctalus leisleri*), Savi's pipistrelle (*Hypsugo savii*), particoloured bat, (*Vespertilio murinus*), serotine (*Eptesicus serotinus*), soprano pipistrelle (*Pipistrellus pygmaeus*) were active in close proximity the proposed Project near Fushë Studë at the time of survey (Hunia et al., 2016). A number of bat species were found roosting in structures (i.e. abandoned military bunkers, houses and tunnels) near Fushë Studë in proximity to the Project in 2015 (Hunia et al., (2016); Table 2-5).

Table 2-5: Bat species identified roosting near Fushë Studë in proximity to the Project 2015 (Hunia et al., 2016)

Species	Description
Greater horseshoe bat	Identified in bunkers and abandoned houses in the surrounds of Fushë Studë.
Lesser horseshoe bat	Identified in bunkers and abandoned houses in the surrounds of Fushë Studë.
Greater mouse-eared bat	Summer roosts identified in the Hoxha bunkers and tunnels in the surroundings of Fushë Studë.
Lesser mouse-eared bat	Summer roosts identified in Hoxha bunkers near Fushë Studë.

2.2.6 Avifauna

The diversity of natural and modified terrestrial and aquatic habitats within the region of the Project in addition to the altitudinal range is likely to contribute to relatively high diversity of bird species in the Shebenik-Jabllanicë National Park and surrounding environs (PROGES and Sapienza University of Rome, 2015).

A bird survey undertaken within Shebenik-Jabllanicë National Park in 2013, focused on surveying within 16 habitat types and included approximately 11% of the National Park, confirmed the presence of 84 bird species. All of these species are categorised as Least Concern by the IUCN Red List of Threatened Species (IUCN, 2020), excluding the rock partridge (*Alectoris graeca*) which is categorised as Near Threatened. The National Park is also known to support a number of migratory and congregatory (and dispersive) bird species. Habitats within the National Park have not been identified by the National Park's management plan as supporting globally significant numbers of migratory or congregatory avifauna populations. Habitats within the verges of the Zgosht to Cereneq Road and the 50m buffer zone are unlikely to support globally significant numbers of migratory or congregatory bird species.

Several species are also rare and threatened at the national level and are categorised by the Albanian Red list (2013) as Endangered or Vulnerable. These bird species are listed as follows:

- golden eagle (*Aquila chrysaetos*) – Albanian Red List EN
- northern goshawk (*Accipiter gentilis*) – Albanian Red List VU
- common buzzard (*Buteo buteo*) - Albanian Red List VU

- short-toed snake eagle (*Circaetus gallicus*) - Albanian Red List VU
- peregrine falcon (*Falco peregrinus*) - Albanian Red List VU
- Eurasian hobby (*Falco Subbuteo*) - Albanian Red List VU
- common kestrel (*Falco tinnunculus*) - Albanian Red List VU.

Whilst a dedicated avifauna survey was beyond the scope of the scoping assessment, a common kestrel (*Falco tinnunculus*; IUCN LC; Albanian Red listed Vulnerable) was observed in flight above rocky habitat near the road at UTM 444095.67, 4569467.96, approximately 3 km from Zgosht. Furthermore, forest, scrub and scree habitats located adjacent to the Zgosht to Cerenec road offer potentially suitable habitat for nesting birds, including nationally rare and threatened species.

2.2.7 Reptiles

The Shebenik-Jabllanicë National Park Management Plan lists 18 species of reptiles as occurring within the National Park (PROGES and Sapienza University of Rome, 2015). These are listed in Table 2-6.

Good habitat connectivity between the National Park and the surrounding environs are likely to facilitate the movement of reptiles inside and outside of the Shebenik-Jabllanicë National Park. Reptiles are known to bask and use refugia on road verges, hence there is potential for reptiles which inhabit the region (potentially including those listed in Table 2-6) to occur within the PDA within suitable habitat along the Zgosht to Cerenec road verges.

Table 2-6 Reptile species recorded in the Shebenik-Jabllanicë National Park

Scientific Name	Common Name	IUCN Status (2020)	National Red Data Book Status (2013)	Bern Convention
<i>Testudo hermanni</i>	Hermann's tortoise	NT	Low risknt	II
<i>Algyroides nigropunctatus</i>	Blue-throated keeled lizard	LC	Low riskcd	II
<i>Podarcis melisellensis</i>	Dalmation wall lizard	LC	Low risk /cd	II
<i>Platyceps najadum</i> (Synonym <i>Coluber najadum</i>)	Dahl's whipsnake	LC	Low risk / cd	II
<i>Coronella austriaca</i>	Smooth snake	LC	Low risk/ nt	II
<i>Zamenis longissimus</i>	Aesculapian snake	LC	Not listed	II
<i>Elaphe quatuorlineata</i>	Four-lined snake	NT	CR	II
<i>Natrix tessellata</i>	Dice snake	LC	Not listed	III
<i>Vipera ammodytes</i>	Nose-horned viper	LC	Low risknt	II

<i>Algyroides nigropunctatus</i>	Dalmatian algyroides	LC	Low riskcd	II
<i>Dolichophis schmidti</i>	Red bellied racer	LC	Not listed	II
<i>Malpolon insignitus</i>		LC	Not listed	III
<i>Dolichophis jugularis</i>		LC	Not listed	
<i>Anguis fragilis</i>	Slow worm	LC	Not listed	III
<i>Lacerta agilis</i>	Sand lizard	LC	Low Risk/ nt	II
<i>Lacerta viridis</i>		LC	Low Risk /cd	II
<i>Natrix natrix</i>	Grass snake	LC	Not Listed	
<i>Podarcis muralis</i>		LC	NE	II

2.2.8 Invertebrates

Two invertebrate species that are categorised as Near Threatened in Europe by the IUCN Red List of Threatened Species (2020) have been recorded in the Shebenik-Jabllanicë National Park, namely the stag beetle (*Lucanus cervus*) and *Caliaeschna microstigma* (PROGES and Sapienza University of Rome, 2015). The literature review identified that the great Capricorn beetle (*Cerambyx cerdo*) may potentially occur in proximity to the Project. This species is IUCN listed VU, Albanian Red Data Book listed EN and is listed on the Habitats Directive under Annex II & IV. Dead or decaying wood with oak forests in the Project area may potentially provide habitat for the saproxylic stag beetle and great Capricorn beetle which are both PBFs for the Project.

2.2.9 Amphibians

The Shebenik-Jabllanicë National Park is known to provide habitat to four species of amphibians (PROGES and Sapienza University of Rome, 2015). All of these species are categorised as Least Concern by the IUCN Red List of Threatened Species (2020) and Low Risk by the Albanian Red List, excluding the fire salamander (*Salamandra salamandra*) and the newt *Ichthyosaura alpestris* which are categorised as data deficient:

- *Bombina variegata* – IUCN LC; Albanian Red List LRcd; Appendix II of the Bern Convention and on Annexes II and IV of Natural Habitats Directive.
- fire salamander (*Salamandra Salamandra*) – IUCN LC; Albanian Red List Data Deficient; listed on Appendix III of the Bern Convention
- *Rana graeca* – IUCN LC; Albanian Red List LRnt; listed on Annex IV of the EU Habitats Directive and Appendix III of the Bern Convention
- *Ichthyosaura alpestris* - IUCN LC; Albanian Red List Data Deficient; listed on Appendix III of the Bern Convention

Culverts, drains and channels associated with the existing Zgosht to Cerenec road in addition to waterbodies located within the 50 m buffer may potentially provide habitat for amphibians such as frogs and newts including those species known to inhabit the

National Park. Amphibians (i.e. frogs, newts and toads) may also use refugia along the existing road verges in the study area. The scoping assessment identified water bodies along the route appear to provide good habitat for both frogs and newts.

2.2.10 Fish

The project area is located within a mountainous landscape characterised by natural and artificial alpine lakes, springs, alpine streams. The eastern end of the Project, that traverses the National Park, is located within the catchment area of the Shkumbin River. This river originates in south-eastern Albania and flows westwards over 181 km to the Myzeqe Plain where it forms a small delta in Karavasta Lagoon. Waterbodies located within the Shebenik-Jabllanicë National Park are known to provide habitat for 13 fish species and it is likely that some of these species may inhabit waterbodies with similar aquatic conditions located outside of the National Park within the wider mountainous region. Of these 13 species, only one fish species (i.e. European eel (*Anguilla anguilla*)) has a geographical range that falls within Albania according the IUCN Red List of Threatened Species (IUCN, 2020).

- bleak (*Alburnus alburnus*) – IUCN LC; Not Listed on the Albanian Red List
- European eel (*Anguilla Anguilla*) – IUCN CR; Not Listed on the Albanian Red List
- stone loach (*Barbatula barbatula*) – IUCN LC; Albanian Red list LRnt
- *Barbus cyclolepis* – IUCN LC; Not Listed on the Albanian Red List
- Mediterranean barbel (*Barbus meridionalis*) – IUCN NT; Albanian Red List LRnt
- nase (*Chondrostoma nasus*) – IUCN LC; Albanian Red List LRcd
- colchic spined (*Cobitis satunini* (synonym *Cobitis taenia*)) – IUCN LC; Albanian Red List LRcd
- gudgeon (*Gobio gobio*) – IUCN LC; Albanian Red list LRnt
- chub (*Squalius cephalus* (synonym *Leuciscus cephalus*)) – IUCN LC; Not Listed on the Albanian Red List
- rainbow trout (*Oncorhynchus mykiss*) – IUCN NA; Not Listed on the Albanian Red List
- pindus stone loach (*Oxynoemacheilus pindus*) – IUCN VU; Not Listed on the Albanian Red List
- topmouth gudgeon (*Pseudorasbora parva*) – IUCN VU; Not Listed on the Albanian Red List
- South European roach (*Rutilus rubilio*) – IUCN NT; Not Listed on the Albanian Red List
- Mediterranean trout (*Salmo trutta macrostigma*) – IUCN NA; Albanian Red List EN.

Of the 13 species of fish listed by the Shebenik-Jabllanicë National Park's Management Plan as occurring in this protected area, three species of fish are considered to be full migrants (i.e. European eel, nase and chub) and only one species, the European eel, is considered to be congregatory (and dispersive) by IUCN (2020).

The fauna scoping assessment identified several waterbodies either within or in close proximity to the 50 m buffer (Figure 2.5). These waterbodies offer potentially suitable habitat to support fish species. The majority of these are located outside of the expected areas of permanent and temporary habitat loss.

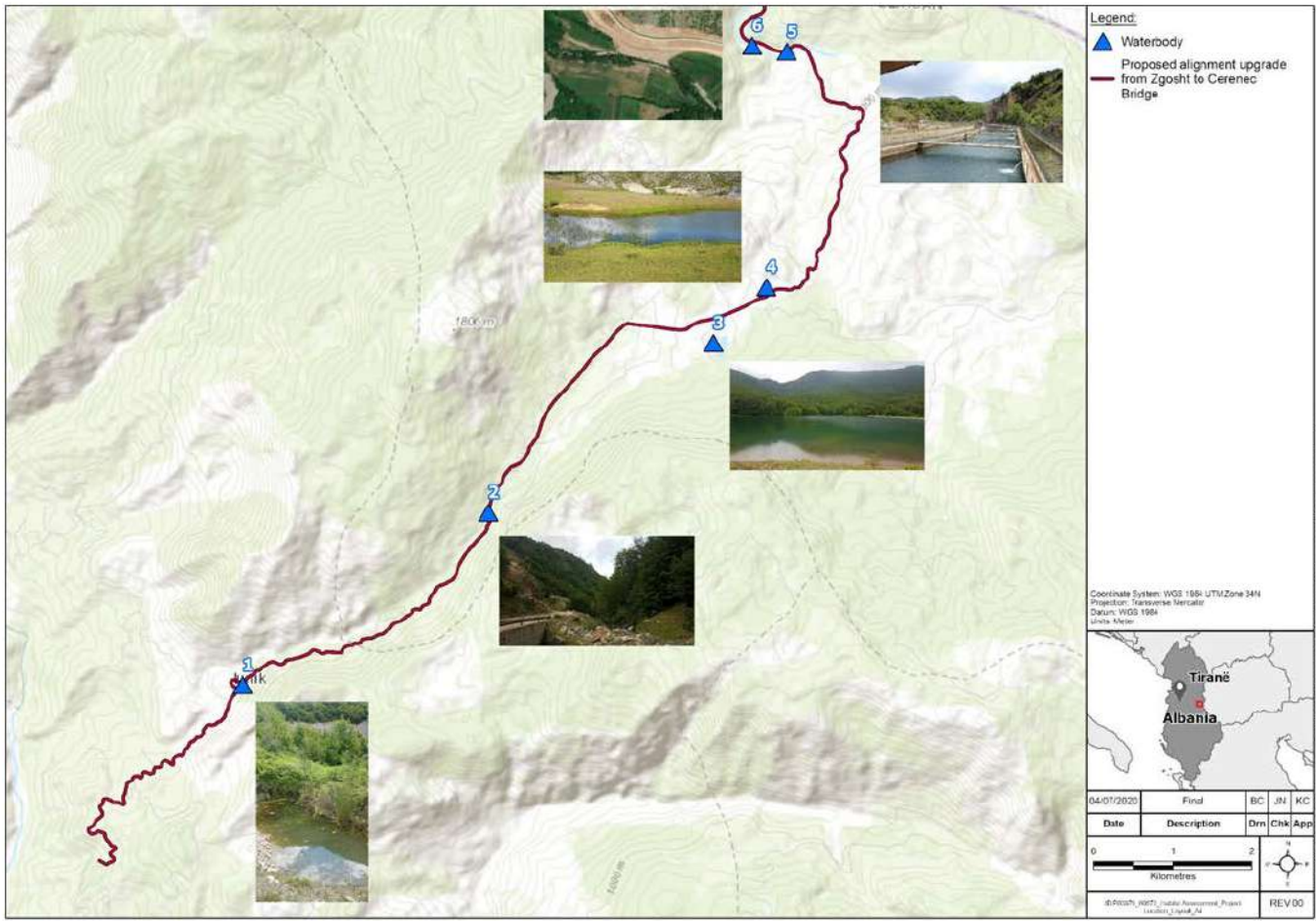


Figure 2.5: Waterbodies located within the 50 m study area

2.2.11 Existing Threats To Biodiversity

The current threats to habitat quality and species diversity were identified as occurring or potentially occurring within the project area. These threats are predominantly linked to human habitation and anthropogenic activities in the region. Existing threats to biodiversity in the project area are as follows:

Alien invasive species encroachment: Whilst alien invasive species were not observed in the study area during the field surveys and have not been identified as occurring in the Shebenik-Jabllanicë National Park (PROGES and Sapienza University of Rome, 2015), invasive species continue to pose a threat to biodiversity. In recognition of this, Albania has adopted an invasive alien species management plan.

Habitat loss and degradation: Deforestation has been identified as the main threat to forest habitat in the Shebenik – Jabllanice National Park, particularly deciduous forests. (PROGES and Sapienza University of Rome, 2015). Deforestation was also noted as occurring outside of the National Park during the biodiversity scoping assessment in June 2020.

The rise in Albanian population in combination with habitat clearance for the development of agro-pastoral activities, the development and expansion of settlements and industries and the establishment and upgrade of transport infrastructure is thought to be a driver for the loss and degradation of natural habitats in Albania. The advancement of intensive agricultural methods, as a result of the introduction of a free market economy has also led to a degradation of natural habitats and subsequent loss of biodiversity (Ministry of Environment 2011; Cat specialist group 1998). Since the 1950s, the forest area has decreased from 45 per cent to 36 per cent of the land cover, resulting in the loss, degradation and fragmentation of habitat for biodiversity and problems with soil erosion (UN, 2002). The lack of sustainable management of forest and conversion to agriculture has impacted biodiversity (UN, 2002).

Over exploitation of natural resources: The continued unsustainable collection of certain Albanian Red Listed plant species recorded in the Shebenik-Jabllanicë National Park pose a threat to the status and range of these populations in the Park and Albania. For example, the nationally Endangered great yellow gentian (*Gentiana lutea*) is threatened by over harvesting for medicinal purposes.

Poaching: Since the 1990s hunting has become one of the major causes of wildlife decline in Albania (Rupert, 2018). To combat the issue, in 2014 the Albanian government approved a complete hunting ban for the whole of Albania. It came into force in March 2014 and was intended to remain effective for two years until March 2016 (law no. 7/2014 “proclaiming the moratorium of hunting in the republic of Albania”). However, because of ineffective management the ban was extended until 2021 (law no. 61/2016 “On the Promulgation of the Moratorium in the Republic of Albania”). Illegal hunting is still occurring even in protected areas. Birdlife International published the report “The Killing” in 2016 which denounces the illegal killing of 25 million birds in the Mediterranean, with Albania being in the ten most problematic areas for the illegal killing of birds (BirdLife International, 2015b). The hunting ban is unpopular with the public and there is limited enforcement, but it has reduced the number of foreigners coming to Albania on hunting holidays.

3 TARGETS AND ACTIONS FOR BIODIVERSITY MANAGEMENT TO BE FOLLOWED BY PROJECT CONTRACTORS AND ADF

3.1 Overview of Project-related Impacts to Priority Habitats and Species and Other Biodiversity

The development of the Project will result in impacts of varying degrees of significance to terrestrial and aquatic habitats and species during construction and operation phases, with some ongoing residual impacts. A full assessment of direct and indirect Project-related impacts is presented in the following documents:

- the Biodiversity Impact Assessment (RSK, 2020b) which characterises Project-related impacts to biodiversity features in the Project area
- the Habitat Regulations Assessment (RSK, 2020c) assesses Project related impacts on the candidate Emerald site's conservation objectives to ensure that the integrity of the site is not adversely affected

A summary of the assessment of Project-related impacts to biodiversity receptors is presented in Appendix 2. Measures will be implemented by the Project to avoid and minimise impacts to biodiversity to the extent practicable. Progressive restoration and rehabilitation measures will also be employed where possible. Diligent application of best practices for managing potential impacts to biodiversity is expected to significantly decrease the potential for residual impacts. Project development will result in the permanent loss of approximately 46.42 ha of terrestrial habitat (natural and modified) including the permanent loss of approximately 6 ha habitat (natural and modified) from within Shebenik-Jabllanicë National Park (a critical habitat-qualifying feature) which will be offset by the Project.

A key priority for the Project is the continued conservation and safeguard of the Shebenik-Jabllanicë National Park in which the proposed alignment traverses. Therefore avoidance, minimisation and restoration measures will have a focus on the biodiversity values of National Park and Candidate Emerald Site. Mitigation measures designed for reducing direct and indirect impacts to biodiversity values of the Shebenik-Jabllanicë National Park will also benefit other habitats and species located outside of these protected areas.

The implementation of specific avoidance and mitigation measures will also focus on key PBFs for the Project namely the Balkan lynx, chamois, golden jackals, brown bears, Eurasian badgers, Eurasian otters, European roe deer, bats (in particular the lesser horseshoe bat (*Rhinolophus hipposideros*), the stag beetle, great Capricorn beetle, breeding birds and endemic, nationally rare and threatened plant species (i.e. *Junicperus oxycedrus*, serpentine false brome and mountain tea). Mitigation measures designed for reducing direct and indirect impacts to these PBFs and their habitats will also benefit other fauna considered in the ESMP and BAP, hence specific mitigation measures are not required for other priority species.

An Environmental and Social Management Plan will be developed by ADF for the Project. This will provide detailed plans and procedures for the protection and management of environmental and social receptors, including biodiversity. An Environmental and Social Action Plan will also be prepared for the Project. These plans will be implemented by the ADF and the Project contractors. A summary of the key avoidance, mitigation and habitat restoration / rehabilitation measures that will be incorporated into these plans and implemented by the Project is presented below.

3.2 Avoidance Measures

A number of measures have been developed to avoid impacts, as much as feasible, on priority species and habitats, as described below.

3.2.1 Target A: Avoid the loss and degradation of habitats of high biodiversity value

- Bushfire controls will be developed for the Project, including a Project ban on open burning of waste, specific emergency response procedures developed for managing bushfires and the establishment of fire breaks where required.
- The project will avoid the removal of any stands of mature native beech forests including Ancient and Primeval Beech Forests of the Carpathians and Other Regions as this is a habitat type of high conservation importance.

3.2.2 Target B: Avoid the loss of flora of high biodiversity value

- Preclearance checks will be undertaken by the ecologist with support from the ecological clerk of works for nationally endemic, rare and threatened plant species (i.e. *Juniperus oxycedrus*) within the proposed areas of vegetation removal. The contractors will aim to avoid construction works in these areas where feasible to avoid causing mortality or injury to these individual species.

3.2.3 Target C: Avoid Project-related disturbance to fauna

Action C1: Avoid disturbance to priority nocturnal fauna from project-related noise and vibration impacts

- Project construction will not be undertaken at dusk, dawn and at night to avoid disturbance to nocturnal and crepuscular fauna (i.e. bats, the brown bear, golden jackal, European roe deer etc) from increased noise and vibration.

Action C2: Avoid disturbance to priority fauna from artificial lighting

- Night working and the use of artificial lighting along the proposed alignment will not be permitted to avoid adverse impacts to priority nocturnal and crepuscular fauna.
- Project vehicles will not be used at night within the project area to avoid adverse impacts to priority nocturnal and crepuscular fauna

Action C3: Avoid accidental machinery and vehicle collisions with wildlife

- Vehicle operation will be restricted to daylight hours to minimise the risk of vehicle collisions with nocturnal and crepuscular wildlife (i.e. Eurasian badgers, brown bears, golden jackals etc).
- The PDA may provide habitat for breeding and nesting birds of conservation importance (refer to Section 2.2.6). Hence pre-clearance checks will be undertaken by an experienced ornithologist for ground and tree nesting birds within the working width prior to the commencement of the habitat clearance works to avoid causing disturbance or harm to nesting birds and their young from

collisions with machinery. A ‘no-go area’ comprising a 5 m radius will be demarcated around each active nest by the Project contractors with guidance from the ornithologist. Habitat clearance will be prohibited within these ‘no-go areas’ until the chicks have fledged. A method statement for this check and the management of active nesting sites will be prepared by an experienced ecologist. This method statement will be followed by the Project contractors and ADF.

- The PDA is known to provide habitat for foraging and commuting Eurasian badgers however the presence of any setts within the PDA is uncertain (see Section 2.2.4). Hence, pre-clearance checks for badger setts will be undertaken by an experienced ecologist within the PDA prior to the commencement of the habitat clearance works to avoid causing injury or harm to badgers and the destruction of their setts.
- The PDA is known to provide habitat for commuting and foraging Eurasian otters, however the presence of any otter holts within the PDA is uncertain (see Section 2.2.4). Preclearance checks for Eurasian otter holts will be undertaken by an experienced ecologist within the project development area (PDA) prior to the commencement of the habitat clearance works to avoid causing injury or harm to Eurasian otters and the destruction of their holts.
- Based on previous studies, the PDA is considered to support commuting and foraging bats species, however the presence of any bat roosts within the PDA is uncertain (Section 2.2.5). Prior to the commencement of works, a bat ecologist will undertake pre-clearance checks of key potentially suitable trees within areas of woodland and forests (i.e. oak and beech woodland) in the PDA to avoid causing disturbance or injury to roosting bats. The surveyor will initially walk key sections of the alignment and mark trees with features that may potentially support roosting bats (i.e. holes and crevices). The surveyor will then inspect each potentially suitable tree using a camera / endoscope. The detected bats will be translocated to a receptor roost by an experienced bat ecologist following a method statement prepared by the ecologist.
- Mature tree removal will be also avoided where possible to avoid any impacts to potential bat roosts and to minimise habitat degradation.

3.2.4 Target D: Avoid adversely impacting fauna, flora and protected areas through spills of hazardous materials

- Avoid spills of hydrocarbon, oil, asphalt, chemicals and other hazardous materials (e.g. paint, solvents etc.) through adherence to SOP04: Water Quality and Pollution Management (Appendix 3).

3.2.5 Target E: Avoid introduction of invasive species and pests

- An alien invasive species prevention protocol will be implemented to prevent the introduction and transfer of invasive plant species. This will include the avoidance of affected areas by staff and vehicles where possible and washdown procedures of Project vehicles where necessary. A record will be kept of all affected areas to avoid transfer of alien invasive plant species;
- Non-invasive local plant species will only be used for revegetation, as per SOP1: Habitat/ Land Clearance, Stockpiling and Alien Invasive Species Control (Appendix 3); and
- Best practice organic waste management procedures will be followed to avoid attracting pests.

3.3 Mitigation and Minimisation Measures

Biodiversity management controls have been developed to mitigate high-risk potential impacts during the pre-construction / construction and operation phases, as identified in the Biodiversity Impact Assessment (RSK, 2020b) and the Habitat Regulations Assessment (RSK, 2020c), to priority biodiversity species and habitats. A summary of the proposed mitigation measures are presented in Table 3.1. Implementation of these best-practice mitigation measures will reduce as much as feasible the residual impacts on priority biodiversity features. The following section details the principal targets and actions that will be required to ensure no long-term impact on priority biodiversity features.

3.3.1 Target F: Minimise habitat loss and degradation

Action F1: Ensure a minimal impact footprint during vegetation clearance to the extent practicable:

Staff and Project contractors will adhere to a standard operating procedure for land clearance and stockpiling (i.e. soil, gravel, hardcore etc). This will include the provision of the method statement for habitat clearance which will be prepared by an experienced ecologist. This will be communicated to all relevant personnel (i.e. staff and contractors) during the inductions. Key mitigation measures to be included in this statement are listed as follows:

- To minimise habitat loss to the extent practicable, areas scheduled for habitat and land clearance will be demarcated and mapped in advance and personnel informed that any activities outside the designated areas will be strictly forbidden except for entry and exit along designated access routes. These mapped areas will be incorporated into this Biodiversity Management Plan. This will minimise the risk of habitat clearance outside of these areas.
- Environmentally sensitive areas will be clearly marked and mapped as 'No Go Areas' (i.e. key habitats in the National Park) and access by staff and contractors will be strictly forbidden.
- The footprint of the road alignment and right of way (RoW) will be minimised to limit fauna habitat clearance to the extent practicable.
- A land disturbance permit system will be established and managed by the contractors' Environment Team.
- Herbicide and fire will not be permitted as a means to clear vegetation to ensure a minimal impact footprint during habitat clearance and to reduce the risk of mortality and injury to wildlife.
- An ecologist will be on hand to supervise the habitat clearance works and provide advice to the workforce when required.
- Routine checks will be undertaken by the contractors Environmental Team to ensure vegetation clearance is confined to defined areas of disturbance and periodic checks will also be undertaken by ADF and a supervising engineer

3.3.2 Target G: Minimise the risk of causing mortality or injury to flora of high biodiversity value during the habitat clearance works

Action G1: Translocate endemic, rare and threatened plants from within the working width, stockpile areas and facility sites

- If pre-clearance checks identify nationally endemic, rare and threatened plant species within the PDA (including working width and potentially within stockpiling sites, office locations etc), and the need to undertake works in these areas, the contractors will translocate these species from within the PDA to a suitable receptor site to minimise the risk of causing mortality or injury to these individual species. A method statement for the translocation scheme will be prepared by an experienced botanist prior to the commencement of works. The botanist will also supervise the translocation works.

3.3.3 Target K: Minimise the risk of mortality and harm to fauna species of high biodiversity value during habitat clearance and construction

Action F1: Minimisation of accidental vehicle and machinery collisions with fauna

- Staff and Project contractors will adhere to a standard operating procedure for land clearance and stockpiling (i.e. soil, gravel, hardcore etc). This will include the provision of the method statement for habitat clearance which will be prepared by an experienced ecologist. This will be communicated to all relevant personnel (i.e. staff and contractors) during the inductions. Key mitigation measures to be included in this statement are listed as follows:
 - Habitat clearance will be undertaken in a progressive and sensitive manner to enable fauna to move away from the area of works, disperse into surrounding habitats and to avoid fauna from being isolated in fragmented areas of habitat.
 - Slow moving fauna (i.e. amphibians, reptiles and potentially small mammals) will be translocated to a designated receptor site during the clearance works. The contractors and ecologist will be observant for the presence the Hermann's tortoise and four-lined snake.
 - Where possible, habitat clearance will be undertaken outside of the breeding bird season. Where this is not possible, pre-clearance checks will be undertaken by the ecological clerk of works with support of the ecologist to identify active nesting sites. These nesting sites will be retained, and all works will be restricted around the nesting sites until the young have fledged.
 - An ecologist will be on hand to supervise the habitat clearance works and provide advice to the workforce when required.
 - Reduced speed limits of Project vehicles will be enforced by the contractors and ADF in the construction site and all staff will adhere to the highway code to minimise the risk of accidental fauna collisions. This will be communicated to all relevant personnel during staff and contractor inductions.
 - Driver training will be provided by the contractors for key staff members
 - Access to Project roads (where appropriate) will be restricted to authorised people only
 - An Injured Wildlife Protocol will be developed for the Project by an experienced ecologist which will be followed by staff and contractors in the event of an incident during construction. This will include a mandatory reporting system which will enable an assessment of the incident to be undertaken and the requirements for any further actions or mitigation measures to be determined. Reports should include encounters of wildlife and observation of natural resource collection, illegal hunting and wildlife trade. The protocol will also include procedures for the safe management of injured and dead wildlife.

Action K1: Translocate roosting bats from within the project footprint to a purpose-built bat roost

- In the event that the presence of a roosting bats are identified roosting in trees during pre-clearance checks, a bat ecologist will translocate (or exclude) these bats from their tree roosts, to bat boxes prior to the commencement of works at a suitable time (i.e. spring and autumn) of year in accordance with a method statement prepared by the bat ecologist. These bat boxes will be located within suitable receptor sites.

Action J2: prepare and follow a method statement for the removal and potential construction of otter holt

- If an active otter holt is identified during the preclearance checks, an ecologist will be consulted to determine the best cause of action prior to the commencement of works for the minimisation of disturbance. This could potentially entail the avoidance of the holt for a period of time (i.e. natal holts) or holt closure and the construction of a substitute artificial holt in a suitable location. The ecologist will provide a method statement for the contractors to follow and will supervise the works.

Action J2: prepare and follow a method statement for badger sett closure and artificial set construction

- In the event that an active badger sett is identified, an experienced ecologist will prepare a method statement for the sett closure and the construction of a substitute artificial replacement sett in a suitable location. These method statements will be followed by the contractors.

3.3.4 Target H: Minimise habitat loss of the stag beetle and great Capricorn beetle

Action H1: Translocate the stag beetle and great Capricorn beetle deadwood habitat from within *Quercus* sp forests / woodland located in the working width of the road scheme

- Taking a precautionary approach, it is assumed that deadwood within *Quercus* sp forest located within the project area provides habitat for the stag beetle and great Capricorn beetle (see Section 2.2.8 for further details). Hence, the contractors will translocate dead wood from within *Quercus* sp dominated woodland / forest located in the working width to a suitable receptor site to minimise the habitat loss for these species. The locations of these forest sites are illustrated by the habitat map (Appendix 1). A method statement for the translocation scheme will be prepared by an experienced ecologist prior to the commencement of works. The ecologist will also supervise the translocation works.

3.3.5 Target I: Minimise a loss in the local habitat range of the Balkan lynx and other fauna species of high biodiversity value during Operation

Action I1: Retain and repair existing culverts used by small sized fauna to cross the road

- Currently some culverts reportedly serve as potential fauna crossing points. It is anticipated that these will be repaired for the continued use by fauna during operation to limit the road from forming a barrier to the movement of fauna species, particularly reptiles, amphibians and small mammals

Action I2: Retain habitat connectivity for Eurasian Otters

- Streams that are considered to provide suitable habitat for foraging and commuting Eurasian otters will only be culverted where necessary. To enable otters to maintain access to their present habitats and to allow existing otter populations to expand and colonise new areas only culverts that are designed to accommodate commuting Eurasian otters should be installed. Box culverts

designed to a 1:200 flood return period should be used as opposed to cylindrical culverts which fill rapidly so reducing the air space available and making swimming more difficult. Culverts must be as wide as possible and be large enough to allow the incorporation of a dry ledge that is accessible during high water levels. Mammal ledges can be made of solid concrete integral with the culvert or steel that is bolted onto the culvert using metal brackets although the latter is preferable as it will not impact on fish and freshwater invertebrate populations. Ledges must be at least 500mm wide and be accessible both from the bank and the water by the provision of ramps or groups of large boulders. Ledges must be sited at least 150mm above the appropriate high flood level, allowing 600mm headroom. These can be installed on both sides of the culvert although on very small watercourses where it may be more practicable to install only one ledge, otters must be guided to the crossing by planting dense scrub on the opposite bank to the ledge although where the route taken by an otter is known, this will be unnecessary as long as the ledge is on that side of the watercourse.

Action 13: Establish wildlife crossing points for large ranging mammals

- Wildlife crossing points will be established at key sections of the road to facilitate the movement of larger ranging mammals (e.g. the brown bear, grey wolf, roe deer, golden jackals, Eurasian badgers, the Balkan lynx and chamois) across the road at night with reduced risk of vehicle collisions, which in addition to killing or injuring wildlife may cause injury to people and vehicles. The wildlife crossing point will comprise the following components:
 - Reduced speed limits will be signposted during operation along the section of road located adjacent to the western border of the Shebenik-Jabllanicë National Park to minimise the risk of accidental injury and mortality to fauna arising from vehicle collision
 - Vehicle traffic will be slowed further at the wildlife crossing point. This reduction in speed limit will be signposted and rumble strips (or alert strips) or a suitable alternative will be installed on the approach to the wildlife crossing point.
 - Signs will be installed to identify the wildlife crossing point to vehicle traffic.
 - Streetlighting will not be installed along or near the wildlife crossing point to avoid causing disturbance from artificial lighting.
 - Safety barriers, retaining walls and sidewalks will not be installed along or near the wildlife crossing point to facilitate fauna movement across the road.
 - Strategic planting will be undertaken by the contractors along and near the wildlife crossing point to facilitate fauna movement. The planting scheme will be designed by an ecologist with experience of surveying and monitoring fauna.

Several potential wildlife crossing points have been identified by a fauna specialist during the scoping assessment in June 2020; these are illustrated Figure 3-1. Further assessment and monitoring using camera trapping is required to be undertaken by the ecologist to identify the most suitable locations and to avoid conflicts with road safety constraints.

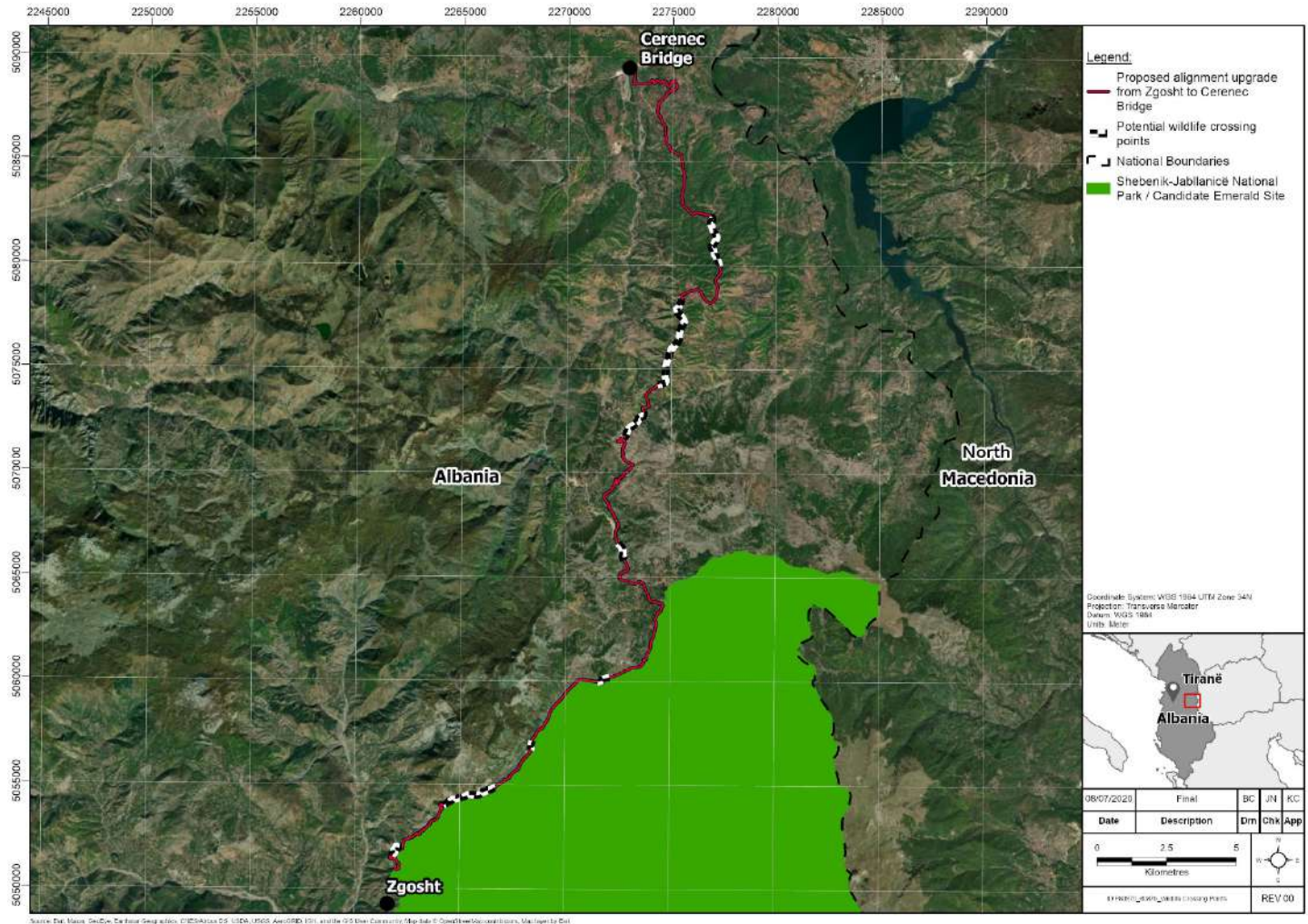


Figure 3-1: Wildlife crossing point location

3.3.6 Target L: Minimise disturbance to fauna

Action L1: Minimisation of disturbance from noise and vibration

- Staff and contractors will adhere to SOP03: Noise and Vibration Management (Appendix 3) throughout the pre-construction and construction phases. This includes the use of silencers and sound barriers (natural and artificial), particularly within and near the Shebenik-Jabllanicë National Park, and regular vehicle / machinery maintenance to minimise noise and vibration.

Action L3: Lower disturbance to fauna from artificial lighting

- Artificial lighting will be used at the site offices and storage areas (i.e. for tools, machinery and material) on site. Artificial lighting will also be used to light urban areas either end of the road during operation. Impacts to fauna caused by disturbance from artificial lighting will be minimised through the use of capped and directional lighting from ecologically sensitive habitats and the use of office blinds / curtains.

Action L4: Minimise dust and suspended sediments

- Staff and contractors will adhere to SOP2: Emission and Dust Control, Erosion and Suspended Sediment Control (Appendix 3).
- This includes the use of dust control measures (i.e. watering, gravel application and wheel washes) on unsealed access tracks and exposed surfaces heavily trafficked by machinery and vehicles (i.e. entry / exit points, vehicle routes and loading and unloading areas.) during the summer months when conditions are dry, when excessive dust generation is evident and during periods of high risk (e.g. dry and windy conditions). Dust suppression water should be taken from suitable recycled water sources where possible.
- Geotextiles will be used to cover exposed areas of rockface and soil prior to the establishment of vegetation in areas of biodiversity sensitivity.
- Sediment control dams and traps will be installed in suitable locations, particularly along ecologically sensitive areas (i.e. the Shebenik-Jabllanicë National Park) to further minimise the risk of sediment loading impacts.

Action L5: Minimise impacts to habitats and species from adverse emissions

- Staff and contractors will adhere to SOP2: Emission and Dust Control, Erosion and Suspended Sediment Control (Appendix 3).
- This includes the use and maintenance of fuel-efficient vehicles, machinery and equipment that comply with industry standards and the use of catalytic converters / low emission engines.

Action L6: Minimise impacts to habitats and species from natural resource exploitation

- Project staff and contractors will be banned from hunting and collecting natural resources within the project area and Shebenik-Jabllanicë National Park to minimise impacts to fauna and their habitats. This will be communicated to staff and contractors through staff inductions and the project code of conduct.
- Project staff and contractors will be banned from fishing, hunting and the collection of natural resources (including freshwater shellfish, timber and non-timber forest products) in the vicinity of the project to minimise impacts to aquatic habitats and species. This will be communicated to staff and contractors through staff inductions and the project code of conduct to emphasise the importance of conserving biodiversity for wildlife and communities.

Action L7: Minimise the impact of an accidental spill of hazardous materials on priority habitats and species

- Emergency response procedures will be prepared for the Project which will include a protocol for responding to accidental spills and leakages of non-hazardous waste and hazardous compounds.
- Staff and contractors will receive training in spill events management.
- Staff and contractors will adhere to the Injured Wildlife Protocol.

3.3.7 Target M: Minimise Indirect Project-related Impacts

Action L7 Minimise indirect Project-related impacts to priority habitats, priority species and their habitats associated with facilitated access, in-migration into the region and the influx of tourists to the Shebenik-Jabllanicë National Park

The Project will work with the National Agency for Protected Areas, the Regional Agency of Protected Areas and Key relevant NGOs operating in the area (i.e. Protection and Preservation of Natural Environment in Albania (PPNEA)) to minimise any impacts on priority fauna and their habitats arising from facilitated access, project-related in-migration and the influx of visitors to the Shebenik-Jabllanicë National Park. This will entail:

- regularly meeting with the National Park managers including the Shebenik-Jabllanicë National Park Management Committee
- regularly meeting with key relevant NGOs operating in the area (e.g. PPNEA) such as PPNEA
- supporting the delivery of the Park's management actions relating to education and awareness raising through sharing technical ecological knowledge, baseline data and monitoring data regarding priority habitats and species
- sharing monitoring data (e.g. as part of the camera trapping programme and biodiversity offsetting) to inform the Park's development of adverted loss actions
- supporting the Shebenik-Jabllanicë National Park Management Committee (i.e. through sharing data and technical guidance) to develop a Tourism Development Tourism Master Plan with the aim of promoting sustainable local economy, low impact ecotourism initiatives within this designated site to mitigate any indirect impacts to wildlife and habitats arising from facilitated access
- undertake activities and co-ordinated stakeholder consultation to support environmental awareness, sustainable natural resource use, promote environmental preservation and conservation practices, capacity building and support policy dialogue.

3.4 Rehabilitation / Restoration Measures

3.4.1 Target M: Successfully rehabilitate and restore habitats within the project area

Action M1: Development and implementation of a Reinstatement and Landscaping Plan

- A Reinstatement and Landscaping Plan will be prepared and implemented by the Contractor. ADF will approve and monitor the implementation of this Plan in consultation with experienced ecologists (including a botanist and a mammal specialist) and approved by the National Agency for Protected Areas or the Regional Agency of Protected Areas. This plan will provide a clear methodology for the reinstatement of the physical environment within the Project footprint, the working width, stockpiling areas and contractor facility area (i.e. arising from habitat clearance, grading etc) in addition to the progressive rehabilitation and

restoration of habitats and vascular plant species within the working width. Rehabilitation and restoration works will aim to re-establish ecosystem function in a 'like for like' (or better) than that which existed prior to Project construction where feasible.

- Habitat rehabilitation and restoration will be undertaken in accordance with a planting scheme using vascular plant species of local provenance and following any recommendations made by the National Agency of Protected Areas. This will entail plug planting and seeding along areas where habitats have been temporarily cleared or degraded during construction including escarpments and embankments adjacent to the road alignment, stockpiling areas, worker facilities etc. The scheme will be developed and implemented by the contractor in consultation with an experienced botanist. A list of potential species for planting will be prepared for the Project by an experienced botanist during the construction phase and is likely to include nationally rare and threatened species. Seeding will be overseen by an experienced ecologist. ADF will approve and monitor the implementation of this scheme.
- It is anticipated that terramesh will be used as part of the bioengineering works to stabilise exposed escarpments and embankments. The geocells (part of this geotextile) will be filled with soil and seeded with grasses and herbs using native species of local provenance.

Action M3: Restore the physical landscapes that have been adversely impacted by Project activities

- All rubbish and waste materials within the project area (including the project footprint, the working width, stockpiling areas and contractor facility area) will be cleared of all rubbish and waste material in accordance with the project's waste management principles.
- The physical landscape of the project area (i.e. escarpments and embankments) will be restored by clearing the area of debris, filling holes with recycled material from the road works.
- The geocells (the upper layer of the geotextile used in the bioengineering works) will be filled with suitable substrate for the establishment of vascular plant species (i.e. grasses and herbs).

Action M5: Undertake regular watering and monitoring to minimise the risk of poor species establishment following planting and translocation

- All planted and translocated vascular plants (i.e. trees, bushes, grasses, herbs, including rare and threatened species) will be regularly watered by the contractors to promote establishment for the first 5 years following planting / translocation, or until successful establishment has been achieved. Water will be transported to the site via water tanks and will not be extracted from local water sources.
- ADF will monitor the establishment of all planted and translocated vascular plants on a regular basis for the first 2 years following the completion of the construction works. Any dead vascular plants will be replaced as 'like for like' during this timeframe.
- Following this period, the municipalities will take over the responsibility for the watering and monitoring works, as specified in the maintenance agreement. ADF will retain a quality assurance role over the first 3 years of handover to ensure that these tasks are completed. Any dead vascular plants will also be replaced as 'like for like' during this timeframe.

Any residual impacts remaining after these rehabilitation / restoration measures have been fully implemented will require offsetting in order to achieve net gain for critical habitat or no net loss for natural habitat, in order to meet the requirements of EBRD PR6.

3.5 Biodiversity Offsetting

3.5.1 Target N: Offset residual impacts to ensure no net loss / net gain for biodiversity

Action N1: Prepare a Biodiversity Offset Strategy and Implement a Biodiversity Offsets Programme for the Project

Project development will result in the permanent loss of approximately 46.41 ha of terrestrial habitat from within the working width (of which approximately 11.87 ha comprise natural habitats) including the permanent loss of approximately 6 ha of natural and modified habitat from within the Shebenik-Jabllanicë National Park (a critical habitat-qualifying feature). The Project will therefore develop a Biodiversity Offset Strategy and implement a Biodiversity Offset Programme that will adequately offset these residual impacts.

Biodiversity offsets are measurable positive conservation outcomes on priority biodiversity features that are attributed to Project activities, and whose magnitude outweighs that of the residual adverse biodiversity impacts arising from the Project development. Offsets require investments in conservation management protection where the results of these investments can be quantified. Offsetting is based on systematic biodiversity accounting based on the explicit calculation of biodiversity losses and gains at matched impact and offset sites.

The project will apply the following principles based on those developed by the multi-stakeholder Business and Biodiversity Offsets Programme, Standard on Biodiversity Offsets (BBOP, 2012):

- adherence to the mitigation hierarchy: all appropriate avoidance, minimisation and on-site restoration measures will be implemented or explored and reasonably ruled out
- equivalence: biodiversity gains from offsets must be 'like for like or better'
- limits to what can be offset: the Project will not cause or significantly contribute to species extinction as these impacts cannot be offset
- landscape context: offsets will be designed accounting for connectivity across the landscape, avoiding fragmentation, and maintaining flows of ecosystem services
- additionality: conservation gains will be clearly attributable to the Project's actions and will be demonstrably above and beyond results that would have occurred if the offset had not taken place
- precautionary approach: estimates of gains and losses will be conservative and include a margin of safety proportional to the risks involved in offset delivery
- long-term outcomes: biodiversity offsets will use an adaptive management approach, incorporating monitoring and evaluation to secure outcomes
- stakeholder participation: offsets will be based upon appropriate and transparent stakeholder consultation
- transparency: the design, implementation and monitored outcomes of biodiversity offsets will be transparent and communicated in the public domain.

The Project recognises the four major technical principles of offset design to be Equivalence, Additionality, Limits and Long-term outcomes. The Project takes the thorough application of the mitigation hierarchy to be intrinsic to its environmental good practice principles.

Table 3-1: Summary of the proposed avoidance, minimisation and restoration / rehabilitation measure

Project-related Impacts	Avoidance Measures	Minimisation Measures	Rehabilitation / Restoration Measures
Pre-Construction and Construction Phase			
Habitat loss	<ul style="list-style-type: none"> Avoid the use of herbicides to clear vegetation Bushfire controls including a Project ban on open-burning of waste 	<ul style="list-style-type: none"> Demarcation and mapping of habitat / land cleared areas. These mapped areas will be incorporated into this BMP. Environmentally sensitive areas will be clearly marked and mapped as 'No Go Areas' and access by staff and contractors will be strictly forbidden. Minimisation of the footprint of the road alignment and RoW to the extent practicable. Establishment of a land disturbance permit system by the Environmental Team Habitats clearance will be undertaken in a progressive and sensitive manner. Translocation of slow-moving fauna. Herbicide and fire usage will not be permitted as a means to clear vegetation. An ecologist will be on hand to supervise the habitat clearance works and provide advice to the workforce. Routine checks will be undertaken by the Environmental Team to ensure compliance. Specific emergency response procedures developed for managing bushfires Pre-clearance checks for badger setts, badger sett closure and the construction of a substitute artificial replacement sett Otter holt checks and management Preclearance checks for endemic, rare and threatened flora and their translocation Establish wildlife crossing points for priority fauna Pre-clearance checks and translocation (or exclude) bats from their tree roosts and the provision of a compensatory roost (i.e. bat boxes) 	<ul style="list-style-type: none"> Preparation and implementation of a Reinstatement and Landscaping Plan Progressive habitat restoration along the margins of the right of way.



Project-related Impacts	Avoidance Measures	Minimisation Measures	Rehabilitation / Restoration Measures
		<ul style="list-style-type: none"> • Translocation of dead wood habitat for the stag beetle and great Capricorn beetle 	
Noise and vibration	<ul style="list-style-type: none"> • Avoidance of night working to avoid impacts to priority nocturnal, crepuscular fauna 	<ul style="list-style-type: none"> • Staff and contractors will adhere to SOP03: Noise and Vibration Management. • This includes the use of silencers and sound barriers (natural and artificial) particularly near the Shebenik-Jabllanicë National Park and regular vehicle / machinery maintenance to minimise noise and vibration. 	
Invasive species transfer and pest immigration	<ul style="list-style-type: none"> • The development and implementation of best practice organic waste management procedures to avoid attracting pests • The development and implementation of an invasive species prevention protocol will be implemented to prevent the introduction and transfer of invasive species. This will include the avoidance of affected areas by staff and vehicles where possible. A record will be kept of all affected areas near the Project area. • To be communicated through induction and training to drivers and other relevant personnel (employees and contractors). 		
Wildlife-vehicle / machinery collision	<ul style="list-style-type: none"> • Vehicle and machinery operation to be restricted to daylight hours to avoid collisions with priority nocturnal, crepuscular fauna • Pre-clearance checks for nesting birds, roosting bats and badger setts 	<ul style="list-style-type: none"> • Progressive and sensitive habitat clearance • Translocation of slow-moving fauna. • Habitat clearance to be undertaken outside of the breeding bird season where possible • Pre-clearance checks and safeguard of active nesting sites. • Enforcement of restricted speed limits • Adhere to the highway code 	



Project-related Impacts	Avoidance Measures	Minimisation Measures	Rehabilitation / Restoration Measures
		<ul style="list-style-type: none"> • Driver training and signage • Restricted access to Project roads (where appropriate) to authorised people only • Signposting of reduced speed limits • The development and adherence of an Injured Wildlife Protocol • Translocation of dead wood habitat for the stag beetle and great Capricorn beetle • Establish a wildlife crossing point for priority fauna • Otter holt checks and management • Pre-clearance checks for badger setts, badger sett closure and the construction of a substitute artificial replacement sett • Pre-clearance checks and translocation (or exclude) bats from their tree roosts and the provision of a compensatory roost (i.e. bat boxes) • Preclearance checks for endemic, rare and threatened flora and their translocation 	
Spills: hydrocarbon, other hazardous materials (i.e. paint, solvents etc.)	<ul style="list-style-type: none"> • Avoid spills of hydrocarbon, oil, asphalt, chemicals and other hazardous materials (e.g. paint, solvents etc.) through adherence to SOP04: Water Quality and Pollution Management 	<ul style="list-style-type: none"> • Emergency response procedures will be prepared for the Project which will include a protocol for responding to accidental spills and leakages of non-hazardous waste and hazardous compounds. • Staff and contractors will receive training in spill events management. • Staff and contractors will adhere to the Injured Wildlife Protocol. 	<ul style="list-style-type: none"> • Preparation and implementation of a Reinstatement and Landscaping Plan
Artificial lighting	<ul style="list-style-type: none"> • Avoid using artificial lighting where possible, particularly in the Shebenik-Jabllanicë National Park • Project vehicles will not be used at night within the Project area 	<ul style="list-style-type: none"> • Use of capped / directional artificial lighting to focus lighting away from sensitive areas, particularly in the National Park • The use of curtains and blinds in onsite Project office and buildings 	
Dust		<ul style="list-style-type: none"> • Staff and contractors will adhere to SOP2: Emission and Dust Control, Erosion and Suspended Sediment Control. • Regular watering during the dry season in areas of biodiversity sensitivity. 	<ul style="list-style-type: none"> • Preparation and implementation of a Reinstatement and Landscaping Plan



Project-related Impacts	Avoidance Measures	Minimisation Measures	Rehabilitation / Restoration Measures
		<ul style="list-style-type: none"> Use of geotextiles to cover exposed topsoil prior to the establishment of vegetation in areas of biodiversity sensitivity. 	<ul style="list-style-type: none"> Progressive habitat restoration along the margins of the right of way.
Loss of nationally endemic, rare and threatened plant species		<ul style="list-style-type: none"> Translocation of nationally endemic, rare and threatened plant species 	
Suspended sediments		<ul style="list-style-type: none"> Staff and contractors will adhere to SOP2: Emission and Dust Control, Erosion and Suspended Sediment Control Install sediment control systems (i.e. traps and dams) where necessary 	Preparation and implementation of a Reinstatement and Landscaping Plan
Emissions (NOx, SOx, CO) from vehicle and machinery use		<ul style="list-style-type: none"> Staff and contractors will adhere to SOP2: Emission and Dust Control, Erosion and Suspended Sediment Control. This includes the use of fuel-efficient vehicles, machinery and equipment that comply with industry standards Regular maintenance of vehicles / machinery Use of catalytic converters / low emission engines 	
Exploitation of natural resources and illegal hunting		<ul style="list-style-type: none"> Prohibit hunting and natural resource collecting by the Project personnel and contractors when at work. To be communicated through induction and training to all personnel (employees and contractors). The Project will work with the protected area managers and key organisations to minimise and monitor impacts of in-migration on natural resource exploitation (including the collection of timber, non-timber products and hunting). 	
Operation Phase			
Noise and vibration from		<ul style="list-style-type: none"> Use of natural and artificial sound barriers near biodiversity sensitive habitats. 	



Project-related Impacts	Avoidance Measures	Minimisation Measures	Rehabilitation / Restoration Measures
traffic vehicles and human disturbance		<ul style="list-style-type: none"> • Speed restrictions within the Shebenik-Jabllanicë National Park and along wildlife crossing points 	
Invasive species transfer and pest in-migration		<ul style="list-style-type: none"> • Actively monitor and eradicate invasive vascular plant species along the right of way 	
Accidental vehicle traffic collisions with fauna		<ul style="list-style-type: none"> • Enforcement of restricted speed limits, particularly in the Shebenik-Jabllanicë National Park and at wildlife crossing points, communicated through signage • Rumble strips or speedbumps will also be installed near biodiversity sensitive areas (e.g. on the approach to the National Park and wildlife crossing points). 	
Artificial lighting		<ul style="list-style-type: none"> • No artificial lighting to be installed outside of urban areas 	
Emissions (NOx, SOx, CO) from vehicle and machinery use		<ul style="list-style-type: none"> • Continued air quality monitoring to inform adaptive management 	
Dust		<ul style="list-style-type: none"> • Continued air quality monitoring to inform adaptive management 	
Suspended sediments		<ul style="list-style-type: none"> • Use and maintenance of an effective draining system to minimise the risk of suspended sediment loading and runoff. 	
Habitat Loss		<ul style="list-style-type: none"> • Specific emergency response procedures developed for managing bushfires 	
Exploitation of natural resources and		<ul style="list-style-type: none"> • Collaboration with protected area managers to ensure indirect impacts to the Shebenik-Jabllanicë National Park are adequately mitigated 	



Project-related Impacts	Avoidance Measures	Minimisation Measures	Rehabilitation / Restoration Measures
illegal hunting from Project-related in-migration		<ul style="list-style-type: none">• Consider providing support to the establishment of an ecotourism programme• Consultation with local authorities to minimise the impacts of in-migration and authorised natural resource exploitation (including the collection of timber, non-timber products and hunting)• Prohibit hunting and natural resource collecting by the road maintenance personnel and contractors when at work. To be communicated through induction and training to all personnel (employees and contractors).	

4 MONITORING, EVALUATION AND ADAPTIVE MANAGEMENT

4.1 Introduction

The Project has committed to establishing an Environmental Monitoring Plan. This will incorporate a Biodiversity Monitoring and Evaluation Programme to assess the efficacy of the avoidance and mitigation measures and to inform the requirement for adaptive management. This could potentially be a collaborative approach with protected area managers and NGOs operating in the area (i.e. the Protection and Preservation of Natural Environment in Albania who are monitoring the Balkan lynx in the National Park).

A draft set of monitoring actions has been developed based on the avoidance and mitigation measures designed for the Project. Where possible, thresholds will be established for each monitoring approach that will alert the Project that mitigation measures need to be adapted and revised biodiversity management measures are required. The draft monitoring measures are summarised in Table 4.1 and the monitoring approach is outlined below.

4.1.1 Remote Sensing

A camera trapping monitoring programme will be developed for the Project and implemented by an experienced ecologist during the construction phase. The programme will entail the establishment of key monitoring sites (i.e. including the proposed wildlife crossing points) and a schedule for the rotation of camera traps at optimum survey periods for fauna species of high biodiversity value. The data will be analysed and entered into a database. Camera trapping will primarily be used to monitor the efficacy of the Project's mitigation measures, identify any changes in priority fauna species habitat and resource use and the requirement for adaptive management. However, the camera trapping programme would also capture information on other wildlife including important prey species for carnivores and omnivores and wildlife diversity. The camera trapping will further the existing knowledge regarding priority species' (and other fauna's) ecology, population dynamics and numbers of individuals. This programme may potentially be run in collaboration with protected area managers, NGOs and ADF's Environment Team.

Indicators:

- changes in habitat use by priority fauna species
- changes in frequency of habitat use by priority fauna

4.1.2 Avifauna Monitoring

Given the importance of the National Park to support bird species of high biodiversity value, an avifauna monitoring programme will be established for the Project by an experienced ecologist to monitor the effectiveness of the mitigation measures, to assess for any significant changes in priority bird species numbers and habitat usage within the project area and adjacent sensitive habitats and identify the requirement for adaptive management. Key monitoring periods are during the breeding / nesting bird season (i.e. end May – early June) and during the migratory bird season (March – April / early May).

This programme may be run in collaboration with protected area managers, NGOs (i.e. Albanian Ornithological Society) and ADF's Environment Team.

Indicators:

- changes in habitat usage by priority bird species
- changes in number of breeding / nesting and migratory bird species (benchmarked against existing monitoring data)
- changes in the frequency of habitat use by priority bird species

4.1.3 Vehicle / Machinery Collision Reporting

The increase in vehicle traffic and machinery usage increases the risk of accidental injury and mortality to fauna, including priority species, caused by collisions with moving vehicles and machinery. The likelihood may be greater during the initial stages of construction when fauna are dispersing from construction sites into the surrounding environs in order to avoid habitat loss and sources of disturbance (i.e. noise, vibration and light). A mandatory wildlife incident reporting system will be established to record and monitor any accidental vehicle and machinery collisions with fauna and sightings associated with the Project during construction. The incident reporting system will be followed by the contractors and managed by a supervising engineer with support from an experienced ecologist when required. The following information will be recorded by the contractors:

- species details, any distinguishing features
- location (e.g. GPS data)
- time and date
- weather conditions
- photographs, if possible
- any measures or actions undertaken, if applicable
- relevant government authorities will be notified as necessary.

Indicators:

- reports of dead fauna
- reports of a collision with wild fauna.

4.1.4 Anecdotal Observations

A reporting system will be established to monitor anecdotal observations of priority wildlife sightings and field signs recorded by staff, contractors and local residents during construction. The reporting system will be followed by the contractors and managed by a supervising engineer with support from an experienced ecologist when required. This information will be used to assess the requirement for adaptive management.

4.1.5 Monitoring Habitat Restoration and Landscaping

The status of the translocated vascular plants (i.e. trees, shrubs and endemic, rare and threatened species) and the planting scheme (i.e. plug planting and seeding), as specified in the Reinstatement and Landscaping Plan, will be closely monitored for the first 5 years following translocation / planting or until successful establishment has been achieved.

This will entail the establishment of permanent quadrats within key areas by the contractors. These quadrats will be inspected and photographed by the Project contractors on a regular basis as a means of recording plant health over time. The quadrats will serve as an indicator of success for the wider restored habitats. Regular walkover assessments will also be undertaken to assess establishment over time. A method statement will be prepared by a botanist or a professional landscape architect which will detail the approach.

In the event of dieback, areas of dead vascular plants will be replaced either through plug planting or seeding. This will be undertaken by contractors under supervision of a supervising engineer in consultation with a botanist or a professional landscape architect.

Indicators:

- changes in indicators of plant health (i.e. leaf colouration, wilting, early senescence etc)
- changes in plant numbers
- changes in coverage

4.1.6 Identify the Locations and Monitoring the Efficacy of the Wildlife Crossing Point

Several potential wildlife crossing points have been identified by a fauna specialist during the scoping assessment in June 2020. Further assessment (i.e. dedicated site visit and examination of the satellite imagery) by an experienced fauna specialist and monitoring using camera trapping is required to identify the most suitable locations prior to the commencement of works.

Once the locations of the wildlife crossing points have been established, monitoring will be undertaken by experienced ecologists throughout the construction phase and during the first 2 years of operation to assess the effectiveness of the wildlife crossing points and to identify the requirement for any modifications. A combination of techniques will be used including walkover transect surveys and a camera trapping monitoring programme by an experienced ecologist. These surveys will also capture information about large ranging priority mammals (and other priority wildlife) utilising habitats in the project area. The findings and any recommendations will be presented to ADF who will authorise any necessary modifications.

Indicators:

- changes in habitat use by priority fauna (e.g. the Balkan lynx, brown bear, chamois, golden jackals, European roe deer, Eurasian badgers)
- changes in frequency of habitat usage by priority fauna
- accidental vehicle collisions with priority fauna

Table 4-1: Summary of recommended monitoring approaches

Monitoring Type	Indicators	Triggers for Adapted Management	Recommended Frequency of Census
Camera tapping for priority fauna species	Changes in the location of habitat use Changes in frequency of habitat use	Decline in habitat use	Traps checked every 3 months During construction
Avifauna monitoring for priority bird species	Changes in habitat usage by priority bird species Changes in number of breeding / nesting and migratory bird species (benchmarked against existing monitoring data) Changes in the frequency of habitat use by priority bird species	Decline in habitat use Decline in numbers of nesting and / or migratory birds	1 census during the breeding / nesting bird season (i.e. end May – early June) 1 census during the migratory bird season (March – April / early May). During construction
Vehicle / Machinery Collision Reporting	Reports of dead fauna Reports of a collision with wild fauna.	An increase in incident reports in a specific location or relating to a specific species / continued reports	Incident reporting – ongoing
Anecdotal observations	N/A	N/A	Ongoing
Habitat Restoration and Landscaping	Changes in indicators of plant health Changes in plant numbers	Plant dieback	For the first 5 years of operation or until establishment
Wildlife Crossing Point Monitoring using camera trapping	Changes in habitat use by priority fauna Changes in frequency of habitat use by priority fauna	A reduction in the diversity of priority fauna numbers A reduction in encounter rates	Prior construction, throughout construction and 2 years during operation

Monitoring Type	Indicators	Triggers for Adapted Management	Recommended Frequency of Census
		Accidental vehicle collisions with priority fauna	

5 IMPLEMENTATION

5.1 Roles and Responsibilities

The roles, responsibilities and monitoring systems for the delivery of avoidance, mitigation and management measures are detailed in the Project’s Environmental and Social Management Plan (ESMP), the Environmental and Social Action Plan, and the Environmental Monitoring Plan (EMP); a summary which relates to biodiversity management is presented below. It is anticipated that this will be updated with more detailed descriptions as the Project progresses.

5.1.1 Staff and Contractors

Implementation of this BMP will require appropriate staff, financial resources, equipment and support systems. It is the responsibility of all ADF staff and Project contractors to comply with the requirements set out in this BMP, ESMP, EMP and EIA. The responsibility of Project contractors and suppliers will be defined through standard terms and conditions of contracts that are consistent with the commitments of the BMP, ESMP and EMP.

ADF is responsible for setting up a suitably experienced and qualified Environment Team to oversee implementation of the BMP by the Project. The team will comprise an ADF environmental and biodiversity expert, an occupational health and safety and social expert. The environmental and biodiversity expert will report directly to the Project Manager. Under the direction of the Environmental and Social Unit manager, the environment team will be responsible for the day-to-day implementation and continued improvement of the BMP, compliance monitoring, compliance with physical and biodiversity rehabilitation activities and reporting.

ADF will contract experienced ecologists (including a fauna specialist, botanist, bat ecologist and ornithologist) to implement key mitigation and monitoring measures as described in Section 3 and Section 4, develop a biodiversity offset strategy and offset programme as described in Section 3.5. An experienced ecologist is defined as a suitably qualified working professional (i.e. that holds a university degree and / or doctorate in a relevant subject area) who is highly experienced at undertaking technical biodiversity survey work and assessments and is competent at providing ecological services for either NGOs, developers and / or government organisations.

A more detailed breakdown of the roles and responsibilities described above is presented below in Table 5.1.

Table 5-1: Summary of staff roles and responsibilities related to biodiversity management

Role	Responsibilities
ADF Project Manager and the Environmental and Social Unit Manager	<ul style="list-style-type: none"> • overall responsibility for the implementation of this management plan • overall responsibility for the development and implementation of biodiversity offsetting • updating this management plan • make the plan available to all employees and contractors

Role	Responsibilities
	<ul style="list-style-type: none"> • provide leadership on biodiversity matters within ADF's Environmental Team • work effectively with relevant department managers to develop best practice standards to ensure compliance with biodiversity requirements • oversee the implementation of the biodiversity management actions in accordance with this plan • lead stakeholder consultation • disseminate data to biodiversity specialists to enable evaluation of the effectiveness of programmes in achieving biodiversity objectives • monitor and report on compliance with the Project's biodiversity actions, commitments and legal obligations • provide technical and strategic advice on biodiversity matters to the Project Manager • with support from the wider environmental team, prepare quarterly and annual biodiversity reports focusing on compliance, monitoring, evaluation and adaptive management • prepare annual reports for EBRD.
Environmental and biodiversity advisor	<ul style="list-style-type: none"> • provide training and guidance to staff and contractors on the requirements of this management plan • assist with the implementation of the biodiversity management actions in accordance with this management plan • enforcement of the biodiversity 'permit to work' systems • monitor and report on compliance in accordance with the national legislation and regulatory requirements, ESMP, ESAP and BMP • monitor and report on compliance in accordance with the biodiversity offset strategy and offset programme • assist in the delivery of biodiversity monitoring, data analysis and reporting including camera trapping for the establishment of the wildlife crossings • assist in the delivery of the biodiversity offset strategy and programme • assist with stakeholder consultation • assist with training and capacity building of employees and contractors.
EHS and social expert	<ul style="list-style-type: none"> • provide technical guidance on social impact management • report to the Environmental and Social Unit Manager on Occupational Health and Safety issues identified in the ESMP and EIA • regularly monitor the implementation of OHS and Social impact mitigation measures conform the ESMP/EIA, EBRD guidelines and National Legislation
Ecological clerk of works	<ul style="list-style-type: none"> • as part of the contractor's team, the ecological clerk of works will provide technical guidance on the implementation of the BMP, the biodiversity offset strategy and offset programme • coordinate and assist in the delivery of the pre-construction surveys, biodiversity checks and monitoring in accordance with the BMP, ESMP and ESA

Role	Responsibilities
	<ul style="list-style-type: none"> • undertake supervisory tasks including the supervision of the habitat clearance works, pre-clearance checks and translocation works (i.e. endemic, rare and threatened plants, nesting birds, roosting bats, Eurasian badgers, Eurasian otter and other wildlife during habitat clearance and the relocation of the stag beetle and great Capricorn beetle dead wood habitat). • the provision of biodiversity inductions and presentation to all contractors and staff • management of the biodiversity 'permit to work systems' and compliance monitoring and enforcement. • support the ecologist with specialist supervisory tasks • Support the ecologist with bat translocation works, badger sett closure and otter holt closure • coordinate the Reinstatement and Landscaping Plan • coordinate and assist with the delivery of the biodiversity offset programme • reporting to the Environmental and Biodiversity Advisor and ADF
Experienced ecologists	<ul style="list-style-type: none"> • support ADF and Project contractors during the construction phase • undertake pre-clearance checks (i.e. for rare and threatened plants, roosting bat, Eurasian badger setts, Eurasian otter holts and nesting birds) • the provision of method statements • undertake specialist supervisory tasks including the supervision of the habitat clearance works and translocation works • undertake the bat translocation works (including identification and preparation of a suitable compensatory roost site) • supervise any Eurasian badger sett closures • supervise any Eurasian otter holt closures and provide advice regarding culvert designs • supervise the translocation of endemic, rare and threatened vascular plants • deliver targeted monitoring works (i.e. camera trapping, bird surveys, fauna transects) • provide inputs into the Reinstatement and Landscaping Plan particularly the planting scheme • further assessment works and provide specialist ecological advice regarding the establishment of the wildlife crossing • develop the biodiversity offset strategy and offset programme
General staff and contractors	<ul style="list-style-type: none"> • comply with requirements of the BMP, Biodiversity Offset strategy and programme, EIA, ESAP and ESMP, relevant to their specific job requirements • uphold the Project's biodiversity objectives as defined in the BMP and ESAP • use appropriate materials, equipment, machinery and vehicles to minimize EHS and biodiversity risks • attend training and site inductions • reporting of accidents and incidents

Role	Responsibilities
	<ul style="list-style-type: none"> ensure suitable provision of experts on a timely basis and sufficient budgetary provisions comply with the Albanian law requirements
supervising engineer	<ul style="list-style-type: none"> undertake daily monitoring of implementation of ESMP / EIA, OHS and Social requirements input into monthly reporting ensure the training of workers, use of appropriate equipment, machinery and vehicles and compliance with health and safety procedures and protective equipment documentation and reporting of occupational accidents, diseases and incidents compliance monitoring the provision of quarterly reports on status of implementation of the criteria on ESMP, EIA, ESAP, OHS and social and environmental mitigation measures. The report will include a chapter on environmental, social and biodiversity performance, based on EIA, ESMP, ESAP and BMP items. The content of the report will be agreed with ADF (subject to review by EBRD). In case of any accidents or negative impact on the environment (not predicted by the EIA / ESMP) the supervising engineer will report to ADF and EBRD immediately.

5.2 Capacity Building

ADF will provide specific environmental and social training that is relevant to the roles and responsibilities of all employees and contractors, inclusive of an initial induction for any on-site workers.

The Environment Team will also receive specific training relevant to their job requirements. This may include species identification, survey techniques, the use of equipment and data analysis.

During periodic site inspections, workers' knowledge of general environmental, health and safety issues will be evaluated to monitor enforcement and compliance with Project procedures and plans.

The construction operator and / or supervisor will be fully aware of the EIA / ESMP and BMP provisions and trained regarding their implementation. The ADF staff will provide training on ESMP / EIA / BMP implementation and reporting, in line with EBRD's guidelines and the Environmental and Social Management Framework of the Project. The workers will be trained before commencement of works (and upon the employment, for newcomers) regarding safety issues and also by ADF staff during site visits to the construction site.

A Site Instruction Manual will be prepared and distributed to all employees (including contractors) summarising environmental and social requirements, responsibilities, and work procedures.

As part of the wider regional and local Roads Connectivity Project, capacity-building trainings will be provided to the municipalities to enhance their knowledge and understanding of the ways in which, the participation of both women and men in road

maintenance can be enhanced and local ownership and sustainability of road maintenance activities promoted. This will include working with several contractors to explore opportunities to promote women's employment in high-skilled jobs in their respective workforce (ADF, 2018).

5.3 Procurement

ADF will be directly responsible for all Project-related procurement. Procurement will be conducted according to EBRD Procurement Policies and Rules (PP&R), issued in November 2017. The Project Implementation Unit (PIU) will analyse and determine the optimum procurement approach to deliver the right procurement result in accordance to the EBRD PP&R.

The Procurement Plan and the General Procurement Notice (GPN) might be updated annually or as necessary to reflect the actual needs of the Project. The Procurement Plan and all its updates shall be subject to EBRD "Prior Review" and No Objection before implementation. The Procurement Plan and all subsequent updates will be published EBRD Client e-Procurement Portal.

5.4 Monitoring and Maintenance Works

5.4.1 Monitoring and Maintenance During Construction and Operation

ADF will be responsible for overseeing the delivery of the monitoring works throughout the preconstruction and construction phase and during the first two years of operation following completion of the construction phase. After this period the responsibility will be handed over to the municipalities.

During the construction phase, the supervising engineer / contractor will report on the implementation of the ESMP, BMP, ESAP and EMP to ADF on a monthly basis as well as on the implementation of works. The report will include a chapter or section on the environmental performance including performance measures relating to biodiversity. The content of the report will be agreed with ADF and subject to review by EBRD. In case of accident or negative impact on the environment including biodiversity (not predicted by the EIA / ESMP) the supervising engineer will report to ADF and EBRD immediately.

The establishment of the planting scheme and flora translocation scheme (if required), as specified in the Habitat and Species Rehabilitation / Restoration Plan and Landscaping Scheme, will be monitored for the first 5 years or until the successful establishment of the vascular plants has been achieved.

Over this period, ADF will retain responsibility for closely monitoring vegetation establishment, the status of any translocated vascular plants (i.e. trees, shrubs and rare and threatened species) and the planting scheme (i.e. plug planting and seeding) and maintenance works (including watering) for the first 2 years of operation. Any dead vascular plants will be replaced by ADF as 'like for like' during this timeframe.

Following this period, the municipalities will take over the responsibility for maintenance (including watering) and monitoring work for the following 3 years, as specified in the maintenance agreement. Over this period, ADF will retain a quality assurance role to ensure that these works are completed by the municipalities and any dead vascular plants will be replaced as 'like for like' during this timeframe.

5.5 Reporting Commitments

ADF will provide an annual environmental and social report to EBRD which includes reporting on project progress, compliance, the provision of any material changes or updates to the ESAP, BMP and ESMP in accordance with the loan agreement.

During construction, there will be weekly and monthly management meetings, where required.

Contractors will prepare a pre-construction report with analysis provided to EBRD prior to the commencement of works and will include biodiversity management plan implementation update to ADF by monthly reporting.

5.6 Updating the BMP

This BMP will be updated, when necessary, to reflect any significant changes; such as the use of blasting during the pre-construction / construction phase and the associated mitigation measures. Any material changes to the BMP will be included in the change of process by the Environmental and biodiversity advisor.

5.7 Performance Review and Auditing

Regular audits of the Project ESMP and associated management systems including the BMP and ESAP implementation will be undertaken internally by ADF. The audits will assess:

- adequacy of the plans with respect to the scale and nature of anticipated impacts and current development stage of the Project
- workforce awareness, competence and compliance with the ESMP, BMP and associated plans and procedures
- performance of managers and operators in implementing, maintaining and enforcing the ESMP, BMP and associated plans
- suitability of allocated resources, equipment and budget for implementation of the ESMP and BMP.

All audit recommendations will be discussed with the contractors and also where appropriate ADF. Corrective actions will be followed up through the relevant ADF tracking database to ensure the process is documented and items closed.

5.8 Disclosure

ADF's website will be used to routinely display the ESMP and EMP. The ESMP will also be disclosed by the municipalities following finalisation. This BMP, the Biodiversity Impact Assessment, Habitat Regulations Assessment, the EIA and Non-technical Summary will also be disclosed by EBRD on their website.

5.9 Project Schedule

It is anticipated that the Project will have a 2-year time span from the loan approval and the road works will take 6 months to complete. The start date will be determined by the

Investor according to the procurement process. The outline Project schedule is presented in Figure 5.1.

5.10 ADF Point of Contact

Nertis Mero

Specialist at the Environment and Social Unit

Department of Infrastructure, Albanian Development Fund

Nr. 10 Sami Frasheri Street

Tirana, ALBANIA

nmero@albaniandf.org

Figure 5.1: Programme of works

Tentative Project Timeline	2020				2021			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Feasibility Study approval								
Design Contract								
Procurement of Construction								
Construction Contract Signature								
Construction Duration								

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APPENDIX 1 HABITAT SUMMARY TABLE AND MAP

Table 6.1: EUNIS and Annex 1 habitat types identified within the study area (50m buffer around the Zgosht to Cereneç road)

EUNIS Habitat Classification	Annex 1 Code and Habitat Type	Annex 1 Priority Habitat Status	Botanical Scoping and Ground-truthing Assessment Findings
Natural Habitats			
C1.3 - Permanent eutrophic lakes, ponds and pools	3150 - Natural eutrophic lakes with Magnopotamion or Hydrocharition - type vegetation	Not priority	Standing waters inhabited mainly with <i>Typha angustifolia</i> , <i>Potamogeton sp.</i> , <i>Myriophyllum sp.</i>
C2 - Surface running waters	3200 – Running water	N/A	
G1.7 - Thermophilous deciduous woodland	91M0 - Pannonian-Balkanic turkey oak –sessile oak forests	Not priority	<p>These woodlands occupy a very wide surface not only in the study area but along all the region from Librazhd to Bulqize. The woodlands are installed in brown slightly acid soil and represent a mixed woodland usually with co-dominance of <i>Quercus cerris</i> and <i>Quercus frainetto</i> with total cover between 85 – 100% and a maximum height of trees up to 13 m. Among these woodlands there are areas in which they are better preserved and in high regeneration rates and some other areas in which they are degraded mainly by previous human activities and in these cases, they overlap with hornbeam scrubs. In dry eroded soils the co-dominant species of these plant communities are <i>Quercus pubescens</i> and <i>Carpinus orientalis</i>.</p> <p>Present species of the woodlands are: <i>Quercus cerris</i>, <i>Q. frainetto</i>, <i>Q. pubescens</i>, <i>Carpinus orientalis</i>, <i>Ostrya carpinifolia</i>, <i>Acer monsepsulanum</i>, <i>Fraxinus ornus</i>, <i>Acer tataricum</i>, <i>Helleborus odoratus</i>, <i>Acinus alpinus</i>, <i>Dactylis glomerata</i>, <i>Clinopodium vulgare</i>, <i>Brachypodium sylvaticum</i>, <i>Teucrium chamaedrys</i>, <i>Fragaria vesca</i>, <i>Cephalanthera rubra</i>, <i>Asparagus acutifolius</i>, <i>Geum urbanum</i>, <i>Melica ciliata</i>, <i>Viola odorata</i>, <i>Veronica chamaedrys</i> etc.</p>
G1.7 - Thermophilous deciduous			

woodland with Roinia pseudoacacia			
G 1.63 - Medio-European neutrophile Fagus forests	9130 - Asperulo-Fagetum beech forests	Not priority	A dense beech forest (old and young) with dominance of <i>Fagus sylvatica</i> is regenerating quite healthy and beautiful in the study area. The forest covers almost always 100% of its surface and can grow up to 30 m with a trunk diameter between 10 – 45 cm. The tree layer is <i>Fagus sylvatica</i> monodominant, and species in the shrub layer are mainly represented by: <i>Cornus mass</i> , <i>Cornus sanguinea</i> , <i>Crategus monogyna</i> , <i>Fraxinus ornus</i> , <i>Juniperus oxycedrus</i> , <i>Rubus ulmifolius</i> , <i>Acer pseudoplatanus</i> etc. The herbaceous layer is composed of diverse species like: <i>Fragaria vesca</i> , <i>Helleborus odorus</i> , <i>Aremone agrimonoides</i> , <i>Lactuca muralis</i> , <i>Granium macrorhizum</i> , <i>Carex crupina</i> , <i>Melitis melissophyllum</i> , <i>Hedera helix</i> , <i>Asplenium trichomanes</i> , <i>Epipactis helleborine</i> , <i>Cephalanthera rubra</i> , <i>Saxifraga rotundifolia</i> , <i>Symphytum tuberosum</i> , <i>Festuca heterophylla</i> , <i>Asplenium trichomanes</i> , <i>Ceterach officinalis</i> etc.
Cleared Medio-European neutrophile Fagus forests			
F3.243 - Balkano-Hellenic deciduous thickets	N/A	N/A	These plant communities represent deciduous shrubs generally dominated by <i>Caprinus orientalis</i> which in fact substitute the <i>Quercion frainetto</i> and <i>Ostryo-Carpinion</i> climax forests. They can have a total cover from 50 % to 85%, mainly in rocky surfaces and surrounded by screes. These scrubs are up to 3 m high and on average 10 years old. The shrub layer is co-dominated by <i>Carpinus orientalis</i> . <i>Ostrya carpinifolia</i> , <i>Juniperus oxycedrus</i> , <i>Fraxinus ornus</i> , <i>Acer tataricum</i> , <i>Quercus pubescens</i> etc.
E5 - Woodland fringes and clearings and tall forb stands/ E5.3 - Pteridium aquilinum fields	N/A	N/A	Once an oak forest, it has now been cleared and the area used for pasture. Almost 85% of the clear surface is populated by <i>Pteridium aquilinum</i> . The other remaining surface is a dry fringe used for pasture with those main plant species: <i>Teucrium pollium</i> , <i>Micromeria juliana</i> , <i>Verbascum sp.</i> , <i>Bromus tectorum</i> , <i>Trifolium resupinatum</i> , <i>Leucanthemum vulgare</i> , <i>Tunica saxifrage</i> , <i>Plantago lanceolata</i> , <i>Filago vulgaris</i> etc. On the southern part of this fringe the oak forest (91M0) is very well preserved. The terrain is very steep and rocky making human activity more challenging and difficult to access

			this part of the woodland. It is a very good part of the oak forest to be protected. On the N-NE side of the fringe the vegetation is represented by degraded <i>Carpinus orientalis</i> scrubland.
G 1.3 - Mediterranean riparian woodland; G 1.112 Mediterranean tall Salix galleries; G 1.1 - Riparian and gallery woodland, with dominant Alnus, Betula, Populus or Salix	92A0 - Salix alba and Populus alba galleries	Not priority	The Oshtuni river and its tributaries hold a magnificent gallery of riparian forest dominated mainly by <i>Salix alba</i> (majority of time monodominant) which is accompanied by <i>Populus nigra</i> , <i>Alnus glutinosa</i> dhe <i>Acer monspessulanus</i> , <i>Ostrya carpinifolia</i> etc. Other species are: <i>Hedera helix</i> , <i>Helleborus odorus</i> , <i>Arum italicum</i> Mill., <i>Brachypodium sylvaticum</i> <i>Dactylis glomerata</i> L., <i>Humulus lupulus</i> , <i>Clematis vitalba</i> etc. This habitat is already endangered by the HPP which is located at the area and is taking away majority of the water; and at the same lightly from the inert material during road construction in 2012. It is recommended careful attention is paid to the disposal of raw materials during construction to avoid them entering the river, but at the same time consider a clean up of the remaining 2012 works.
Screes	N/A	N/A	The area in the surroundings is very rich in screes, but they represent mainly the geological formation of screes rather than the habitat itself in the Annex I of the EU Habitat Directive. As such they will not be classified in any of the codes. By any case those geological formations are either with no vegetation at all, or with very few species such as <i>Pseudofumaria alba</i> , <i>Festuca sp.</i> etc.
Modified Habitats			
Disturbed land from 2012 roadworks	N/A	N/A	
G3.57 – Pinus nigra reforestation	N/A	N/A	In the study area this habitat type is represented by <i>Pinus nigra</i> plantations, so not a natural forest, which are planted 40-60 years ago to protect the soil from erosion. They are mainly monodominant forests but considering they are planted in the Oak phytoclimatic belt, many often in the area are seen as a mixture of pine forest with sparse oak species.
Quarry	N/A	N/A	
HPP and trout cultivation	N/A	N/A	
Road / track	N/A	N/A	
I1 - Arable land and market gardens	N/A	N/A	



J2 - Low density buildings	N/A	N/A	There are a number of buildings situated alongside the existing road as it passes through and close to several small villages.
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APPENDIX 2 SUMMARY BIODIVERSITY IMPACT ASSESSMENT

APPENDIX 3 STANDARD OPERATING PROCEDURES

Table 6-2: Standard Operating Procedure (SOP) 1: Habitat/ Land Clearance, Accidental Vehicle and Machinery Collisions with Fauna, Stockpiling and Alien Invasive Species Control

Action Number	Measures for habitat/ land clearance and stockpiling management	Project Phase	
		Pre-construction / Construction	Operation
Minimisation of Habitat Clearance Areas to The Extent Practicable:			
SOP1.1	Development and implementation of a method statement for habitat clearance (prepared by an experienced ecologist) which will be communicated to all relevant personnel (i.e. staff and contractors). This will include the following mitigation measures:	✓	
	<ul style="list-style-type: none"> To minimise habitat loss to the extent practicable, areas scheduled for habitat and land clearance will be demarcated and mapped in advance and personnel informed that any activities outside the designated areas will be strictly forbidden except for entry and exit along designated access routes. These mapped areas will be incorporated into the Biodiversity Management Plan. 		
	<ul style="list-style-type: none"> Environmentally sensitive areas will be clearly marked and mapped as ‘No Go Areas’ (i.e. Shebenik-Jabllanicë National Park) and access by staff and contractors will be strictly forbidden. 		
	<ul style="list-style-type: none"> A land disturbance permit system will be established and any necessary habitat and land clearance permits to be obtained in advance from ADF's Environment Department 		
	<ul style="list-style-type: none"> Habitats clearance will be undertaken in a progressive and sensitive manner to enable fauna to move away from the area of works, disperse into surrounding habitats and to avoid fauna from being isolated in fragmented areas of habitat. 		
	<ul style="list-style-type: none"> Slow moving fauna will be translocated to a designated receptor site during the clearance works. 		
	<ul style="list-style-type: none"> Herbicide and fire will not be permitted as a means to clear vegetation to ensure a minimal impact footprint during habitat clearance and to the reduce the risk of poisoning fauna and avifauna. 		
	<ul style="list-style-type: none"> Salvage stripped topsoil and subsoil, where feasible, in stockpiles for future reuse 		



	<ul style="list-style-type: none"> • Where possible, soil seed bank in the topsoil will be preserved for future rehabilitation, to maintain local genetic diversity 		
	<ul style="list-style-type: none"> • Storage areas will be located in areas away from existing trees, hedgerows and drainage 		
	<ul style="list-style-type: none"> • An ecologist will be on hand to supervise the habitat clearance works and provide advice to the workforce. 		
	<ul style="list-style-type: none"> • Routine checks will be undertaken to ensure vegetation clearance is confined to defined areas of disturbance; 		
SOP1.2	The National Agency of Protected Areas has recommended that the width of the road is kept to the minimum accepted standard, 7 m width for a two-lane road to minimise habitat loss. However, the existing road is 9 m. This recommendation will be taken into consideration.	✓	
SOP1.3	Pre-habitat clearance checks will be undertaken by an experienced botanist to identify the location of any rare, threatened or protected vascular plants within the areas designated for clearance.	✓	
Minimisation of Accidental Vehicle and Machinery Collisions with Fauna:			
SOP1.4	Habitat clearance will be undertaken in a progressive and sensitive manner to enable fauna to move away from the area of works, disperse into surrounding habitats and to avoid fauna from being isolated in fragmented areas of habitat.	✓	
SOP1.5	Slow moving fauna will be translocated to designated receptor sites (as identified by an ecologist) during the clearance works.	✓	
SOP1.6	Reduced speed limits of project vehicles will be enforced in the construction site and all staff will adhere to the highway code to minimise the risk of accidental fauna collisions. To be communicated to all relevant personnel during staff inductions.	✓	
SOP1.7	Reduced speed limits will be signposted during operation to minimise the risk of accidental injury and mortality to fauna during operation.	✓	✓
	Where possible, habitat clearance will be undertaken outside of the breeding bird season. Where this is not possible, pre-clearances checks will be undertaken to identify active nesting sites. These will be retained until the young have fledged.	✓	
	Driver training will be provided	✓	
	Restricted access to Project roads (where appropriate) to authorised people only.	✓	



SOP1.8	An Injured Wildlife Protocol will also be developed for the project by an experienced ecologist which will be followed by staff and contractors in the event of an incident. This will include a mandatory reporting system which will enable an assessment of the incident to be undertaken and the requirements for any further actions or mitigation measures to be determined. Reports should include encounters of wildlife and observation of natural resource collection, illegal hunting and wildlife trade. The protocol will also include procedures for the safe management of injured and dead wildlife.	✓	
Stockpile Management:			
SOP1.9	Soil stockpiles will be constructed and managed following the below procedure, as appropriate:	✓	
	<ul style="list-style-type: none"> • Stockpiles will be located within designated soil stockpile areas where movement of vehicles and equipment are excluded and up-slope (at least 20 m away) from local waterways and flood inundation areas to minimise the risk of erosion and sediment run-off. 		
	<ul style="list-style-type: none"> • Stockpiles will be stabilised with matting or other appropriate controls if they are to remain bare for more than 3 months, particularly during the winter in the rainy season. 		
	<ul style="list-style-type: none"> • Slope ratios will be no more than 2:1 (horizontal/vertical). 		
	<ul style="list-style-type: none"> • Compaction of stockpiles will be avoided as this will hinder establishment of vegetation during rehabilitation / restoration 		
	<ul style="list-style-type: none"> • Location of soil stockpiles and batters will be geo-referenced and mapped in a GIS database with details on type of material and duration of stockpiling recorded. 		
	<ul style="list-style-type: none"> • Diversion structures will be installed up-slope of stockpiles and sediment controls (e.g. silt fence) located downslope, to minimise erosion and sediment loading (refer to SOP: Erosion and Sediment Control for further details). 		
Alien Invasive Species Control:			
SOP1.10	An alien invasive species protocol will be developed (by an experienced ecologist) and implemented to minimise the risk of transferring and introducing alien invasive species into the project area. This will include:	✓	
	<ul style="list-style-type: none"> • A washdown procedure will be employed to prevent invasive weed spread and potential contamination of the project area from the receiving environment. 		

	<ul style="list-style-type: none"> • Pre-clearance checks for alien invasive species of areas designated for clearance and the site access / egress routes will be undertaken prior to the commencement of site preparation works. 		
	<ul style="list-style-type: none"> • Uncontaminated soil will be used for construction, restoration and rehabilitation. 		

Table 6-3: SOP2: Emission and Dust Control, Erosion and Suspended Sediment Control

Action		Project Phase	
Number	Measures for the Management of Air Quality, Dust Control, Erosion and Suspended Sediment Control	Pre-construction / Construction	Operation
Air Quality Controls:			
SOP2.1	Fuel efficient vehicles, machinery and equipment used during project construction and maintenance works will comply with industry standards.	✓	✓
SOP2.2	The project will integrate energy efficiency principles in the road design where feasible e.g. optimised lighting system (i.e. solar powered or fluorescent lamps on timers).	✓	✓
SOP2.3	Ensure contractors comply with relevant measures for greenhouse gas management and energy conservation.	✓	✓
SOP2.4	Conduct awareness training on energy conservation and greenhouse gas reduction for staff and contractors.	✓	✓
Dust Controls:			
SOP2.5	Use dust control measures (i.e. watering, gravel application and wheel washes) on unsealed access tracks and exposed surfaces heavily trafficked by machinery and vehicles (i.e. entry/exit points, vehicle routes and loading and unloading areas.) during the summer months when conditions are dry, when excessive dust generation is evident and during periods of high risk (e.g. dry and windy conditions). Dust suppression water should be taken from suitable recycled water sources.	✓	
SOP2.6	Enforce speed restrictions of mobile plant on roads to minimise dust generation.	✓	
SOP2.7	Quickly stabilise exposed areas of soil and scree (i.e. cover with geotextiles), and progressively restore the habitats in accordance with the project's rehabilitation and restoration plan.	✓	



SOP2.8	The following dust management measures will be employed for soil and gravel stockpiling:	✓	
	• Locate stockpiles in areas naturally sheltered from wind, if feasible.		
	• Install temporary wind fences, if required.		
	• Stabilise long-term topsoil stockpiles (more than three months).		
	• Spray water on stockpiles in the event of excessive fugitive dust emissions.		
	• Stockpiles will be protected against vandalism		
SOP2.9	Avoid undertaking primary dust generating activities during dry and windy conditions.	✓	
SOP2.10	Open-burning of general wastes and vegetation will be banned	✓	✓
Erosion and Suspended Sediment Control			
SOP2.11	Surface water management infrastructure (e.g. cut-off / diversion drains, velocity dissipation devices, culverts) will be constructed in appropriate locations to minimise and control surface water flow over disturbed areas and hard surfaces.	✓	✓
SOP2.12	Excavation and stockpiling will cease during prolonged periods of wet weather.	✓	
SOP2.13	Sediment control dams and traps will be mapped and installed in suitable locations, particularly along higher elevations above ecologically sensitive areas to further minimise the risk of sediment loading impacts.	✓	
SOP2.14	Preparatory works (i.e. habitat clearance, grading and stockpiling etc) will be undertaken during the dry season and periods of high intensity rainfall to minimise erosion and the generation of suspended sediments	✓	
SOP2.15	Measures will be employed to stabilise exposed soil and unstable surfaces (i.e. through using terramesh or other geotextiles) where necessary	✓	✓
SOP2.16	Vegetation located on steep slopes within the project area will also be preserved where possible to minimise the risk of erosion.	✓	✓
SOP2.17	Habitat clearance will be minimised to the extent practicable;	✓	
SOP2.18	Preparatory works causing ground disturbance (i.e. habitat clearance, grubbing, grading etc) will be avoided within 50m of sensitive water bodies (alpine lakes, springs and streams within the PDA)	✓	
SOP2.19	Schedule major earthworks and grading operations for early in the dry season. Avoid the wet / rainy season or periods of high intensity rainfall wherever possible;	✓	



SOP2.20	Project vehicles and machinery will be restricted to designated access / egress routes and excluded from operating in areas outside of construction and operation sites.	✓	✓
SOP2.20	The integrity of the road structure and associated drainage system will be maintained on a regular basis whilst the road is in operation to ensure that impacts to fauna and their habitats arising from suspended sediments and runoff continue to be minimised.		✓

Table 6-4: SOP3: Noise and Vibration Control

Action Number	Measures for the Management of noise and vibration	Project Phase	
		Pre-construction / Construction	Operation
Minimisation of noise and vibration:			
SOP3.1	The use of noisy machinery and vehicles will be avoided at dusk, dawn and at night to minimise disturbance to nocturnal and crepuscular fauna from increased noise and vibration.	✓	
SOP3.2	Machinery (i.e. concrete batching facility, workers facilities, generators, plant equipment etc) which are sources of noise emissions will be situated away from sensitive habitats. Natural noise buffers (dense vegetation, rocky outcrops and mounds) will be retained to attenuate noise emissions	✓	
SOP3.3	All vehicles and plant will be fitted with effective exhaust silencers to minimise noise emissions.	✓	
SOP3.4	All project-generated noise and vibration will be assessed and comply with relevant legislative requirements and noise and vibration guidelines including World Health Organisation Guidance.	✓	✓
SOP3.5	Plant, vehicles, equipment and machinery will comply with industry standards for operation.	✓	✓
SOP3.6	Plant, vehicles, equipment and machinery will be regularly checked and maintained to ensure that they are in good working order and within industry standards for noise and vibration emissions.	✓	✓



SOP3.7	Noise attenuation measures will be utilised (i.e. temporary noise enclosures or barriers) to minimise noise disturbance near sensitive habitats	✓	✓
SOP3.8	Piling/drilling methods will be used which have the lowest noise and vibration impact (i.e. lowering drop heights or impact levels for piling hammers and using piling shrouds or temporary barriers or hoardings).	✓	
SOP3.9	Noise reduction, sound insulation and absorption measures will be applied to different equipment where feasible (e.g. mufflers on engine exhausts and compressor components; impedance mufflers/silencers and vibration insulating on air compressors, blowers and fans; installing sound barriers around generators etc).	✓	
SOP3.10	Compressors will be fitted with properly lined and sealed acoustic covers which will be kept closed whenever the machines are in use.	✓	
SOP3.11	All ancillary pneumatic tools will be fitted with suitable silencers.	✓	
SOP3.12	Machinery that is used intermittently will be shut down or throttled back to a minimum during periods when not in use.	✓	
SOP3.13	Any plant (i.e. generators or pumps) that is required to operate before and after legal working hours will be surrounded by acoustic enclosures or portable screening.	✓	
SOP3.14	Working hours during construction will be limited between 7am and 7pm to avoid disturbance to fauna at night.	✓	

Table 6-5: SOP4: Water Quality and Pollution Management

Action Number	Measures for the Management of Water Quality and Pollution events	Project Phase	
		Pre-construction / Construction	Operation
Pollution Controls:			
SOP4.1	Pollution controls will be put in place during the construction process. These will be fully defined by the project prior to the construction	✓	
SOP4.2	Stockpiles of materials and hazardous compounds (including asphalt, oil, diesel and chemicals) will not be located near any surface watercourses and standing water bodies (i.e. lagoons, wetlands, ponds, creeks, tributaries etc) or near wells.	✓	
SOP4.3	Stockpiles will be located on a sealed surface and covered (i.e. with a canvas, sheets or more permanent casing) and surrounded by a bund to minimise the risk of impacts arising from accidental leakages and spills.	✓	
SOP4.4	Stockpiles will be protected against vandalism and theft that can lead to spills.	✓	
SOP4.5	Water discharge from facilities (i.e. wheel washes, vehicle washing points, equipment washing points etc) will be captured by a combination of drainage systems, settling tanks and oil interceptors. The waste will then be responsibly disposed.	✓	
SOP4.5	Clearly communicate to all employees and contractors that any dumping or discharging of potentially contaminated water (e.g. oily water, raw sewage, untreated waste water, etc.) into the receiving environment is strictly prohibited: through employee training, mandatory induction, specific contract requirements, and procedures in place.	✓	✓
SOP4.6	Emergency response procedures will be prepared for the Project which will include a protocol for responding to accidental spills and leakages of diesel fuel, non-hazardous waste and hazardous compounds.	✓	
SOP4.8	Only licenced operators will be used to clean-up solid waste.	✓	