Habitats Regulation Assessment

The Proposed Shëngjin to Velipojë Road Scheme, Albania

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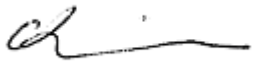
Signature		Signature	
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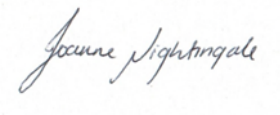
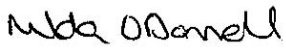
Signature		Signature	
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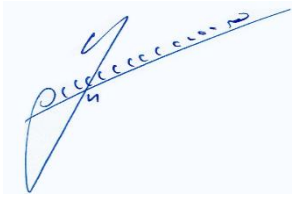
Signature		Signature	
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EXECUTIVE SUMMARY

RSK have been commissioned to undertake a Habitats Regulations Assessment (HRA) for the proposed Shëngjin to Velipojë road scheme on behalf of the European Bank for Reconstruction and Development (EBRD.)

This requirement was highlighted as part of a gap analysis undertaken by RSK to identify project gaps that are required to meet EBRD's Performance Requirement 6 (PS6): Biodiversity Conservation and Sustainable Management of Living Natural Resources (EBRD, 2014).

The proposed project traverses the Buna River Protected Landscape, IUCN Category 5, Ramsar, Important Bird Area, Important Plant Area and candidate Emerald Network Site.

This Ramsar site covers 49,562 ha and is located on the east of the borderline between Albania and Montenegro. The site comprises a mosaic of freshwater habitats, brackish water habitats, woodland, freshwater marshes, wet pastures, sandy shore and rocky habitats. The hydrological connection of Shkodra Lake, Buna River and Drin River and the presence of wetlands are of importance in terms of flood control, sediment trapping and shoreline stabilization. The Ramsar site supports rich fauna biodiversity, particularly in context of biodiversity at the national scale, including species of national and global conservation importance.

The proposed road does not cross any wetland habitat and no major tributaries or creeks are located within the footprint of the proposed road alignment, construction access and associated facilities. As such there are no direct impacts to the wetland habitats, the coastal lagoon, or associated waterways within the Ramsar / Emerald site. However, the proposed project will result in likely significant effects from the permanent loss of 8.09 ha of other, non-aquatic habitat from within the Ramsar/candidate Emerald site.

Likely significant effects on bats, nesting and wintering/migratory birds, mammals, reptiles, amphibians, fish and vascular plants were identified from both the construction and operational phases of the project.

Impacts were mostly identified from activities that may result in change in water surface quality, air quality and disturbance from noise and vibration during the construction phase and mortality from wildlife-vehicle collisions, barrier to movement of species and project induced migration during the operational phase. Insufficient data is currently available on the potential environmental impacts, in particular air quality, noise and water quality, hence a precautionary approach has been taken throughout this assessment.

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1 INTRODUCTION

1.1 Background

On behalf of European Bank for Reconstruction and Development (EBRD) RSK have been commissioned to produce a Habitats Regulations Assessment (HRA) for the proposed Shëngjin to Velipojë road scheme, Albania. EBRD is considering providing a sovereign loan to the Republic of Albania for the benefit of the Albanian Development Fund (ADF) to finance the works. As part of this process RSK were commissioned to undertake a supplementary biodiversity assessment which will enable the project to meet EBRD's Performance Requirement 6 (PS6): Biodiversity Conservation and Sustainable Management of Living Natural Resources (EBRD, 2014). The supplementary biodiversity assessment (RSK 2018) highlighted gaps in the information required to be compliant with EBRD PS6 such as the need for the project to undertake a Habitats Regulations Assessment (HRA). This assessment is required because the proposed footprint of the Shëngjin to Velipojë road will traverse the Buna River Protected Landscape which is designated as a Ramsar and candidate Emerald Site and is under the management of the Shkodra Forestry Service Directorate.

This report addresses whether the development might have any likely significant effect on any site having statutory designation for wildlife or nature conservation at the European or international level, i.e. any site designated as a special area of conservation (SAC), a special protection area (SPA), or a Ramsar site; collectively known as Natura 2000 sites. For the purposes of this report there is only one site considered in this context, the Lake Shkodra and River Buna Ramsar and candidate Emerald site.

1.2 Project Description

The Project is located on the west coast of Albania, approximately 55 km from Tirana and entails rehabilitation and upgrade of an existing road and the construction of a new section of road between two towns, Shëngjin to Velipojë (Figure 1 1). According to the Government of Albania, the project is of great public importance, especially for the tourism sector.

Figure 1-1: Project Location

The footprint of the proposed road is 12.6 km in length and covers approximately 12.5 ha. Approximately 2.3 km of the road scheme, located at the north-western end of the proposed road in the village of Rrjoll (near Velipojë; Figure 1-1), falls within the alignment of the existing Rruga Banks Rrjollë road. This is a predominantly unsurfaced road that extends from the settlement at Baks-Rrjollë, beyond Rrjolli, across exposed sand. This existing sandy track is used mainly during summer season by tourists to access the beach.

From this point the proposed road alignment gradually rises across the rugged and generally exposed escarpment to the ridge of Mount Renci (at a height of approximately 280 m above sea level) and the site of a degraded settlement over approximately 5.25 km. This section of the proposed alignment crosses unvegetated dunes located at the base of Mount Renci, followed by a mosaic of oak scrubland, small stands of Mediterranean evergreen *Quercus* forest dominated by *Quercus ithaburensis* (IUCN Least Concern, LC), areas of sparsely vegetated scree, poorly vegetated cliffs and small areas of exposed rock faces .

Over the ridge of Mount Renci, the alignment traverses a mosaic of degraded pasture, fallow and regenerating fallow that surrounds the degraded settlements. From this point the footprint crosses an adjoining area of maquis, arborescent matorral and thermo-Mediterranean scrub, before joining an existing unsurfaced road / track. The footprint of the proposed road then roughly follows the alignment of this existing road / track for

approximately 3.7 km before joining Bulevardi Nënë Tereza near Shëngjin port. Habitats located along this portion of the proposed alignment are dominated by a mosaic of bare ground, maquis, arborescent matorral and thermo-Mediterranean scrub, and miscellaneous inland habitats with sparse or no vegetation. This transitioned into coniferous forest dominated by pine plantations, regenerating pine scrub (arising from the clearance of pine stands) with scattered housing and into the urban environment of Shëngjin. The very last section of the existing access route has the characteristics of an established urban road.

1.2.1 Road design

The road will measure 7 m in width, which is the minimum requirement for a two-lane road, with two hard shoulders located either side of the road (measuring between 0.5 m to 1 m depending on the location). The road will also be fitted with safety barriers, retaining walls, protection walls and a drainage system. Artificial lighting will be installed along a 7 m section of the road located within Shëngjin. This section of the road will also comprise two shoulders measuring 0.5 m and two sidewalks measuring 1.5 m. Artificial lighting and pavements will also be installed along the end portion of the road at Rrjolli. The maximum slope of the road will be 8%, according to the predicted standard.

The section of the road from Shëngjin town to the top of Mount Renci will be constructed over an existing track, characterised by a continuously climbing slope. A viewing platform and access road will be constructed at the highest point to enable tourists to stop for a few minutes to enjoy the view over the Adriatic Sea.

In areas of gradient, excavation will be undertaken to achieve a flat or gently inclined road surface. The road embankment will be scaled every 6 m to 8 m height. These embankments will be contoured with drainage channels to avoid crossing water and abrasions.

The section of the road from the top of Mount Renci to Baks-Rrjollë is characterised by a steep gradient and a loose rockface. To protect the road and vehicle traffic from rockfalls, ‘open sided tunnels’ will be constructed (i.e. in areas where the ground slope is above 60º), comprising reinforced concrete platforms situated over the road on concrete pillars (almost like a square tunnel).

The rock face within this section of the road will be stabilised using terramesh / geocells geotextile (a safety net that allows growth of vegetation), instead of concrete. This geotextile has two layers. The first layer comprises zinc plated wire mesh that is anchored to the rockface and protects the landscape from erosion. The second layer comprises a dense plastic net which can hold substrate for planting and natural revegetation.

1.2.2 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 be cleared using graders or bulldozers. In total, 434 trees and bushes will be moved from within the footprint / working width during habitat clearance and translocated (or relocated) to suitable receptor sites. Pneumatic drills and jackhammers will also be used during excavation and grading; blasting will not be used during construction. The exact area of habitat clearance beyond the road footprint is uncertain.

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 within 1.6 km of the right side of the proposed road. The following locations of four temporary waste disposal sites have been identified for storing inert materials, which will be reused for road construction:

- site 1 - 2.9 km (distance along the proposed road alignment from the start at Shëngjin)
- site 2 - 4.8 km
- site 3 - 9.6 km
- site 4 - 11.6 km

These stockpile areas currently comprise bare ground and will be rehabilitated following use. The exact locations of the borrow pits are unknown at this stage.

Materials for road construction will be supplied by a licensed company. Waste project materials will also be deposed in accordance with the official process and the approach will be approved by the local authorities. Construction works will not be carried out at night; 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 Buna River Protected Landscape 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 tanks.

Personnel facilities such as a portable office and cabins for storage of personal items and equipment will also be installed within the project area 1.6 km of the right side of the road but the exact location is unknown. The power supply to the office will be made through the existing network. It is anticipated that the workforce will use existing accommodation located in Shëngjin.

1.3 The HRA process

The Habitats Directive was adopted in 1992 as an EU response to the Bern Convention. It aims to promote the maintenance of biodiversity by requiring member states to take measures to maintain or restore natural habitats and wild species listed in the Directive's annexes at a favourable conservation status through the introduction of robust protection for those habitats and species of European importance.

In applying these measures, member states are required to take account of economic, social and cultural requirements, as well as regional and local characteristics.

The directive is built around two pillars: the Natura 2000 network of protected sites and the strict system of species protection. Overall, the directive protects over 1,000 animal and plant species and over 200 so-called 'habitat types' (special types of forests, meadows, wetlands, etc.) that are of European importance that are listed in the directive's Annexes.

- Annex I covers habitats
- Annex II covers species requiring designation of Special Areas of Conservation
- Annex III covers species in need of strict protection

- Annex IV covers species whose taking from the wild can be restricted by European Law.

Article 6 paragraph (3) and (4) state:

'*Any plan or project not directly connected with or necessary to the management of the site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subject to appropriate assessment of its implications for the site in view of the site's conservation objectives. In the light of the conclusions of the assessment of the implications for the site and subject to the provisions of paragraph 4, the competent national authorities shall agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the site concerned and, if appropriate, after having obtained the opinion of the general public. 4. If, in spite of a negative assessment of the implications for the site and in the absence of alternative solutions, a plan or project must nevertheless be carried out for imperative reasons of overriding public interest, including those of social or economic nature, the Member State shall take all compensatory measures necessary to ensure that the overall coherence of Natura 2000 is protected. It shall inform the Commission of the compensatory measures adopted. Where the site concerned hosts a priority natural habitat type and/or a priority species the only considerations which may be raised are those relating to human health or public safety, to beneficial consequences of primary importance for the environment or, further to an opinion from the Commission, to other imperative reasons of overriding public interest.*

An appropriate assessment (or Habitat Regulations Assessment) is required to assess, identify and characterise the project-related impacts on the integrity, conservation objectives and or biodiversity importance of the candidate Emerald / Ramsar site, as illustrated in Figure 1-2. This assessment should be carried out by a competent authority in accordance with Article 6(3) of the Habitats Directive to assess whether the proposed road scheme will have an adverse impact on the integrity of the candidate Emerald site. Site integrity is defined as:

"*the coherence of its structure and function across its whole area that enables it to sustain the habitat, complex of habitats and/or the levels of populations of the species for which it was classified*"

The assessment should follow four main stages as identified by the European Commission Guidance and EBRD PR6 (EBRD 2014) and will require consultation with a range of stakeholders.

The HRA process involves four stages described below:

Stage One: Screening — the process which identifies the likely impacts upon a Natura 2000 site of a project or plan, either alone or in combination with other projects or plans and considers whether these impacts are likely to be significant.

Stage Two: Appropriate assessment — the consideration of the impact on the integrity of the Natura 2000 site of the project or plan, either alone or in combination with other projects or plans, with respect to the site's structure and function and its conservation objectives. Additionally, where there are adverse impacts, an assessment of the potential mitigation of those impacts.

Stage Three: Assessment of alternative solutions — the process which examines alternative ways of achieving the objectives of the project or plan that avoid adverse impacts on the integrity of the Natura 2000 site.

Stage Four: Assessment where no alternative solutions exist and where adverse impacts remain — an assessment of compensatory measures where, in the light of an assessment of imperative reasons of overriding public interest (IROPI), it is deemed that the project or plan should proceed (Oxford Brookes 2001.)

No conservation objectives for the Ramsar site have been set so the assessment is based on the qualifying features described in the citation and the management objectives set out in the Buna River Management Plan.

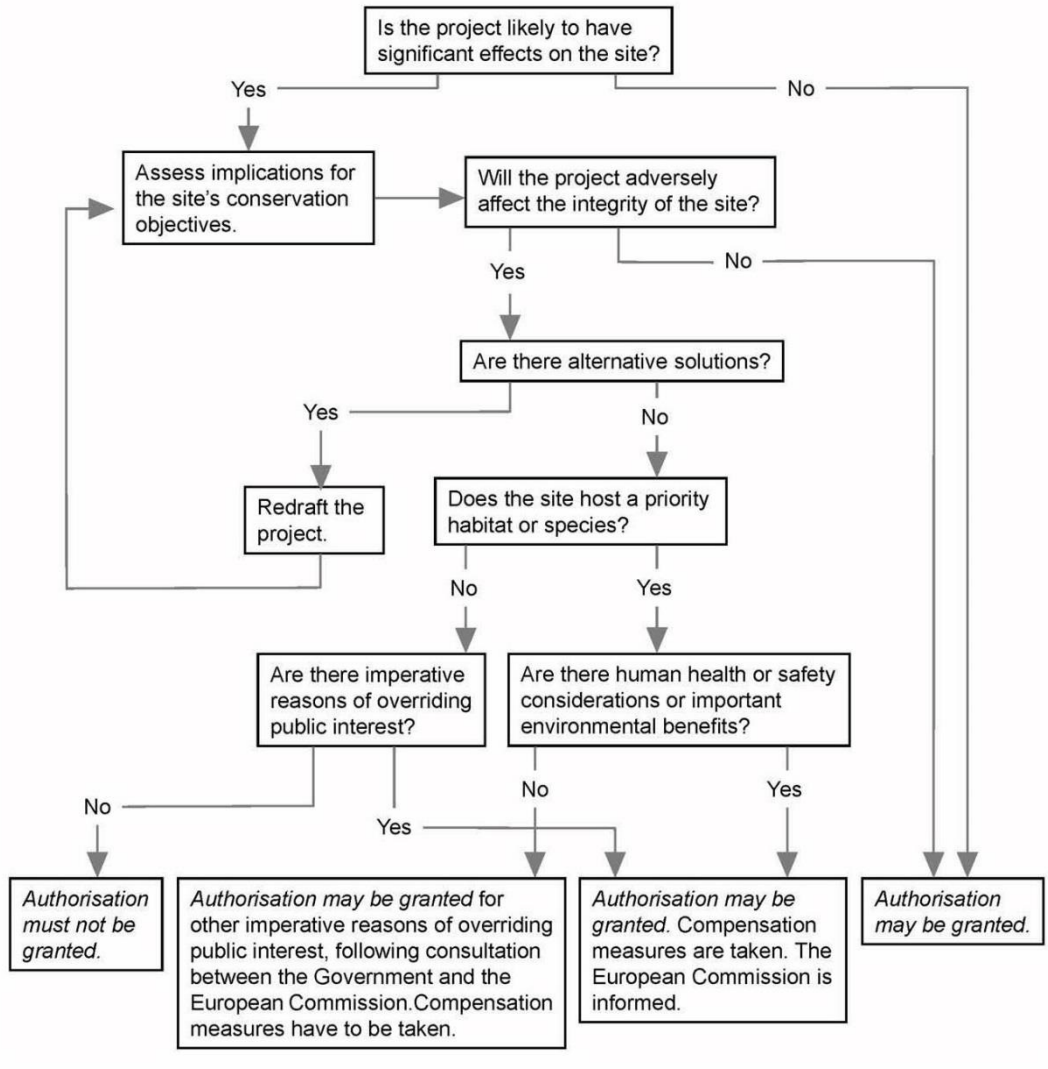


Figure 1-2: Consideration of projects affecting European sites

1.3.1 In combination effects

When undertaking the assessment, the phrase 'in combination with other plans or projects' in Article 3(3) refers to cumulative effects caused by the projects or plans that are currently under consideration together with the effects of the project. When impacts are assessed in combination, it can be established whether or not there may be, overall, an impact which may adversely affect the integrity of a Natura 2000 (Oxford Brookes 2001).

1.4 Current status of knowledge

1.4.1 Background

RSK were commissioned to undertake a supplementary biodiversity baseline assessment in November 2018. This biodiversity assessment supplements the existing biodiversity information presented in the Environmental Impact Assessment: Design of Road Shëngjin – Velipojë Project Ideas (December 2017) and makes recommendations that will enable the project to meet EBRD's PR6 (EBRD, 2014).

This supplementary biodiversity baseline assessment comprised the following components:

- literature and data review
- habitat mapping
- site visit with rapid walkover priority species survey and ground truthing of the habitat map
- critical habitat and priority biodiversity feature screening
- gap analysis of existing documentation for the project and supplementary biodiversity information against EBRD's Performance Requirement 6
- Recommendations for the project to achieve EBRD Performance Requirement 6 compliance.

Subsequently additional biodiversity and environmental baseline surveys were undertaken in spring 2019 which included:

- breeding bird survey
- camera trap survey
- vocalisation recall survey (for golden jackal and grey wolves)
- bat survey
- botany survey
- air quality measurements
- water quality measurements
- noise measurements

Information from these surveys and assessments has been used to inform this HRA.

1.4.2 Results

1.4.2.1 *Protected Area Status*

The proposed project traverses the Buna River Protected Landscape, IUCN Category 5, Ramsar, Important Bird Area, Important Plant Area and candidate Emerald Network Site. The boundaries of these protected areas are presented in Figure 1-3.

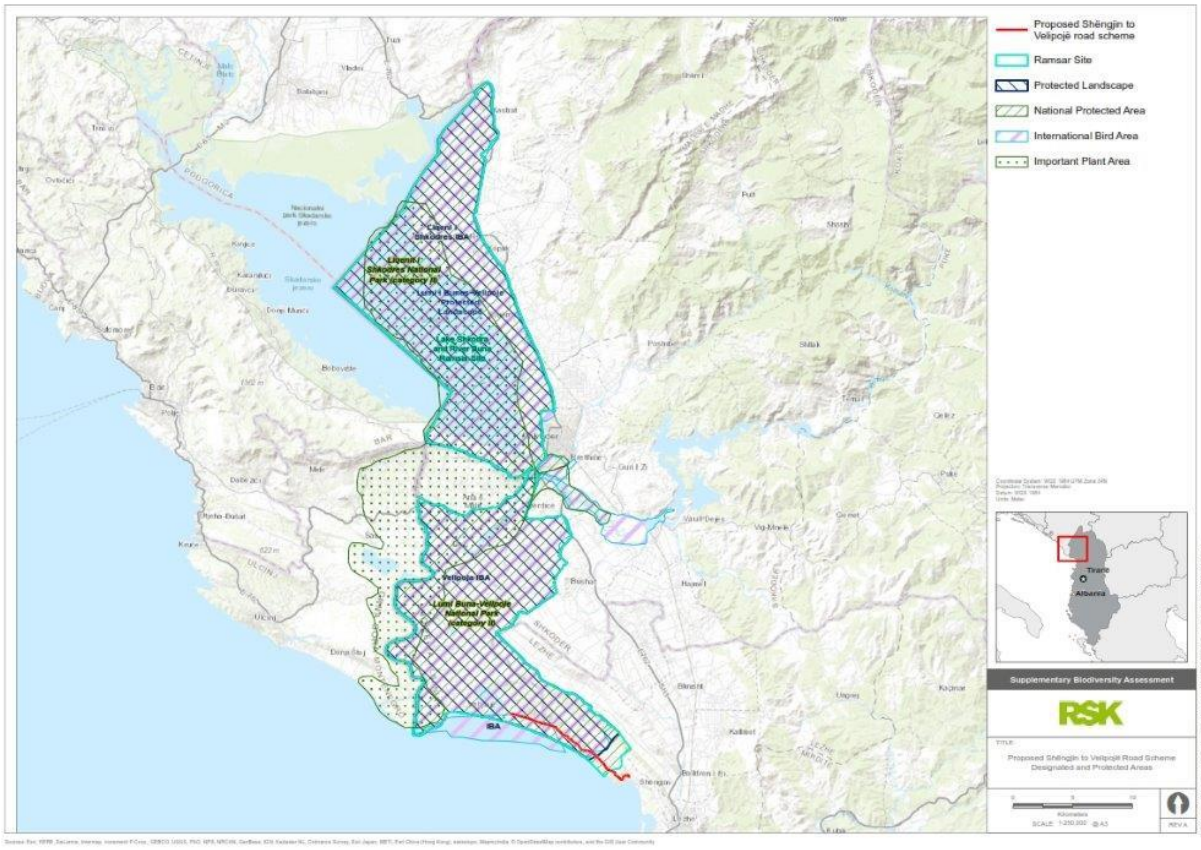


Figure 1-3: Protected Areas Map

1.4.2.2 *Habitats*

Habitat quality varied across the extent of the proposed alignment. Habitat degradation arising from felling trees and habitat clearance was most apparent in close proximity to scatted households near Shëngjin, Baks-Rrjollë and the degraded settlements. Evidence of grazing by goats, cattle and pigs was observed throughout the majority of the proposed road alignment. Erosion was evident near Baks-Rrjollë resulting in the destabilisation of areas of the dune system. Discarded household waste and litter were recorded adjacent to the scatted households near Shëngjin.

A description of the habitat types within the project Area of Influence (AOI) is provided in Table 1.

Table 1: Summary of the habitat evaluation from the field survey

EUNIS Habitat Types	Descriptions (source: European Environment Agency, 2018)	Habitat Descriptions Based on Field Observations	Annex 1 Habitat Status (Current Name as Adopted in Directive 97/62/EC)	Estimated Coverage (ha) in the Road Footprint	Estimated Coverage (ha) in the Buffer and Road Footprint
Habitats Located within the Footprint and / or Buffer Zone of the Proposed Road Alignment					
Broadleaved deciduous woodland (G1.78 Quercus trojana woodland)	Supra-Mediterranean, and occasionally meso-mediterranean woods dominated by the semideciduous *Quercus trojana* or its allies. Other typical species include *Quercus pubescens*, *Carpinus orientalis*, *Juniperus oxycedrus*, *Cistus creticus*, *Fraxinus ornus*, *Dactylis glomerata*, *Brachypodium pinnatum*, *Helictotrichum convolutum* and *Ostrya carpinifolia*	Oak woodand with *Quercus trojana* dominates the south western slopes of the Mount Renzi, within the area of the proposed project footprint. The forest is developed over a calcareous substraet with large, sparse trees, often centuries old but not taller than 15–18 m. At higher altitudes and on the more steep slopes which are more inaccessible, the forest is very dense and difficult to reach. A sparse shrubland layer for the most part, but where it is present it is characterised by *Juniperus oxycedrus, Asparagus acutifolius, Phillyera media* etc. At lower altitudes, the forest is more mixed with *Quercus pubescentis* becoming more prominent with occasional individuals of *Quercus cerris* and *Qercus petraea,*both of which can also be present within the shrub layer. The herb layer is dense and dominated by species such *Stipa bromoides, Brachypodim sylvaticum, Dactylus glomerata, Oenanthe pimpineloides, Cyclamen hederifolium, Teucrium chamaedrys.* Species such as *Galatella albanica* (an Albanian endemic) may well be present but couldn't be indentified for certain in the field due to seasonality. If confirmed, this would be a new location for the species.	Does not qualify	4.1	28.11

EUNIS Habitat Types	Descriptions (source: European Environment Agency, 2018)	Habitat Descriptions Based on Field Observations	Annex 1 Habitat Status (Current Name as Adopted in Directive 97/62/EC)	Estimated Coverage (ha) in the Road Footprint	Estimated Coverage (ha) in the Buffer and Road Footprint
		Floristically, the forest has a mixture ofof the mediteranean types of *quercus dehesas* in open formations but also it has mesophile species in the more dense ones (Fanelli et. al, 2015). As such it deserves conservation and further investigation			
Thermophilous Deciduous Woodland	Forests or woods of submeditteranean climate regions and supramediterranean altitudinal levels, and the western Eurasian steppe and substeppe zones, domiated by deciduous or semideciduous thermophilous Quercus species or by other southern trees such as Carpinus orientalis, Castanea sativa or Ostrya carpinifolia. Thermophilous deciduous trees may, under local microclimatic or edaphic conditions, replace the evergreen oak forests in mesomediterranean or thermomediterranean areas, and occur locally to the north in central and western Europe.	Within the project footprint this forest community type is dominated by *Ostrya carpinifolia* with very low abundance of *Quercus trojana*. It is an open forest with around 40% cover, due to anthropogenic activity.They are present over carbonatic rocks at altitudes of around 200m asl and represent old forests, 7-8m tall. *Ostrya carpinifolia* dominates the shrub layer which is an indicator of good forest regeneration, thus requiring preservation. Additional shrub layer species include *Fraxinus ornus, Quercus trojana, Pistacia terebinthus, Acer monspessulanum* and *Crataegus monogyna.* The herb layer is very diverse and dynamic being represented in our areas of relvees by: *Dactylis glomerata, Salvia officinalis, Coronilla emerus, Hedera helix, Tamus communis, Viola sp., Lychis viscaria, Cyclamen hederifolia* etc.	In wider terms this vegetation community is related with two Annex 1 habitats, one of which is priority habitat: *91H0: Pannonian woods with Quercus pubescens 91M0: Pannonian-Balkanic turkey oak –sessile oak forests Further field work and data elaboration is needed on order to clearly define the Annex 1 relevance		

EUNIS Habitat Types	Descriptions (source: European Environment Agency, 2018)	Habitat Descriptions Based on Field Observations	Annex 1 Habitat Status (Current Name as Adopted in Directive 97/62/EC)	Estimated Coverage (ha) in the Road Footprint	Estimated Coverage (ha) in the Buffer and Road Footprint
Coniferous woodland	Forest, including plantations dominated by coniferous trees, mainly evergreen (*Abies, Cedrus, Picea, Pinus, Taxus, Cupressaceae*) but also deciduous *Larix*. Includes forest with mixed coniferous and deciduous broadleaved trees, provided that the cover by coniferous trees exceeds that of deciduous trees.	Pine plantation dominated by a monoculture of aleppo pine (*Pinus halepensis*; IUCN LC; not listed on the Albanian Red List).  This habitat type can be found in two different loactions, within the rocky areas (within the project footprint) with *Pinus halepnsis* and the mixed plantations with *Pinus halepensis, Pinus pineaster* and *Pinus pinea* in the coastal dune system (outside the project footprint – discussed in more detail below). The Aleppo pine plantations on calcareous rocks are dominated by *Pinus halepensis* with an open canopy. The shrubland layer is mainly dominated by *Punica granatum, Crataegus monogyna, Phillyrea latifolia, Juniperus oxycedrus* etc. Meanwhile in the herbs layer is represented by	Does not qualify	2.0	12.63

EUNIS Habitat Types	Descriptions (source: European Environment Agency, 2018)	Habitat Descriptions Based on Field Observations	Annex 1 Habitat Status (Current Name as Adopted in Directive 97/62/EC)	Estimated Coverage (ha) in the Road Footprint	Estimated Coverage (ha) in the Buffer and Road Footprint
		Asphodelus ramosus, Clinopodium vulgare, Thymus longicaulis, Teucrium chamaedrys, Teucrium pollium, Dactylis glomerata, Clematis viticela, Asparagus acutifolius etc. The forest is overgrazed.			
Punica granatum dominated communities	Whilst not included in the EUNIS classification nor in Annex I, it is very important within the Balkan Peninsula. Fanelli et. al 2015, describes it as an association nova hoc loco with the name *Clematido viticellae-Punicetum granati*. Some authors include those communities within the Mediterranean Maquis and some others consider them apart. We support the idea of considering them an important specific community of the area supporting the identification of the new plant association by Fanelli et al. 2015	Widespread within the area, paricular on the lower slopes of the mountain at the point where the calcareious rocks meet the alluvial plain. The average height of the trees is approximately 3m with a total canopy cover of 90% - therefore can (unusually) open or closed shrubland. *Punica granatum* is a tertiary relict species, with a distribution from former Yugoslavia to Afghanisatan (Meusel & Jäger 1992) and in Albania its distribution areal is only in the nothern part of the country, thus very limited. The other accompanying species are very interesting and also tertiary relicts sych as *Clematis viticella*, and others like: *Rosa sempervirens, Paliurus spina – christi, Crataegus monogyna.* The herbs layer is not very dense and characterised by species like: *Viola odorata, Catapodium rigidum, Dactylis glomerata, Tripholium campestre, Arum italicum* and other ruderal species like *Mercurialis annua, Hordeum murinum, Asphodelus ramosa* etc. whichi indicate the presence of grazing in the area.	Does not qualify	0.1	0.77
Temperate and mediterranean-montane scrub (Illyrian Paliurus	Garrigues of the Adriatic lowlands and hills of the Balkan peninsula dominated by *Paliurus spina-*	*Paliurus spina – christi* shrubs are fairly spread out in the area representing highly fragmented communities. They can be found in small groups	Does not qualify	1.3	9.12

EUNIS Habitat Types	Descriptions (source: European Environment Agency, 2018)	Habitat Descriptions Based on Field Observations	Annex 1 Habitat Status (Current Name as Adopted in Directive 97/62/EC)	Estimated Coverage (ha) in the Road Footprint	Estimated Coverage (ha) in the Buffer and Road Footprint
spina-christi garrigues)	*christi*. *Punica granatum* is a frequent component.	dominated by *Paliurus spina – christi* or larger ones when the thron brush is co-dominant. Usually it is accompanyed by *Phillyrea latifolia, Pyrus amygdaliformis, Punica granatum.* The herb layer is quite mixed due to the open canopy and includes species such as *Bupleurum praealtum, Euphorbia characias, Clematis viticella* etc. These formations appear very disturbed and in a degraded stage.			
Maquis, arborescent matorral and thermo-Mediterranean scrub	Evergreen sclerophyllous or lauriphyllous shrub vegetation, with a closed or nearly closed canopy structure, having nearly 100% cover of shrubs, with few annuals and some vernal geophytes; trees are nearly always present, some of which may be in shrub form. Shrubs, sometimes tall, of *Arbutus, Cistus, Cytisus, Erica, Genista, Lavandula, Myrtus, Phillyrea, Pistacia, Quercus* and *Spartium* are typical. Included is pseudomaquis, in which the dominants are mixed deciduous and evergreen shrubs.	Maquis vegetation with Greek juniper (*Juniperus excelsa*), common walnut (*Juglans regia*), strawberry tree (*Arbutus unedo*)  Eastern Phillyrea thickets These communities represent dense shrublands up to 5m high, usually mono - dominated by *Phillyrea latifolia* and in some other cases accompanied by *Punica granatum, Pistacia terebinthus* etc. which at	Does not qualify	2.1	14.1

EUNIS Habitat Types	Descriptions (source: European Environment Agency, 2018)	Habitat Descriptions Based on Field Observations	Annex 1 Habitat Status (Current Name as Adopted in Directive 97/62/EC)	Estimated Coverage (ha) in the Road Footprint	Estimated Coverage (ha) in the Buffer and Road Footprint
		the same time represent the low shrub layer of the formation. The species that compose the herbaceous layer are: *Viola odorata, Hedera helix, Cyclamen hederifolia, Clematis viticella, Asparagus acutifolius* etc. <u>Helleno-Balkanic pseudomaquis</u> They represent shrub formations intermediate between Mediterranean maquis and schibljak (Southeastern sub-Mediterranean deciduous thickets), resulting from the degradation of the Ostryo-Carpinion of the Helleno-Balkanic peninsula. In the road project footprint area in Renzi Mt. these shrub formations represent the most common composition with monodomination of *Carpinus orientalis* and in some other more rare cases a mix formation of Carpinus orientalis, Pistacia *terebinthus, Paliurus spina-christi, Phillyrea latifolia, Crataegus monogyna* etc. The Carpinus orientalis shrublands are developed in calcareous rocky formations, like a thick bushland circa 3-4 m tall very dense usually in lower altitudes than *Quercus trojana* forests but surrounding its margins. The herb layer is poor and it is represented by *Viola sp., Hedera helix, Clematis viticella, Asparagus acutifolia, Arum maculatum, Ceterach officinarium* etc.			
F6.3 - Illyrian garrigues (F6.36 - Illyrian Teucrium and	Shrubby formations, often low, of the meso- and occasionally supra-Mediterranean zones of the	This community represents vegetation of the stony Mediterranean grasslands dominted by *Salvia offcinalis* acoompanyed by other species like: *Satureja montana, Teucrium pollium, Teuchrium*	Does not qualify		

EUNIS Habitat Types	Descriptions (source: European Environment Agency, 2018)	Habitat Descriptions Based on Field Observations	Annex 1 Habitat Status (Current Name as Adopted in Directive 97/62/EC)	Estimated Coverage (ha) in the Road Footprint	Estimated Coverage (ha) in the Buffer and Road Footprint
other labiates garrigues)	Adriatic lowlands of the Balkan peninsula from Istria to southern Albania. Specifically, the Illyrian Teucrium garrigues represent garrigues of the Adriatic lowlands and hills of the Balkan peninsula of which the main components are labiate shrubs or robust perennials (except *Rosmarinus*), in particular *Salvia officinalis.*	*chamaedrys, Crysopogon gryllus, Teucrium montanum, Convolvulus elegantissimus, Dactylus glomerate, stipa bromoides* etc. Stones and rocks have an average cover of 30% and a slope of 30o. The community is widespread in Albania on dry, calcareous hills along the coasts and on the southern mountains (Buzo 1990; Hoda & Mersinllari 2000). In an upper belt of the stony vegetation dominated with *Salvia officinalis*, in the footprint area there are communities dominated by *Crysopogon gryllus*, accompanied by species such as *Orlaya grandiflora, Satureja montana, Teucrium pollium, Onosma arenaria, Psoralea bituminosa* etc. In other cases, there are rocky pastures which are dominated by *Satureja montana* and co-dominated by *Teucrium pollium* in warmer and less steapy aspects. The accompanying species are more or less the same and mixed with the species of other communities such as the garrigues around, which is an indicator of disturbed environments.			
E.1 – Dry grasslands (E1.3 : Mediterranean xeric grassland)	Meso- and thermo-Mediterranean xerophile, mostly open, short-grass perennial grasslands rich in therophytes; therophyte communities of oligotrophic soils on base-rich, often calcareous substrates e.g.	This community of Mediterranean grasslands dominated by *Hyparrhenia hirta* occupies small but very frequent surfaces in the project road footprint area. It develops on moderate slopes (10–15°) on S, SW or W aspects. This community is very stony, more than any other community of grasslands or garrigues in the study area; bare rocks have a very high cover from 60% to 90%. Other accompanied species are *Salvia glutinosa, Satureja montana,*	Does not qualify		

EUNIS Habitat Types	Descriptions (source: European Environment Agency, 2018)	Habitat Descriptions Based on Field Observations	Annex 1 Habitat Status (Current Name as Adopted in Directive 97/62/EC)	Estimated Coverage (ha) in the Road Footprint	Estimated Coverage (ha) in the Buffer and Road Footprint
	vegetation of the class Thero-Brachypodietea.	*Teucrium pollium, Convolvulus elegantissimus, Micromeria juliana, Cetaurium erythrea* etc.			
Miscellaneous inland habitats with sparse or no vegetation	Miscellaneous bare habitats, including glacial moraines, freeze-thaw features, inland sand dunes, burnt ground and trampled areas. Vegetation, if present, is dominated by algae, lichens or bryophytes, with vascular plants absent or very sparse.		Does not qualify	1.5	10.7
Screes	Accumulations of boulders, stones, rock fragments, pebbles, gravels or finer material, of non-aeolian depositional origin, unvegetated, occupied by lichens or mosses, or colonized by sparse herbs or shrubs. Included are screes and scree slopes produced by slope processes, moraines and drumlins originating from glacial deposition, sandar, eskers and kames resulting from fluvio-glacial deposition, block slopes, block streams and block fields constructed by	Scree vegetated with graminoid species interspersed with herbs. 	A number of scree types are categorised as Annex 1 habitats (i.e. 8110, 8120, 8130, 8140, 8150, 8160). A botanical survey would be required to more fully characterise the floristic composition of scree habitat within the project footprint and surrounding environs. It was difficult to classify which scree type	1.3	9.97

EUNIS Habitat Types	Descriptions (source: European Environment Agency, 2018)	Habitat Descriptions Based on Field Observations	Annex 1 Habitat Status (Current Name as Adopted in Directive 97/62/EC)	Estimated Coverage (ha) in the Road Footprint	Estimated Coverage (ha) in the Buffer and Road Footprint
	periglacial depositional processes of downslope mass movement, ancient beach deposits constituted by former coastal constructional processes. Deposits originating from aeolian depositional processes (dunes) or from eruptive volcanic activity are not included; they are included in H5 and H6 respectively. High mountain, boreal and Mediterranean unstable screes are colonized by highly specialised plant communities. They or their constituting species may also inhabit moraines and other depositional debris accumulations in the same areas. A very few communities form in lowland areas elsewhere.		is present during the sub-optimal survey time – possibly Eastern Mediterranean scree.		
H3 : Inland cliffs, rock pavements and outcrops (H3.5 : Almost bare rock pavements,	Unvegetated, sparsely vegetated, and bryophyte- or lichen-vegetated cliffs, rock faces and rock pavements, not presently adjacent to the sea, and not	In the assessed area we encountered typical limestone pavement geologcal formation, which was populated with dufferent lychens and almost bare from vascular vegetation. In the fissures of the pavements there is *Geranium robertianum* and some ferns and other species of the genius	*8240 – Limestone pavement 8210 - Calcareous rocky slopes with		

EUNIS Habitat Types	Descriptions (source: European Environment Agency, 2018)	Habitat Descriptions Based on Field Observations	Annex 1 Habitat Status (Current Name as Adopted in Directive 97/62/EC)	Estimated Coverage (ha) in the Road Footprint	Estimated Coverage (ha) in the Buffer and Road Footprint
including limestone pavements)	resulting from recent volcanic activity. Parts of seacliffs free from the influence of wave or wind transported marine salt are included. More specifically, this includes level surfaces of rock exposed by glacial erosion, by weathering processes, or by aeolian scouring, bare or colonized by mosses, algae or lichens. The hard rock surface may be exposed or partially covered by erosional rock debris. Included are rock surfaces in karst landscapes, rock dome tops, whaleback, roche moutonné, flyggberg and rock basin formations of periglacial areas, golec and felsenmeer formations, level surfaces of dykes and old lava flows. Vascular plant communities may colonize cracks and weathered surfaces	*Festuca sp*. and *Bromus sp*. Hard to determinate because they were too dry at the period of the field mission. Additionally, in this vegetation group we can mention also the calcareous wall faces, or calcareous rocky slopes inhabited with very few species, distant from each other and sometimes mono dominant vegetation. We have encountered rocky vegetation with *Satureja montana* and *Putoria calabrica*.	chasmophytic vegetation		

EUNIS Habitat Types	Descriptions (source: European Environment Agency, 2018)	Habitat Descriptions Based on Field Observations	Annex 1 Habitat Status (Current Name as Adopted in Directive 97/62/EC)	Estimated Coverage (ha) in the Road Footprint	Estimated Coverage (ha) in the Buffer and Road Footprint
Coastal dune and sandy shore	Sand-covered shorelines of the oceans, their connected seas and associated coastal lagoons, fashioned by the action of wind or waves. They include gently sloping beaches and beach-ridges, formed by sands brought by waves, longshore drift and storm waves, as well as dunes, formed by aeolian deposits, though sometimes re-fashioned by waves.	 A small area of a shifting, coastal dune located within the survey area at the foot of Mount Renci. It is likely that a combination of erosion (i.e. caused by wind and water), over grazig, conversion to agro-pastoral land and vehicle movement have inhibited natural sucession.	(EU code 2110) Embryonic shifting dunes	1.2	7.17
Coastal saltmarshes and saline reedbeds	Angiosperm-dominated stands of vegetation, occurring on the extreme upper shore of sheltered coasts and periodically covered by high tides. The vegetation develops on a variety of sandy and muddy sediment types and may have admixtures of coarser	This community in the surrounding environments of the road project footrpin is dominated by *Juncus maritimus* and *Juncus. acutus* accompanied by *Carex extensa, Aster tripolium, Plantago crassifolia, Blackstonia perfoliata, Centaurium tenuiflorum* etc. The status of this habitat in the road project footprint is in its majority very degraded.	1410 : Mediterranean salt meadows (*Juncetalia maritimi*)		

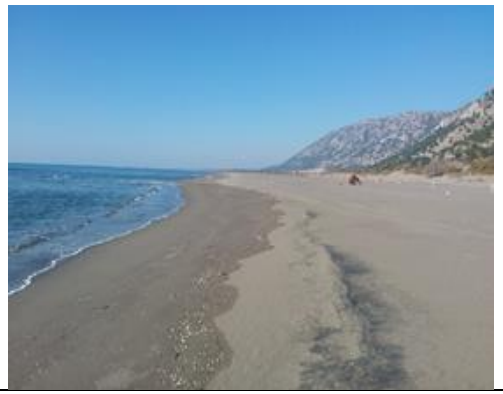
EUNIS Habitat Types	Descriptions (source: European Environment Agency, 2018)	Habitat Descriptions Based on Field Observations	Annex 1 Habitat Status (Current Name as Adopted in Directive 97/62/EC)	Estimated Coverage (ha) in the Road Footprint	Estimated Coverage (ha) in the Buffer and Road Footprint
	material. The character of the saltmarsh communities is affected by height up the shore, resulting in a zonation pattern related to the degree or frequency of immersion in seawater.				
Arable and market gardens	Croplands planted for annually or regularly harvested crops other than those that carry trees or shrubs. They include fields of cereals, of sunflowers and other oil seed plants, of beets, legumes, fodder, potatoes and other forbs. Croplands comprise intensively cultivated fields as well as traditionally and extensively cultivated crops with little or no chemical fertilisation or pesticide application. Faunal and floral quality and diversity depend on the intensity of agricultural use and on the presence of borders of natural vegetation between fields.	 Agro-pastoral land, some of which are delineated with walls and fences. In some areas, these sites are being left for fallow or have appeared to have been abandoned and are in a transitionary scrub-state.	Does not qualify	0.2	1.96

EUNIS Habitat Types	Descriptions (source: European Environment Agency, 2018)	Habitat Descriptions Based on Field Observations	Annex 1 Habitat Status (Current Name as Adopted in Directive 97/62/EC)	Estimated Coverage (ha) in the Road Footprint	Estimated Coverage (ha) in the Buffer and Road Footprint
Low density buildings	Buildings in rural and built-up areas where buildings, roads and other impermeable surfaces are at a low density, typically occupying less than 30% of the ground. Excludes agricultural building complexes where the built area exceeds 1 ha (J1.4).	Scattered buildings located along the exisiting track near Shëngjin and burban development adjacent to the Baks-Rrjollë road.	Does not qualify	3.9	32.01
Additional Habitats Located Outside the Footprint and Buffer of the Proposed Road Alignment, Within The AOI					
Coastal habitats	Coastal habitats are those above spring high tide limit (or above mean water level in non-tidal waters) occupying coastal features and characterised by their proximity to the sea, including coastal dunes and wooded coastal dunes, beaches and cliffs. Includes free-draining supralittoral habitats adjacent to marine habitats which are normally only affected by spray or splash, strandlines characterised by terrestrial invertebrates and moist and wet coastal dune slacks and dune-slack pools. Excludes supralittoral rock pools and	A number of coastal habitats are located in close proximity to the proposed road alignment including a beach and dune system.	N/A	N/A	N/A

EUNIS Habitat Types	Descriptions (source: European Environment Agency, 2018)	Habitat Descriptions Based on Field Observations	Annex 1 Habitat Status (Current Name as Adopted in Directive 97/62/EC)	Estimated Coverage (ha) in the Road Footprint	Estimated Coverage (ha) in the Buffer and Road Footprint
	habitats adjacent to the sea which are not characterised by salt spray, wave or sea-ice erosion.				
B1.31 : Embryonic shifting dunes	Formatiomn sof the coasts of nemoral, steppe, Meditteranean and warm-temperate humid zones, representing the first stages of dune construction, constituted by rippes or raised sand surfaces of the upper beay or by a seaward fringe at the foot of the tall dunes. Typically *Elymus farctus, Otanthus maritimus, Sporobolus pungens, Pancratium maritimum, Medicago marina* or *Anthemis tomentosa* may be present. The vegetation may belong to the class Ammophiletea with communities of *Otanthus maritimus, Agropyro juncei-Sporoboletum pungentis, Cypero mucronati-Agropyretum juncei, Elymetum sabulosi, Medicagini*	Found outside the project footprint, this plant community is represented by one-year or multi-year formations occupying marine deposits in the immediate vicinity or on the first line immediately after the marine line on marine fiber fanograms such as *Posidonia oceanica, Cymodocea nodosa* or seaweed. Its characteristic species are *Cakile maritima, Xanthium strumarium, Salsola horse, Atriplex hastata, Euphorbia peplis, Elymus farctus, Euphorbia paralias, Eryngium maritimum.* These communities are widely spread almost throughout all the study area, but are fragmented where the people walk or stay during the summer, and where the construction of tourist complexes has begun.	1210- Annual vegetation of drift lines		

EUNIS Habitat Types	Descriptions (source: European Environment Agency, 2018)	Habitat Descriptions Based on Field Observations	Annex 1 Habitat Status (Current Name as Adopted in Directive 97/62/EC)	Estimated Coverage (ha) in the Road Footprint	Estimated Coverage (ha) in the Buffer and Road Footprint
	marinae-Ammophiletum australis and species Elytrigia bessarabica, Glycyrrhiza glabra, Limonium graecum, Limonium sinuatum, Zygophyllum album, Inula crithmoides, Scirpus holoschoenus, Paronychia argentea and *Centaurea spinosa.*				
Coastal saltmarshes and saline reedbeds	Angiosperm-dominated stands of vegetation, occurring on the extreme upper shore of sheltered coasts and periodically covered by high tides. The vegetation develops on a variety of sandy and muddy sediment types and may have admixtures of coarser material. The character of the saltmarsh communities is affected by height up the shore, resulting in a zonation pattern related to the degree or frequency of immersion in seawater.	This community is dominated by *Juncus maritimus* and *Juncus. acutus* accompanied by *Carex extensa, Aster tripolium, Plantago crassifolia, Blackstonia perfoliata, Centaurium tenuiflorum etc*. The recent assessment of the conservation status of this habitat in the Mediterranean bio-geographic region shows that the habitat is at serious risk of extinction (at least on a regional level) (EC, 2013). According to Bego et. al, (2013), this community is very fragmented in this area.	1410 : Mediterranean salt meadows (*Juncetalia maritimi*)		

EUNIS Habitat Types	Descriptions (source: European Environment Agency, 2018)	Habitat Descriptions Based on Field Observations	Annex 1 Habitat Status (Current Name as Adopted in Directive 97/62/EC)	Estimated Coverage (ha) in the Road Footprint	Estimated Coverage (ha) in the Buffer and Road Footprint
F9.3 - Southern riparian galleries and thickets	Tamarisk, oleander, chaste tree galleries and thickets and similar low woody vegetation of permanent or temporary streams and wetlands of the thermo-Mediterranean zone, southwestern Iberia & Macaronesia	This plant community is spread in the shape of belts in different altitudes but still very fragmented. The dominant species are: *Vitex agnus-castus, Tamarix dalmatica and rarely Populus alba*. Other species of these communities are *Juncus acutus, Schoenus nigricans, Juncus littoralis, Plantago crassifolia* etc	92D0: Southern riparian galleries and thickets (Nerio-Tamaricetea and Securinegion tinctoriae)		
B.1.7 – Coastal dune woods	Coastal dunes colonised by woodland which are directly influenced by proximity to the sea.	Found bordering the sand dunes.The dominant species are *Pinus pinaster, Pinus halepensis* and rarely *Pinus pinea*, The forest was cultivated 40 to 50 years ago for the stabilization of sand dunes and protection of agricultural lands, but it has gain stability towards naturalisation. Among the other plant species are: *Helianthemum joniana, Juniperus oxucedrus, Satureja hortensis, Teucrium pollium, Ruscus aculeatus, Paliurus spina - christi, Punica granatum* etc.	*2270: Wooded dunes with *Pinus pinea* and/or *Pinus pinaster*		

EUNIS Habitat Types	Descriptions (source: European Environment Agency, 2018)	Habitat Descriptions Based on Field Observations	Annex 1 Habitat Status (Current Name as Adopted in Directive 97/62/EC)	Estimated Coverage (ha) in the Road Footprint	Estimated Coverage (ha) in the Buffer and Road Footprint
Sand beaches above the driftline	Gently sloping sand-covered shorelines fashioned by wind action along coasts and beside associated coastal lagoons.		Does not qualify	N/A	N/A
Coastal dune and sandy shore	Sand-covered shorelines of the oceans, their connected seas and associated coastal lagoons, fashioned by the action of wind or waves. They include gently sloping beaches and beach-ridges, formed by sands brought by waves, longshore drift and storm waves, as well as dunes, formed by aeolian deposits, though sometimes re-fashioned by waves.	 Large shifting, primary dunes were observed at the foot of Mount Renci. These dunes were poorly vegetated may be attributed to continued erosion and over grazing.	(EU code 2110) Embryonic shifting dunes	N/A	N/A

EUNIS Habitat Types	Descriptions (source: European Environment Agency, 2018)	Habitat Descriptions Based on Field Observations	Annex 1 Habitat Status (Current Name as Adopted in Directive 97/62/EC)	Estimated Coverage (ha) in the Road Footprint	Estimated Coverage (ha) in the Buffer and Road Footprint
Brackish coastal lagoons	Lagoons are expanses of shallow coastal salt water, of varying salinity and water volume, wholly or partially separated from the sea by sand banks or shingle, or, less frequently, by rocks. Fully saline coastal lagoons are classified as X02. Flads and gloes, considered a Baltic variety of lagoons, are small, usually shallow, more or less delimited water bodies still connected to the sea or cut off from the sea very recently by land upheaval. Characterised by well-developed reedbeds and luxuriant submerged vegetation and having several morphological and botanical development stages in the process whereby sea becomes land. Mediterranean lagoons may host the [Ruppietum] community with halophytic vegetation, while at sites with a fresh water supply, plant communities of [*Juncetum*] and		(EU Code 1150) Coastal lagoons priority Annex 1 habitat	N/A	N/A

EUNIS Habitat Types	Descriptions (source: European Environment Agency, 2018)	Habitat Descriptions Based on Field Observations	Annex 1 Habitat Status (Current Name as Adopted in Directive 97/62/EC)	Estimated Coverage (ha) in the Road Footprint	Estimated Coverage (ha) in the Buffer and Road Footprint
	[*Phragmitetum*] can develop. [*Sarcocornia perennis*] and [*Arthrocnemum macrostachyum*] may occur here.				
Inland cliffs, rocky pavements and outcrops	Unvegetated, sparsely vegetated, and bryophyte- or lichen-vegetated cliffs, rock faces and rock pavements, not presently adjacent to the sea, and not resulting from recent volcanic activity. Parts of sea cliffs free from the influence of wave or wind transported marine salt are included. Rock accumulations resulting from depositional processes are excluded and listed under H2 or H5.	These type of vegetation communities are spread in the entire area of Renzi Mt. They are represented by very low number of plant species and usually are specific to the locations. The ones encountered during the road project footprint are described above.	(EU code 8210) Calcareous rocky slopes with chasmophytic vegetation	N/A	N/A

EUNIS Habitat Types	Descriptions (source: European Environment Agency, 2018)	Habitat Descriptions Based on Field Observations	Annex 1 Habitat Status (Current Name as Adopted in Directive 97/62/EC)	Estimated Coverage (ha) in the Road Footprint	Estimated Coverage (ha) in the Buffer and Road Footprint
Geolittoral wetlands and meadows: reed, rush and sedge stands: natural stands		 Dune wetland that grades into a lagoon wetland. Dominated by *Juncus* sp.	Does not qualify	N/A	N/A
Inland dune juniper scrubs	Juniperus communis-rich scrub of Germano-Baltic fluvioglacial inland dunes	Small areas of *Juniperus oxycedrus ssp. macrocarpa*dominated scrub located at the foot of Mount Renci.	Does not qualify	N/A	N/A
Arable and market gardens	Croplands planted for annually or regularly harvested crops other than those that carry trees or shrubs. They include fields of cereals, of sunflowers and other oil seed plants, of beets, legumes, fodder, potatoes and other forbs. Croplands comprise intensively cultivated fields as well as traditionally and extensively cultivated crops with little or no chemical	Agro-pastoral land, some of which are delineated with walls and fences. In some areas, these sites are being left for fallow or have appeared to have been abandoned and are in a transitionary scrub-state.	Does not qualify	N/A	N/A

EUNIS Habitat Types	Descriptions (source: European Environment Agency, 2018)	Habitat Descriptions Based on Field Observations	Annex 1 Habitat Status (Current Name as Adopted in Directive 97/62/EC)	Estimated Coverage (ha) in the Road Footprint	Estimated Coverage (ha) in the Buffer and Road Footprint
	fertilisation or pesticide application. Faunal and floral quality and diversity depend on the intensity of agricultural use and on the presence of borders of natural vegetation between fields.				
Low density buildings	Buildings in rural and built-up areas where buildings, roads and other impermeable surfaces are at a low density, typically occupying less than 30% of the ground. Excludes agricultural building complexes where the built area exceeds 1 ha (J1.4).		Does not qualify	N/A	N/A

1.4.2.3 *Priority Biodiversity Features: Vulnerable Species*

As part of the supplementary biodiversity assessment the existing biodiversity baseline data and supplementary information were used to develop a list of priority biodiversity features which are present or potentially present within the study area. This list underpinned the screening process of candidate critical habitat-qualifying features against PR6 criteria. Information was collated about each priority biodiversity feature to inform the screening process (more detail is provided in the supplementary biodiversity assessment report).

Priority species categorised as Vulnerable by the IUCN Red list of Threatened Species (2018) that occur or potentially occur within the area of analysis are listed as follows:

Insect:

- Great capricorn beetle (*Cerambyx cerdo*)

Fish:

- *Cyprinus carpio*

Mammal:

- Long fingered Bat (*Myotis capaccinii*)

Reptiles:

- Loggerhead Sea Turtle (*Caretta caretta*)
- Meadow viper (*Vipera ursinii*)

Birds:

- Common pochard (*Aythya farina*)
- Great Bustard (*Otis tarda*)
- Greater spotted eagle (*Aquila clanga*)
- Lesser White-fronted Goose (*Anser erythropus*)
- Red-breasted goose (*Branta ruficollis*)
- Marbled teal (*Marmaronetta angustirostris*)

Species categorised by the National Red Lists for Albania as Vulnerable that occur or potentially occur within the area of analysis are presented in **Error! Reference source not found.** 2.

Table 2: Priority Species Categorised as Vulnerable by the National Red List of Albania

Taxon Type	Common Name	Scientific Name	IUCN (2018) Status
Plant	Marsh pennywort	*Hydrocotile vulgaris*	Least Concern
	Flowering-rush	*Butomus umbellatus*	Least Concern

Taxon Type	Common Name	Scientific Name	IUCN (2018) Status
	Great Fen-Sedge	*Cladium mariscus*	Least Concern
	Yellow Water-lily	*Nuphar lutea*	Least Concern
	European White Waterlily	*Nymphaea alba*	Least Concern
		Nymphoides peltata	Least Concern
	Arrowhead	*Sagittaria sagittifolia*	Least Concern
		Adiantum cappilus-veneris	Least Concern
	Greater Duckweed	*Spirodela polyrhiza*	Least Concern
	Field elm	*Ulmus minor* (synonym *Ulmus campestris*)	Data Deficient
	Crack willow	*Salix fragilis*	Not evaluated
		Nymphoidetum peltata	Least Concern
Fish		*Salmothymus obtusirostris*	Endangered
	Twaite Shad	*Alosa fallax*	Least concern
		Petromyzon Marinus	Least concern
		Salmo trutta lacustris	Least concern
Mammal	Mediterranean Horseshoe Bat	*Rhinolophus euryale*	Near Threatened
	Eurasian Otter	*Lutra lutra*	Near Threatened
	Golden Jackal	*Canis aureus*	Least Concern
	Brown bear	*Ursus arctos*	Least Concern
Amphibian	Balkan water frog	*Pelophylax kurtmuelleri* (synonym *Rana balcanica*)	Least Concern
Bird	Common buzzard	*Buteo buteo*	Least Concern
	Common Kestrel	*Falco tinnunculus*	Lest Concern
	Eurasian oystercatcher	*Haematopus ostralegus*	Near Threatened
	Eurasian bittern	*Botaurus stellaris*	Least Concern
	Grey heron	*Ardea cinerea*	Least Concern
	Little egret	*Egretta garzetta*	Least Concern
	Black-crowned night heron	*Nycticorax nycticorax*	Least Concern
	Sandwich tern	*Sterna sandvincensis*	Least Concern
	Short-toed snake eagle	*Circaetus gallicus*	Least Concern
	Slender-billed gull	*Larus genei*	Least Concern
	Squacco heron	*Ardeola ralloides*	Least Concern

Taxon Type	Common Name	Scientific Name	IUCN (2018) Status
	Western marsh harrier	*Circus aeruginosus*	Least Concern

1.4.2.4 *Critical Habitat-qualifying Features*

The most sensitive biodiversity features are defined as critical habitat which have the highest degree of irreplaceability and vulnerability and as such are of the highest biodiversity value. Not all priority biodiversity features qualify as critical habitat even though they remain of conservation importance. Critical habitat is defined by EBRD PR6 as follows:

1. Highly threatened or unique ecosystems
2. Habitats of significant importance to endangered or critically endangered species
3. Habitats of significant importance to endemic or geographically restricted species
4. Habitats supporting globally significant migratory or congregatory species
5. Areas associated with key evolutionary processes
6. Ecological functions that are vital to maintaining the viability of biodiversity features described in this paragraph.

Table 3 provides a summary of the findings of the critical habitat screening exercise. Consultation with protected area managers and fish and plant experts are required to further refine the findings of this critical habitat screening (more detail is provided in the supplementary biodiversity assessment report and the stakeholder consultation section 5).

Table 3: Summary Findings of the Critical Habitat Screening

EBRD PR6 Criteria	IFC PS6 Criterion Threshold Numbers	Critical Habitat-qualifying Features	Justification
Highly threatened or unique ecosystems	4b	No critical habitat qualifying features	-
	4b	Lake Shkodra and River Buna Ramsar complex Coastal lagoon	Protected area status Priority Annex 1 habitat
Habitats of significant importance to endangered or	1a:	• Slender-billed curlew • Atlantic sturgeon • Adriatic sturgeon	Precautionary due to the paucity of data

critically endangered species		• Starry sturgeon • European eel	
	1b	No critical habitat-qualifying features	-
	1c	• Atlantic sturgeon • Adriatic sturgeon • Stellate sturgeon • European eel	Expert opinion is required to validate this
Habitats of significant importance to endemic or geographically restricted species	2	*Querqus robur* spp *scutariensis*	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	No critical habitat qualifying features	-
Ecological functions that are vital to maintaining the viability of biodiversity features described (as critical habitat features)	N/A	Buna River, connecting waterbodies and wetland habitats of the Lake Shkodra and River Buna Ramsar complex	Precautionary basis assuming the presence of the critical habitat-qualifying species listed above

2 LAKE SHKODRA AND RIVER BUNA RAMSAR AND PROTECTED LANDSCAPE OF BUNA RIVER CANDIDATE EMERALD SITE

2.1 Introduction

2.1.1 Emerald Network Candidate Site Status

The Protected Landscape of Buna River is a candidate Emerald site (Council of Europe, 2018). The Emerald Network is an ecological network of Areas of Special Conservation Interest, which were established to conserve the species and habitats of the Bern Convention requiring specific protection measures.

The network was launched by the Council of Europe as part of its work under the Convention on the Conservation of European Wildlife and Natural Habitats (or Bern Convention). These habitats and species are listed respectively in Resolution No. 4 (1996) and Resolution No. 6 (1998) of the Standing Committee to the Bern Convention. The Natura 2000 sites are considered as the contribution from the EU member States to the Emerald Network.

The Protected Landscape of Buna river (Velipoja / Peizazhi i Mbrojtur i lumit te Bunes-Velipoja) was one of the 25 sites in Albania included on the updated list of officially nominated candidate Emerald sites at the Standing committee 37th meeting held on the 5 to 8 December 2017.

Once a candidate site is officially adopted as an Emerald Network sites, the sites are designated and managed at national level by employing measures that contribute to the main objective of the Network.

Management

2.1 The national designation of the adopted Emerald sites will ensure that they are protected from external threats and subject to an appropriate regime for achieving a satisfactory conservation status of the species and natural habitats listed in Resolutions no. 4 (1996) and no. 6 (1998) present on the site, involving, if and where appropriate, management plans, administrative measures and contractual measures;

2.2 The authorities responsible for the implementation of the management measures and their monitoring will be clearly identified;

2.3 Specific short and long-term site objectives will be drawn up for the management of Emerald sites, in compliance with the national/regional conservation objectives of the country, in order to facilitate the monitoring of their implementation and the regular assessment of their achievement;

2.4 National, regional and local stakeholders will be involved, if and where appropriate, in the planning of the management of the sites, as well as in the implementation of the conservation and protection measures foreseen, and in the monitoring of the sites' management.

No specific management plan or citation has been developed for this site.

2.1.2 Lake Shkodra and River Buna Ramsar site.

This Ramsar site covers 49,562 ha and is located on the east of the borderline between Albania and Montenegro. The northern portion of the site falls in to the district of Malesia e Madhe and the remaining portion is located in the district of Shkodra. The site comprises a mosaic of freshwater habitats, brackish water habitats, woodland, freshwater marshes, wet pastures, sandy shore and rocky habitats.

The hydrological connection of Shkodra Lake, Buna River and Drin River and the presence of wetlands are of importance in terms of flood control, sediment trapping and shoreline stabilization.

The Ramsar site supports rich fauna biodiversity, particularly in context of biodiversity at the national scale, including species of national and global conservation importance. These include: the insect species *Cerambyx cerdo*; fish species *Acipenser sturio*, *Acipenser naccarii*, *Acipenser stellatus*, *Salmothymus obtusirostris* and *Chondrostoma scodrensis*; birds; *Pelecanus crispus*, *Anser erythropus*, *Branta ruficollis*, *Oxyura leucocephala* ,*Marmaronetta angustirostris* and *Numenius tenuirostris*; and mammals; *Rhinolophus euryale* and *Myotis capaccinii*.

Table 4 Number of Fauna Species of National and Global Conservation Importance Inhabiting Lake Shkodra and River Buna Ramsar Site

Fauna Type	Species of National Conservation Importance	Species of global Conservation Importance
Mollusc	34	1
Insects	13	2
Fish	44	14
Amphibians	11	1
Reptiles	10	1
Birds	88	9
Mammals	16	8

Thirty-six plants listed on the National Red List as being of unfavourable conservation status inhabit the site, of which twelve are listed as endangered, twelve as vulnerable, ten as rare, one sub-species is considered to be endemic (*Querqus robur* subsp. *scutariensis*[1]) and there is insufficient knowledge regard the remining two species. A total of 108 plant species recorded in the Ramsar Site are listed in the Red List of Peatlands of International Biodiversity Conservation Importance in Europe (Heinicke & Joosten).

This area is characterised by a high diversity of fish species, due to diversity of its water resources (i.e. fresh, brackish and marine) and habitats. The hydrological network of the Southwestern Balkan, Shkodra Lake, rivers Buna and Drin (including Ohrid and Prespa

[1] This species is not listed as a valid sub-species on resources such as IUCN and Kew Plant Database and therefore its endemic status cannot be confirmed.

lakes) provide foraging, spawning habitat and nursery ground for fish in addition to habitats for migratory fish (ichthyofauna). The Buna River is a migration corridor for thirteen fish species who migrate from the sea to these lakes and rivers. Six of these migratory fish species are globally rare and threatened as listed above.

The Ramsar site is one of the three migration routes for European birds in the north to south direction and provides wintering habitat (in the Eastern Mediterranean) for woodlark (*Lullula arborea*; IUCN least concern) that accounts for approximately 1% (over 10.000 individuals) of the species European population. Bird monitoring at the site has reported wintering water birds to have reached between 24,000 – 30,000 individuals (Hagemeijer et al. 1993; Bino 2002, Schneider-Jacoby et al. 2004). Waterbirds recorded in the site in 2003- 3004 in large numbers include great cormorant (*Phalacrocorax carbo*; approximately 3100 individuals), Dalmatian pelican (*Pelecanus crispus*; approx. 30 individuals) and spotted redshank (*Tringa erythropus*; approx.1000 individuals) (Schneider-Jacoby et al. 2004).

For the purposes of this assessment it is assumed that the boundary of the candidate Emerald site is consistent with the Ramsar site.

2.2 Qualifying features of the Ramsar site[2]

A description of the criteria for which the Lake Shkodra and River Buna Ramsar Site qualifies is provided in Table 4. As no specific citation for the candidate Emerald site or list of conservation objectives for the Ramsar site is available, this assessment is based on the qualifying features described in the Ramsar citation and the conservation objectives for wildlife set out in the Buna River Management Plan which are:

- Measure 1.1: Preservation of pastures
    - objective:
        - Maintain the status of alluvial forests, wetlands, dry oak forests, shrubs and meadows and improve the condition of forests along rivers and sand dunes within Buna River Protected Landscape.
- Measure 1.2: Conservation of wild fauna
    - objectives:
        - 1) Improving knowledge about fauna (mammals, birds, reptiles, amphibians, freshwater fish and invertebrates) and the conservation status of target species.
        - 2) Improving protection and achieving sustainable use of wild fauna.
- Measure 1.3: Conservation of water resources
    - objective:
        - Evaluating and mitigating the Buna River Protected Landscape hydraulic risk, as well as improving public awareness in terms of correct waste management.

[2] Criteria definition provided in Appendix 2

Table 5: Qualifying features of the Ramsar site

Criterion number	Qualifying Criterion	Description
1	*A wetland should be considered internationally important if it contains a representative, rare, or unique example of a natural or near-natural wetland type found within the appropriate biogeographic region.*	The hydrographic net Lake Shkodra – River Buna – Velipoja Coast represents a wide variety of habitats, communities and landscape values. They consist of transboundary freshwater ecosystems (lake and river), Buna delta, seacoast (Velipoja), coastal lagoon (Viluni), floodplain forests, sand dunes, freshwater marshlands, calcareous and karst formations, subterranean waters, human-made ponds, irrigated lands, wet pastures, arable lands, etc. All these habitats shelter a high diversity of flora and fauna and make the relevant area one of the most diverse and abundant sites in the South Balkan and Adriatic coast. In the hydrologic aspect, the role of this hydrographic net affects a very large area. Connection Shkodra Lake - River Buna - River Drin determines the hydrologic regime of Shkodra Lake, River Buna itself, their tributaries in the catchment area and has an important impact on the morphology of Buna delta. Through Buna mouth, this connection ensures the migration of aquatic species from Shkodra Lake and its tributaries to Adriatic Sea, but also from Ohrid and Prespa Lakes (through connection with Drin River), affecting a large area covered by the hydrographic net of the south western Balkan.
2	*A wetland should be considered internationally important if it supports vulnerable, endangered, or critically endangered species or threatened ecological communities.*	The Ramsar area supports 36 global threatened animal species. Referring to IUCN Red List of Threatened Species (2005), 3 of those species are Critically Endangered (CR), 3 Endangered (EN), 8 Vulnerable (VU), 10 Lesser Risk (LR), 3 Data Deficient (DD) and 7 species have NT status. Insecta • *Cerambyx cerdo* Pisces • *Acipenser sturio* • *Acipenser naccarii* • *Acipenser stellatus* • *Salmothymus obtusirostris* • *Chondrostoma scodrensis* Aves • *Pelecanus crispus* • *Anser erythropus* • *Branta ruficollis* • *Oxyura leucocephala* • *Marmaronetta angustirostris*

		• *Numenius tenuirostris* Mammalia • *Rhinolophus euryale* • *Myotis capaccinii* 36 plant species found at the proposed Ramsar area belong to the Albanian Red Book, 12 of them are considered as Endangered, 12 as Vulnerable, 10 as Rare and 2 species are Insufficiently known. The presence of 1 endemic subspecies should also be noted (Quercus robur (L.) subsp. scutariensis). (further details see section 19)
3	*A wetland should be considered internationally important if it supports populations of plant and/or animal species important for maintaining the biological diversity of a particular biogeographic region.*	The relevant area shelters a high proportion of biodiversity of Albania and Southwestern Balkan, with importance for maintaining the biological diversity in the region. One of the most important regional ecological features of the area is the biological migration, especially for fish and birds. For fish, this area maintains the presence and reproduction of migratory species of a large area covered by the hydrographic net of the Southwestern Balkan, connected with Shkodra Lake, rivers Buna and Drin (including Ohrid and Prespa lakes). This area contains 14 fish species and subspecies of global conservation concern (see item 20. Noteworthy fauna for details). According to bird counts of Schneider-Jacoby et al. (2003 - 2004), this area appears to be an important wintering area in the Eastern Mediterranean for Woodlark *Lullula arborea,* which may hold about 1% (over 10.000 individuals) of the species European population. In national level, this area supports an important proportion of the biodiversity, in qualitative and quantitative aspect. In the following, there is a list with the species number of the most known animal groups of the area and its percentage in national scale (see Appendix 2 for details).
4	*A wetland should be considered internationally important if it supports plant and/or animal species at a critical stage in their life cycles, or provides refuge during adverse conditions.*	This area is a part of one of the three migration roads of European birds in the direction north – south. So, it plays a very important role for maintaining bird diversity at regional level. It is a shelter for 9 bird species of global conservation concern (see item 20. Noteworthy fauna for details). This area is a nesting site also for bird species of European conservation concern, such as Levant Sparrow Hawk *Accipiter brevipes*, European Nightjar *Camprimulgus europaeus, Coracias garrulus, Emberiza melanocephala, Lanius minor, Lanius senator, Oenanthe hispanica, Otus scops,* Eurasian Spoonbill *Platalea leucorodia* and Common Redshank *Tringa totanus*. Considerable breeding populations have been recorded also for *Actitis hypoleucos*, Kentish Plover *Charadrius alexandrinus, Charadrius dubius*, Stone Curlew *Burhinus oedicnemus* and Oystercatcher *Haematopus ostralegus*. Rrenci Mountain, in the southeastern part of the proposed Ramsar area, has a significant bio-ecological role, as a migration corridor for the big mammals of the Montenegrin side of Buna area toward Adriatic Sea in Albania. So, it plays the role of a natural bridge for terrestrial animals who cross Buna River (brown bear Ursus arctos, jackal Canis aureus, wolf Canis lupus, wild boar Sus scroffa, fox Vulpes vulpes)

5	*A wetland should be considered internationally important if it regularly supports 20,000 or more waterbirds.*	According to bird counts in Shkodra Lake, Buna River, Velipoja Reserve, seashore, Viluni Lagoon and marshes in surrounding areas (Domni, Pentari, Murtemza) included in the proposed Ramsar area, maximal number of wintering water birds has reached 24,000 – 30,000 individuals. These counts belong to Hagemeijer et al. 1993; Kayser et al. 1995, 1997; Bino et al, 1996; Bino 2001; Bino 2002, Schneider-Jacoby et al. 2003, 2004 (see item 32. Bibliographical references).
6	*A wetland should be considered internationally important if it regularly supports 1% of the individuals in a population of one species or subspecies of waterbird*	According to Schneider-Jacoby et al. 2004, their results of bird counts (2003 – 2004) and comparison with the results of the Wetlands International "Waterbird Population Estimates", 3d edition, 2002, 3 species reach the 1% criterion of the Ramsar Convention. The species and their counts from Schneider-Jacoby et al. 2004 are: *Phalacrocorax carbo* (3100) *Pelecanus crispus* (30) *Tringa erythropus* (1000)
7	*A wetland should be considered internationally important if it supports a significant proportion of indigenous fish subspecies, species or families, life-history stages, species interactions and/or populations that are representative of wetland benefits and/or values and thereby contributes to global biological diversity.*	Buna River is a migration road for reproduction or feeding of 13 fish species and subspecies from- and to the sea, for the waters connected with Shkodra Lake, rivers Buna and Drin (including Ohrid and Prespa lakes). Among these migratory species, 6 of them are globally threatened species: *Acipenser sturio, Acipenser naccarii, Acipenser stellaus, Alosa fallax, Lampetra fluviatilis* and *Lampetra planeri*.
8	*A wetland should be considered internationally important if it is an important source of food for fishes, spawning ground, nursery and/or migration path on which fish stocks, either within the wetland or elsewhere, depend.*	The proposed Ramsar area offers important food sources for fish, spawning grounds, nursery and migration paths on which fish stocks depend (either within the wetland or other habitats connected to them). This area has a high diversity of fish species, due to diversity of its water resources (fresh water, brackish water, marine water), (see also item 20. Noteworthy fauna). Coasts of Shkodra Lake and freshwater marshes of the area are very important spawning grounds for cyprinids (Fam. Cyprinidae). For some other species, such as mugillids (e.g. *Mugil cephalus, Liza ramada*) and sparids (e.g. *Sparus aurata*) coastal and lagoon waters are important spawning grounds, serving as a nursery for their young.

3 STAGE 1 SCREENING

3.1 Potential Impacts

3.1.1 Criterion 1

3.1.1.1 *Summary of qualifying information*

The hydrographic net Lake Shkodra – River Buna – Velipoja Coast represents a wide variety of habitats:

- transboundary freshwater ecosystems (lake and river)
- Buna delta
- seacoast (Velipoja)
- coastal lagoon (Viluni)
- floodplain forests
- calcareous and karst formations
- sand dunes
- freshwater marshlands
- subterranean waters
- human-made ponds
- irrigated lands
- wet pastures
- arable lands

All these habitats shelter a high diversity of flora and fauna and make the relevant area one of the most diverse and abundant sites in the South Balkan and Adriatic coast.

3.1.1.2 *Potential impacts during construction*

Likely significant effects from construction phase for criterion 1 have been identified from:

- habitat loss
- change in surface water quality
- air quality

The proposed road does not cross any wetland habitat and no major tributaries or creeks are located within the footprint of the proposed road alignment, construction access and associated facilities. As such there are no direct impacts to the wetland habitats, the coastal lagoon, or associated waterways within the Ramsar / Emerald site. However, the proposed project (including a buffer area of 50m either side of the alignment) will result in likely significant effects from the permanent loss of 14.29 ha of other, non-aquatic habitat from within the Ramsar/candidate Emerald site. Habitat losses within the Ramsar boundary are provided in Table 6 below.

Table 6: Summary of habitat loss within the Ramsar site

Habitat Type	Area (ha)
Broadleaved deciduous woodland	4.08
Coastal dunes and sandy shores	1.22
Coniferous woodland (Plantation)	0.17
Inland cliffs, rock pavements and outcrops	1.33
Low density buildings	2.85
Maquis, arborescent matorral and thermo-Mediterranean brushes	1.95
Miscellaneous inland habitats with very sparse or no vegetation	1.43
Temperate and mediterranean-montane scrub (Illyrian *Paliurus spina-christi* garrigues)	1.27
Grand Total	**14.29**

There are no likely impacts on the hydrology of the area through the pre-construction phase (habitat clearance) as the proposals do not affect aquatic habitats.

Indirect likely significant effects on surface water quality from the construction phase are likely to be in the form of suspended sediments generated from earthworks during periods of rain washing away exposed soil. Sediment-laden runoff has the potential to cause local effects on aquatic habitats smothering emergent and riparian vegetation and resulting in reduced biological fitness. In addition, sediment may cause the local loss of benthic habitats which in turn could affect the biological fitness of aquatic fauna. Nutrient loading from the sedimentation can in turn cause the formation of algal blooms which can impair water quality. Increased nutrients and turbidity from sediment runoff can also lead to the formation of blue-green algal blooms (Conley et al., 2009) which can impair water quality and adversely affect some aquatic fauna. Nutrients can also accumulate along the bottom of streams and lakes in calmer conditions and enhance eutrophication (Webster et al., 2001). Nitrogen and phosphorus are important nutrients in aquatic systems and phosphorus is considered the limiting nutrient for phytoplankton production in freshwater systems (Rabalais, 2002). Algal blooms are less likely to remain in systems that are periodically flooded, but the risk of occurrence is increased in areas of standing water such as the coastal lagoon and dune pools.

Any accidental spills of fuels, waste and grey-water have the potential to cause local contamination of water. This can in turn cause lethal and sub-lethal effects on aquatic biota.

Fugitive dust emissions, measured as particulate matter of varying particle size (e.g. PM10 and PM2.5) will be generated by land clearance and earthwork activities. Construction will expose an area to wind erosion / dust generation within Mount Renci. Significant dust emissions are also expected to result from the use and upgrade of the existing unsurfaced Rruga Banks Rrjollë road.

An accumulation of dust on leaves can block stomata and thereby impact on normal photosynthetic, transpiration and cellular respiration rate (Sharifi et al., 1997) and finer dust can be directly taken into the stomatal openings (Farmer, 1993) impairing the biological fitness of plants. Prolonged smothering can result in the mortality of an individual.

3.1.1.3 *Potential impacts during operation*

Likely significant effects from operation phase for criterion 1 have been identified from:

- change in surface water quality;
- air quality
- in-migration

Likely significant effects from sediment loading and eutrophication are likely to be smaller during the operation phase but there is still the potential for fuel spills, unplanned events and runoff from roads leading to contamination of water sources affecting downstream aquatic habitats. Nutrient, sediment, heavy metal and petroleum hydrocarbon loads can all cause changes to water chemistry and effects on aquatic habitats. Heavy metals can result from worn tires, exhausts, worn engine parts, brake linings and rust. Heavy metals are toxic to aquatic life and can potentially contaminate ground water. Road salts can also produce high sodium and chloride concentrations in ponds, lakes, and other aquatic habitats. This can cause fish kills and changes to water chemistry (USEPA website downloaded 2019).

Similarly, likely significant effects from fugitive dust emissions described in section 3.1.1.2 are likely to be smaller during the operational phase.

Project-induced in-migration is expected to increase the exploitation of natural resources (i.e. herbs, grasses and timber) and habitat clearance for agro-pastoral activities and the establishment of settlements. Natural resource collection (i.e. sage and timber) is likely to be highest in the areas around existing settlements such as Shëngjin and Banks Rrjollë whereas agro-pastoral activities may occur along the edge of the proposed road on the flatter topographic areas of Mount Renci. Mediterranean evergreen Quercus forest, coniferous forest and maquis scrub are likely to be targeted for timber collection. Sage plants growing within vegetated scree habitats of Mount Renci are likely to be targeted for non-timber forest products. These activities will cause increased pressure on natural resources.

Indirect habitat loss and degradation from habitat clearance and the encroachment of settlements adjacent to the proposed road alignment pose a significant threat, potentially further contributing to direct loss of species of importance listed in the Ramsar citation. The operating road system will also increase accessibility along Mount Renci and Banks Rrjollë which may stimulate renewed interest in farming in this area leading to the loss of natural habitats and plant species associated with them.

3.1.2 Criterion 2

3.1.2.1 *Summary of qualifying information*

According to the citation the proposed Ramsar area supports 36 globally threatened animal species as listed in the Albanian Red List.

Fourteen vulnerable, endangered or critically endangered fauna species are listed as present in the Ramsar citation. Since the publication of the citation some species assessments have changed. However, a precautionary approach has been adopted and until the Ramsar citation is updated to reflect the current status of wildlife in the region all species have been included in the evaluation.

3.1.2.2 *Potential impacts during construction*

Invertebrates

- great capricorn beetle (*Cerambyx cerdo*) - IUCN Vulnerable; Albanian Red Data Book listed Endangered Habitats Directive – Annex II & IV

Although the IUCN assessment in 1996 does not list Albania as part of its geographical range, this species is listed within the Ramsar citation and is therefore assumed to be present.

Likely significant effects from the construction phase for invertebrates under criterion 2 have been identified from:

- habitat loss

This species is a saproxylic species utilising deadwood of standing veteran oaks (*Quercus sp*) and other deciduous trees. It is associated with forested hills at low altitude but as it relies on decaying trees is more often found in old natural open semi-natural forests, landscape parks and other man-made environments (EU WSFP 2009). Quercus forests will be directly affected by the construction but at present the level of survey detail does not allow for a detailed understanding of whether deadwood habitat suitable for this beetle is present within the construction footprint. Likely significant effects from habitat loss and degradation are considered as a precautionary approach until presence of potential habitat can be confirmed or denied.

Fish

Five fish species are listed under criterion 2 of the Ramsar citation:

- European sea sturgeon (*Acipenser sturio*) - IUCN Critically Endangered; Albanian Red listed Endangered
- Adriatic sturgeon (*Acipenser naccarii*) - IUCN Critically Endangered; Albanian Red listed Endangered
- stellate sturgeon (*Acipenser stellatus*) - IUCN Critically Endangered; not evaluated by the Albanian Red List
- Adriatic salmon (*Salmothymus obtusirostris)* -- IUCN Least Concern; Albanian Red listed Endangered
- *Chondrostoma scodrensis* – IUCN Extinct

Based on up to date information from IUCN and National Oceanic and Atmospheric Administration (NOAA 2019) all three of the sturgeon species may no longer be present within the landscape but as no site-specific data is available a precautionary approach has been taken with the assumption they are present or could be present in the Buna catchment. Information from a local fish specialist suggests that *Acipenser sturio* uses Skadar Lake for spawning from the Adriatic Sea through Bojana River. This fish was once common in Skadar Lake and it was important for fishing. As in other Adriatic rivers, the population of this fish has dramatically decreased but may still be present in very low numbers in Buna River.

Chondrostoma scodrensis was formerly restricted to the Lake Skadar basin in Albania and Montenegro but is now extinct (Crivelli, A.J. 2006).

Likely significant effects from construction phase for fish listed under criterion 2 have been identified from:

- change in surface water quality

There will be no direct likely significant effects on the marine or riparian habitats from the road construction. Indirect impacts from sedimentation may occur, but as the project does not cross any major rivers, potential impacts are limited. No assessment of impacts from sediment loading on aquatic habitats has been undertaken but even when taking a precautionary approach it is still considered that any sedimentation that may arise is not considered to be of a scale sufficient to cause significant sedimentation load within the aquatic habitats utilised by these fish.

Salmothymus obtusirostris zetensis, inhabits the Zeta and Morača River in Montenegro in their lower parts of flow and very low presence is observed in the upper reaches of the Buna River. The population of this species is very low and decreasing. This species utilises cold streams and small rivers, usually in deep, quiet places at high altitude (Crivelli 1996). Potential sedimentation and nutrient loading from construction activities would not affect these high-altitude streams and therefore no likely significant effects are expected on this species.

Avifauna

Six bird species are listed under criterion 2 of the Ramsar citation:

- Dalmatian pelican (*Pelecanus crispus*) - IUCN Least Concern; Albanian Red listed Critically Endangered
- slender-billed curlew (*Numenius tenuirostris*) – IUCN Critically Endangered; Albanian Red listed Critically Endangered
- lesser white-fronted goose (*Anser erythropus*) – IUCN Vulnerable,
- red-breasted goose (*Branta ruficollis*) - IUCN Least Vulnerable; Albanian Red listed Critically Endangered
- white-headed duck (*Oxyura leucocephala*) – IUCN Endangered; Albanian Red listed Critically Endangered
- marbled teal (*Marmaronetta angustirostris*) – IUCN Vulnerable

In 2017 Dalmatian pelican was downlisted by the IUCN to near threatened from previous vulnerable status due to successful conservation efforts in Europe and stable populations in parts of its range (Birdlife 2018).

The population of slender billed curlew is assumed to be very small (fewer than 50 individuals) based on the lack of recent records. There are no recent confirmed sightings of this species within Europe, where it formerly regularly wintered (Birdlife 2018). This species is unlikely to be present within the Emerald / Ramsar site based on existing information but with a paucity of data a precautionary approach has been taken and effects on this species have been assessed. None of these six species was identified from within the project area during the additional baseline field surveys but taking a precautionary approach they may found in the wider environs and therefore likely significant effects have been assessed.

Likely significant effects from construction phase for birds listed under criterion 2 have been identified from:

- change in surface water quality
- disturbance (noise and vibration)

There will be no direct impacts on wetlands, rivers or other aquatic habitats during the pre-construction phase (habitat clearance) and therefore no direct habitat loss for the four wildfowl listed above.

Soil erosion from construction activities has the potential to cause sedimentation and nutrient loading on receiving waters. These impacts described for criterion 1 may cause a reduction in forage availability and ingestion of sediment laden water could cause a reduction in the biological fitness of these species.

The Viluni coastal lagoon is located *c*. 400m from the western end of the proposed road footprint. There is the potential for construction activities to cause anthropogenic noise and visual disturbance to wildfowl using the lagoon and depending on the noise levels to habitats further to the west. Disturbance can cause a displacement of the local population which may affect total food supply, foraging efficiency and energy expenditure due to flight (Riddington et al 1996.) Disturbance varies depending on the magnitude, duration, location and predictability of the source and susceptibility to this disturbance depends on the season, species, forage availability and weather conditions. Species are usually more susceptible during spring and autumn passage as they have not had time to become habituated to anthropogenic affects. Data on predicted noise levels are not available and therefore a precautionary approach has been taken. Likely significant effects on these birds are expected from noise disturbance.

Mammals (bats)

Two mammal species (bats) were identified under this criterion:

- Mediterranean horseshoe bat (*Rhinolophus Euryale)*; IUCN listed Near Threatened; Albanian Red Data Book listed vulnerable
- long-fingered bat (*Myotis capaccinii*) IUCN listed Vulnerable; Albanian Red Data Book listed Locally Rare.

Mediterranean horseshoe bat was downlisted by the IUCN from Vulnerable to Near threatened in 2008. Both of these species were identified within the project area and surrounding environs during the additional baseline field surveys.

Likely significant effects from construction phase for mammals listed under criterion 2 have been identified from:

- habitat loss
- change in surface water quality
- disturbance (noise and vibration)
- light spill

The Long-fingered Bat (*Myotis capaccinii*) depends strictly on aquatic habitats. It forages over wetlands and waterways (including artificial waterbodies, such as canals and reservoirs), also scrub. It prefers clutter-free environments to forage. It generally roosts in underground habitats (principally caves). In the Balkans it is confined to karst areas. Movements between summer and winter colonies are mostly within a distance of 50 km

(Paunović, M. 2016). This species was found to be breeding in a disused military bunker within the Buna River Protected Landscape, 1.5km from the project area.

There will be no direct loss of forage habitat for long-fingered bat but the construction through the karst habitats has the potential to adversely affect potential roosting sites (caves, military tunnels / bunkers and buildings). Any blasting, tunnelling or piling works within the mountainous habitat could destroy caves through rock fall and any building demolition has the potential to affect bat roosts.

Mediterranean horseshoe bats (*Rhinolophus euryale)* feed in woodland, riparian and scrub habitat and roost most commonly in underground sites (Juste, J. & Alcaldé, J. 2016). This species was found to be breeding in a disused military bunker within the Buna River Protected Landscape, 1.5km from the project area.

The loss of oak woodland habitat will reduce available forage area for the Mediterranean horseshoe bat and any direct or indirect effects on caves, bunkers and buildings has the potential to affect roosting sites.

Sedimentation and nutrient loading of surface water described under criterion 1 could also have effects on the abundance of aquatic biota on which long-fingered bats prey. A study on long-fingered bats in Italy concluded that generally the species preferred large (5m plus diameter) calm waters bordered by well-developed riparian vegetation and that their diet was dominated by pollution-tolerant insects (e.g. Chironomus midges) but bats preferred to forage in less polluted waters. Localised low levels of sedimentation are therefore unlikely to significantly affect the prey availability of this species.

Noise and vibration from construction activities near to bat roosts, especially if activities are carried out during night time, have the potential to cause acoustic trauma, displacement from important food and shelter resources, and signal masking. Bats are fully dependent on echolocation and passive listening for survival (both social interactions and navigation) and therefore acoustic trauma is potentially very serious (Caltrans 2016).

Artificial lighting is thought to increase the chances of predation and bats may modify their behaviour to avoid this threat (BCT 2018). Illumination of a bat roost can reduce the utilisation of the roost and can cause abandonment. At minimum it can delay the departure time from a roost to forage which can lead to less efficient foraging. Lighting of a flight path can be as detrimental as effects on the roost itself as bats avoid lit areas and can no longer access forage areas (BCT 2018.) Lighting of construction compounds overnight near a roost or on a commuting route could have effects on the local population of these bats.

3.1.2.3 *Potential impacts during operation*

Invertebrates

There will be no operational impacts from the road project on the great capricorn beetle as the operation of the road will not adversely affect standing dead wood habitat on which it depends.

Fish

Likely significant effects from operation phase for fish listed under criterion 2 have been identified from:

- change in surface water quality

- in-migration[3]

The operation of the road is likely to result in lower levels of sedimentation than the construction phase and therefore no adverse impacts on fish during construction or operation are considered likely.

Likely significant effects from project induced in-migration have been identified. The road will encourage people to the area and their actions may affect species and habitats within the protected area. Increased rates of fishing will have direct effects on fish abundance and the secondary effects of waste and runoff may cause indirect impacts to fish in marine and aquatic habitats.

Avifauna

Likely significant effects from operation phase for avifauna listed under criterion 2 have been identified from:

- change in surface water quality;
- in-migration;
- disturbance (noise and vibration.)

The potential impact on surface water quality described under criterion 1 may affect aquatic biota in the wetland habitats which in turn would affect the wading birds feeding on the aquatic invertebrates.

Potential impacts from disturbance described for birds in section 3.1.2.2 is also relevant to the operational phase. Vehicle movement will create frequent noise but as the noise will be continuous rather than sporadic water birds in adjacent habitats may become habituated.

Likely significant effects from project induced in-migration have been identified. Increased natural resource collection (i.e. fruits, herbs and timber) may degrade fauna habitat quality and cause a decrease in available resources for birds using wetland habitats. The increase in people in the region will also cause elevated noise levels causing increased disturbance to birds.

Mammals (bats)

Likely significant effects from operation phase for mammals listed under criterion 2 (bats) have been identified from:

- disturbance (noise and vibration)
- direct mortality from vehicle collision
- light spill
- in-migration

As discussed in the construction impacts the lighting of the road during the operational phase of the project has the potential to restrict movement of bats and may affect traditional commuting routes to forage habitat. Bats use linear habitat features to aid navigation and a road with lighting may sever a linear feature. This fragmentation may

[3] Project induced in-migration is the influx of people into a region as a result of a project. It can be driven by economic or social reasons.

result in effects on the long-term viability of the local bat population if the road is found to sever a commuting and foraging corridor.

The operating road may stimulate the establishment of urban development along the alignment (i.e. housing and holiday accommodation), particularly along the flat topographical landscapes of Mount Renci and also renew interests in farming in this area to the increased access. These forms of indirect fauna habitat loss would further compound the impact of disturbance to roosts and a reduction in available forage habitat.

3.1.3 Criterion 3

3.1.3.1 *Summary of qualifying information*

The Ramsar site shelters a high proportion of biodiversity of Albania and Southwestern Balkan, with importance for maintaining the biological diversity in the region. One of the most important regional ecological features of the area is the biological migration, especially for fish and birds. At a national level it supports an important proportion of biodiversity and is an important wintering site for European woodlark.

3.1.3.2 *Impacts during construction*

Vascular plants

Lake Shkodra and River Buna Ramsar site reportedly supports the following vascular plant species which are threatened and rare in Albania (Table 7).

Table 7: Vascular plant species listed under criterion 3

Common name	Scientific name	IUCN conservation status	Albanian red list status	Habitat association
European waterclover	*Marsilea quadrifolia*	LC	EN	Aquatic
Marsh pennywort	*Hydrocotyle vulgaris*	LC	VU	Aquatic
European frogbit	*Hydrocharis morsus-ranae*	LC	VU	Aquatic
Lax-flowered orchid	*Anacamptis laxiflora*			Wetlands
Orchis des Marais	*Anacamptis palustris*	LC		Wetlands
Sea daffodil	*Pancratium maritimum*		EN	Maritime sands
	Desmazeria marina		VU	Maritime sands
Sea grape	*Ephedra distachya*	LC	EN	Shrubland, rocky areas, grassland, desert, marine coastal/suprtidal
Wild olive	*Olea oleaster*			Widespread
Bay laurel	*Laurus nobilis*	LC	EN	Widespread
Flowering-rush	*Butomus umbellatus*	LC	VU	Wetland/Aquatic

Common name	Scientific name	IUCN conservation status	Albanian red list status	Habitat association
Great fen-sedge	*Cladium mariscus*	LC	VU	Aquatic, wetlands
Yellow water-lily	*Nuphar lutea*	LC	VU	Aquatic
European white waterlily	*Nymphaea alba*	LC	VU	Aquatic
	Nymphoides peltata	LC	VU	Wetlands
Arrowhead	*Sagittaria sagittifolia*	LC	VU	Wetlands
Water caltrop	*Trapa natans*		EN	Aquatic
Maidenhair Fern	*Adiantum cappilus-veneris*	LC	VU	Terrestrial – rocky crevices
Lesser water-plantain	*Baldellia ranunculoides*	NT	CR	Wetlands, marine coastal/supratidal
Greater duckweed	*Spirodela polyrhiza*	LC	VU	Wetlands
Field elm	*Ulmus minor*	DD	VU	Wetlands
	Hippuris vulgaris	LC	CR	Wetlands
Crack willow	*Salix fragilis*	N/A	VU	Riparian
	Nymphoidetum peltata	LC	VU	Wetlands

These species are all listed LC by the IUCN Red List of Threatened Species (2018) but are considered to be of conservation importance in Albania. The detailed botany survey of the proposed site, undertaken in May 2019, did not identify any of the species listed in Table 7 but did record the following additional plants listed on the Albanian Red List of Threatened Species:

Albanian Red Listed CR:

- *Punica granatum*

Albanian Red Listed EN:

- *Colchicum autumnale*
- *Galatella albanica* - A national endemic located in *Quercus trojana* woodlands
- *Origanum vulgare*
- *Hypericum perforatum*
- *Quercus ilex*

Albanian Red Listed VU:

- *Arbutus unedo*
- *Erica arborea*
- *Juniperus oxycedrus ssp. Macrocarpa*
- *Ostrya carpinifolia*

- *Quercus pubescens*
- *Salvia officinalis*
- *Satureja montana*

Albanian Red Listed LRcd:

- *Crataegus heldreichii*

According to the Lake Skadar and River Buna Ramsar site information sheet (Ramsar, 2005) this Ramsar site supports the endemic *Quercus robur* spp *scutariensis.* The literature review identified one account of this subspecies as occurring within fragmented agro-pastoral land and meadows near the village of Gostilj near Lake Skadar (Pešić et al., 2018). European oak (*Quercus robur*) is IUCN LC and listed as VU by the National Red List, however neither red list mentions this particular sub-species. Furthermore, the review did not yield any information to validate the authority and validity of the taxonomic classification of this sub-species. The detailed botany survey undertaken in May 2019 did not identify this species within the project area and it is therefore considered not to be present.

Likely significant effects from construction phase for vascular plants listed under criterion 3 have been identified from:

- habitat loss
- change in surface water quality
- air quality

Many of the plant species listed in the Ramsar citation are associated with the aquatic habitats (including marine). There will be no direct impact on the aquatic habitat and therefore no direct loss of these species. The potential sedimentation and nutrient loading described under criterion 1 may cause adverse effects on these species.

The proposed construction footprint passes through areas of Mediterranean evergreen *Quercus trojana* woodland, maquis and scree which supports vascular plant species listed on the Albanian Red List including *Galatella albanica* which is a national endemic found in *Quercus trojana* woodlands. Habitat clearance for construction has the potential to cause direct loss of these species.

Fugitive dust emissions, measured as particulate matter of varying particle size (e.g. PM10 and PM2.5) will be generated by land clearance and earthwork activities. Impacts from the construction phase could therefore affect plants within the coastal lagoon and woodland habitats. An accumulation of dust on leaves can block stomata and thereby impact on normal photosynthetic, transpiration and cellular respiration rate (Sharifi et al., 1997) and finer dust can be directly taken into the stomatal openings (Farmer, 1993) impairing the biological fitness of plants. Prolonged smothering can result in the mortality of an individual.

Vehicles and plant machinery that use diesel fuel will generate combustion emissions such as CO, SO_2, NOx, particulate matter (PM10 and PM2.5) and VOCs. Respiration of oxides of nitrogen and sulphur can potentially have a significant impact on the biological fitness of vascular plants (Emberson et al., 2001).

Molluscs

The site supports a good assemblage of molluscs of which the following are listed *Unio elongates*, *Unio crassus* and *Microcondylaea compressa*. These three species are aquatic but for the purposes of this assessment it is assumed that molluscs of conservation interest may be associated with both terrestrial and aquatic habitats.

Likely significant effects from construction phase for vascular plants listed under criterion 3 have been identified from:

- habitat loss
- change in surface water quality

The construction phase will not directly affect wetland habitats and therefore no direct impact on aquatic molluscs are expected but there will be loss of terrestrial habitat in which molluscs may be found. Some habitat loss for terrestrial molluscs may occur but the proportion of habitat loss compared to the overall resource is small and therefore not significant. Sedimentation and nutrient loading described under criterion 1 may cause reduced biological fitness of molluscs in aquatic habitats within receiving waters.

Fish

Potential construction and operational impacts on fish are described under criterion 2. In addition to the fish species described under criterion 2 the following species of conservation importance have been identified in the region:

- *Chondrostoma ohridanus,* is endemic fish species for Ohrid – Skadar Lake system and half of the entire population inhabit the Skadar Lake system (including Buna River). There is a dramatic decrease in abundance over the last few years (Prof. Spase Shumka pers comm.)
- *Scardinius erythrophthalmus scardafa* (CR-Critically Endangered), has been recorded in Buna River (Prof. Spase Shumka pers comm.)
- European eel *Anguilla anguilla* (IUCN listed Critically Endangered, National Red List not evaluated)

The European eel is lives in fresh, brackish waterbodies and migrating down rivers to the pelagic marine waters to breed and spawn. Relatively little is known about its marine phase. They inhabit coastal water, transitional waters (i.e. estuaries and lagoons) and freshwater habitats (i.e. lakes, rivers, ponds etc), and is likely to be present within the coastal lagoon.

Likely significant effects from construction phase for fish under criterion 3 have been identified from:

- Change in surface water quality

The construction phase will not directly affect wetland habitats and therefore no direct impacts on freshwater fish are expected. Sedimentation and nutrient loading described under criterion 1 and 2 may cause reduced biological fitness of fish in aquatic habitats.

The region is an important migratory route for fish moving through the hydrographic net of the Southwestern Balkan, connected with Shkodra Lake, rivers Buna and Drin (including Ohrid and Prespa lakes). The construction will not directly affect any of the riparian or wetland habitat and therefore migratory fish and their habitats will not be

affected. If any sedimentation occurs, then it will be localised only meaning that the migratory routes and key spawning and feeding habitats will not be impacted.

Although the eel's habitat will not be directly affected any sedimentation and nutrient loading from the construction phase may affect the biological fitness of this species.

Amphibians

The project area is considered to offer potentially suitable habitat to support the following amphibian species of conservation importance:

- Balkan water frog (*Pelophylax kurtmuelleri*) – IUCN LC; Albanian Red List VU
- Alpine salamander (*Salamandra atra*) – IUCN LC; Albanian Red List low risk
- yellow-bellied toad (*Bombina variegate*) – IUCN LC; Albanian Red List low risk
- European green toad (*Bufotes viridis*) – IUCN LC; Albanian Red List low risk
- Greek stream frog (*Rana graeca*) – IUCN LC; Albanian Red List low risk
- common frog (*Rana temporaria*) – IUCN LC; Albanian Red List low risk
- European tree frog (*Hyla arborea* - IUCN LC; Albanian Red List low risk

Likely significant effects from construction phase for fish under criterion 3 have been identified from:

- Change in surface water quality

No direct impacts on wetland habitat will occur during the construction phase and therefore no loss of breeding and forage habitat or direct mortality to amphibians is expected. The sedimentation and nutrient loading described under criterion 1 may cause reduced biological fitness in amphibians present in aquatic habitats reached by receiving waters.

Reptiles

Woodland, scree and maquis habitat in the project footprint may support reptiles.

The project area is considered to offer potentially suitable habitat to support the following reptile species of conservation importance:

- European pond turtle (*Emys orbicularis*) – IUCN listed Near Threatened; Albanian Red List Near Threatened
- Hermann's tortoise (*Testudo hermanni*) – IUCN listed Near Threatened; Albanian Red List Near Threatened
- Western Caspian turtle (*Mauremys rivulata*) – Not IUCN listed; Albanian Red List VU
- European adder (*Vipera berus*) – IUCN listed Least Concern; Albanian Red List Near Threatened
- nose-horned viper (*Vipera ammodytes*) - IUCN listed Least Concern; Albanian Red List Near Threatened
- smooth snake (*Cornella austriaca*) - IUCN listed Least Concern; Albanian Red List Near Threatened
- four-lined snake (*Elaphe quatuorlineata*) - IUCN listed Least Concern; Albanian Red List CR
- European ratsnake (*Zamenis situla synonym Elaphe situla*) - IUCN listed Least Concern; Albanian Red List CR

- Aesculapian ratsnake (*Zamenis longissimus synonym Elaphe situla*) - IUCN listed Least Concern; not listed on the Albanian Red List;
- Balkan whip Snake (*Hierophis gemonensis*, synonym *Coluber gemonensis*) - IUCN listed Least Concern; Albanian Red List CR
- Balkan green lizard (*Lacerta trilineata*) - IUCN listed Least Concern; Albanian Red List Low Risk
- Kotchys Gecko (*Mediodactylus kotschyi*) - IUCN listed Least Concern; not listed on the Albania National Red List

Likely significant effects from construction phase for reptiles under criterion 3 have been identified from:

- habitat loss
- air quality
- direct mortality through vehicle collision and site clearance
- barrier to movement

Terrestrial habitat loss will result in less habitat availability for reptiles and has the potential to cause direct mortality as excavators and other machinery clear the construction footprint.

The construction activities will cause a physical barrier between areas of suitable habitat which may restrict movement of reptiles through the landscape. Reptiles will be less likely to cross open areas and may avoid areas with increased noise and activity from construction work.

Fugitive dust emissions may result in likely significant effects on reptiles. The magnitude of impacts to retiles arising from the inhalation of these emissions (dust and air pollutants) is dependent on the quantity, composition, respiratory rates and health of fauna. Emissions can cause irritation and impairment of respiratory functions, skin irritation and vision impairment of fauna. Potential impacts may be cumulative in nature.

Avifauna

The region is an important migratory route for a number of wildfowl, but no migratory species are present in globally significant numbers, triggering critical habitat. Migratory species mostly use the wetland habitats on passage and during the wintering phase. Raptors such as golden eagle (*Aquila chrysaetos*) and peregrine falcon *(Falco peregrinus)* use the inland cliff and rocky mountainous habitats; ground nesting birds such as rock partridge (*Alectroris graeca)* were observed in the sparsely vegetated areas and turtle dove (*Streptopelia turtur*), in the forest habitats.

Likely significant effects from construction phase for birds under criterion 3 have been identified from:

- change in surface water quality
- disturbance (noise and vibration)
- direct mortality through vehicle collision and site clearance

Wading birds are likely to be affected by noise and visual disturbance during construction from activities such as vehicle movements, pile drivers, excavators and other machinery.

Unfamiliar or loud noise and vibration emissions are known to evoke a flight reaction in avifauna. Birds are also known to experience stress, reduced biological fitness and decreased breeding success on exposure to noise (Francis and Barber, 2013). Chronic stress can increase species' susceptibility to diseases, pathogens and parasites (Dhabhar, 2002; Sapolsky et al., 2000). The distance at which a response is likely depends on the noise level and the individual species. The Viluni coastal lagoon is located *c*. 400m from the construction footprint and is therefore the area most likely to be affected by construction noise and activity.

The behaviour of birds could be adversely affected if vocalisations are masked or the perception of sound is inhibited by high noise and vibration levels, as a large proportion of these species rely on acoustic signals for courtship and mating and predator detection and avoidance. However, some birds are known to develop short-term adaptations to noise, such as vocal adjustments (i.e. changing song frequencies, amplitude or timing; Barber et al., 2010). Species that are quickly able to adapt to changes in ambient noise and vibration levels are less affected than species that are unable to adapt. If noise or vibration is perceived as a threat, animals can increase vigilance and anti-predator behaviour (Francis and Barber, 2013). The construction period is likely to be between twelve months to two years and noisy activities are expected throughout the majority of that period. If undertaken during sensitive periods during the species life cycle these activities could affect a breeding cycle causing more long-lasting effects.

Of particular importance in the region is the Eastern Mediterranean Woodlark *Lullula arborea*, which is considered to hold about 1% (over 10.000 individuals) of the species European population during the winter. This species inhabits open and semi-open habitats on well-drained often acidic or sandy soils but was not observed during the additional baseline surveys and is therefore not considered to be present within the project area.

There may be some direct mortality to birds through collision with vehicles and machinery particularly at dusk or dawn when birds are generally more active. If the road crosses a migration flight path, then mortality rates may be significant.

Mammals

The project area is considered to offer potentially suitable habitat to support the following mammal species of conservation importance:

- Eurasian badger (*Meles meles*) – IUCN listed least concern; Albanian Red Listed Endangered
- Fox (*Vulpes vulpes*) - IUCN listed least concern
- Wild boar (*Sus scrofa*) - IUCN listed least concern
- Marten species (*Martes sp.*)
- Brown bear (*Ursus arctos*) - IUCN listed least concern
- Grey wolf (*Canis lupus*) – IUCN listed least concern
- Golden jackal (*Canis aureus*) - IUCN listed least concern
- Otter (*Lutra lutra*) – IUCN near threatened
- Roe deer – (*Capreolus capreolus*) - IUCN listed least concern

Surveys of the project area in June 2019 confirmed that the following mammal species are present within the project area:

- lesser Horseshoe bat (*Rhinolophus hipposideros*) - IUCN NT in Europe
- Meditteranean Horseshoe bat (*Rhinolophus Euryale*) - IUCN Mediterranean VU; Albanian Red Listed VU
- Eurasian badger - IUCN LC; Albanian Red List EN
- golden jackal - IUCN LC; Albanian Red List VU
- wild cat (*Felis silvestris*) - IUCN LC; Albanian Red List EN

Likely significant effects from construction phase for mammals under criterion 3 have been identified from:

- habitat loss
- disturbance (noise and vibration)
- direct mortality through vehicle collision and site clearance
- barrier to movement

Pre-construction site clearance will result in the loss of woodland and scrub habitats that are likely to support these species.

Disturbance from construction activities may result in temporary displacement of these species from habitats surrounding the construction footprint. However, carnivore species and crepuscular / nocturnal species may still cross the construction area at night once activities have ceased. Site clearance may cause accidental death of small mammals that are unable to vacate or mortality from collision with construction vehicles as mammals attempt to cross the construction route. In addition to this the physical presence of the construction area may cause a barrier to movement between areas of retained habitat for those species who tend to use vegetation cover for concealment.

3.1.3.3 *Potential impacts during operation*

Vascular plants

Likely significant effects from operation phase for vascular plants under criterion 3 have been identified from:

- air quality
- change in surface water quality
- in-migration

Increased traffic use on the road may lead to localised air quality impacts as described for the construction phase. It is considered that the fugitive dust emissions will be less severe than during the construction phase but the NOX emissions may be higher during operation.

Sedimentation as described under section 3.1.1.3 (criterion 1) may affect some of the vascular plants described. However, the species of conservation interest are mainly floating-leaved and emergent aquatics that are less susceptible to effects than submerged species, so impacts will be minimal.

Impacts from in migration described under criterion 1 are also applicable here.

Molluscs

No operational impacts on molluscs are expected.

Migratory fish

Likely significant effects from operation phase for fish under criterion 3 have been identified from:

- change in surface water quality
- in-migration

Impacts from sedimentation during the operational phase are considered to be lower but there is still the potential for road runoff to cause increased nutrient loading and pollution to receiving waters.

Avifauna

Likely significant effects from operation phase for birds under criterion 3 have been identified from:

- change in surface water quality
- disturbance (noise and vibration)
- direct mortality through vehicle collision and site clearance
- in-migration

As described under criterion 2 the operational phase may result in disturbance to migrating and nesting birds using aquatic habitats especially the coastal lagoon which is *c*. 400m from the road. Disturbance impacts will be exacerbated by project induced migration with more people likely to be visiting the area.

Reptiles

Likely significant effects from operation phase for reptiles under criterion 3 have been identified from:

- direct mortality through vehicle collision and site clearance
- barrier to movement

Amphibians

Likely significant effects from operation phase for amphibians under criterion 3 have been identified from:

- direct mortality through vehicle collision and site clearance
- barrier to movement

Mammals

Likely significant effects from operation phase for mammals under criterion 3 have been identified from:

- direct mortality through vehicle collision and site clearance
- barrier to movement

- disturbance (noise)
- light spill
- in-migration

The operation of the road has the potential to create a barrier to movement of the species through the landscape as they avoid crossing the road. This may affect migration between wintering and summering areas and denning sites. If mammals do attempt to cross, vehicle movement along the road has the potential to cause mortality through collision with cars or due to steep slopes created by road infrastructure. Vehicle speeds will be higher during the operational phase and therefore more likely to cause mortality to large mammals than the construction phase.

Noise and light spill created by vehicle movement and road lighting will add to barrier effects and create fragmentation of habitats either side of the road.

Project induced migration from the road may result in increased pressure on natural resources in the area as described for vascular plants. Habitat loss could create a reduction in prey availability which may affect the survival of some carnivores. Alternatively, it could lead to increased conflict and persecution for example with the golden jackal which may be drawn to human presence as it tends to increase availability of food (carrion, refuse, and animal dung) (Hoffman 2018) but its presence may put it at greater risk of persecution.

Indirect fauna habitat loss from in-migration of people to the region would further compound the impact of direct fauna habitat loss, habitat fragmentation and serve as an additional barrier to the movement of wildlife, particularly wide-ranging species such as golden jackal. This may limit access the resources and reduce the current carrying capacity of the species' home ranges.

The road will also facilitate access to habitats in the vicinity of the road for illegal hunting. This will increase pressure on local fauna populations in the vicinity of the road if the hunting ban is not enforced.

Pest species (i.e. rodents and birds) and feral dogs may be attracted to the area if litter and food scraps are inappropriately disposed of by passengers and drivers when using the road, thereby creating potential for conflict and disease transmission.

3.1.4 Criterion 4

3.1.4.1 *Summary of qualifying information*

This area is a part of one of the three migration roads of European birds in the north – south direction and plays a very important role for maintaining bird diversity at a regional level. It is also important for nesting birds and the migration of large mammals.

3.1.4.2 *Potential impacts during construction*

Avifauna

The breeding bird survey undertaken in June 2019 identified 95 species of birds and of these, 87 were considered to be breeding in the survey area. Fifty-eight species were confirmed breeding while the rest are categorised either as probable breeding (12 species) or possible breeding (17 species).

Of the species observed, two globally rare and threatened species are breeding within the project area:

- European turtle-dove (*Streptopelia turtur*) – IUCN VU
- rock partridge (*Alectoris graeca*) – IUCN NT

One other species may be breeding outside of the project area but within the Ramsar site in wetlands nearby Baks-Rrjoll.

- Oystercatcher (*Haematopus ostralegus*) – IUCN NT at the global scale and VU in Europe

Furthmore, the survey identified the following rare and threatened species at the national level by the Albaina Red List (2013) that may be breeding within or near the project area.

Table 8: Results of the Breeding Bird Survey

Common name	Scientific name	Albanian Red List	Breeding status
Golden eagle	*Aquila chrysaetos*	EN	possible breeding
Eagle owl	*Bubo bubo*	CR	possible breeding
Common buzzard	*Buteo buteo*	VU (during breeding)	confirmed breeding
Short-toed eagle	*Circaetus gallicus*	VU	confirmed breeding
Peregrine falcon–	*Falco peregrinus*	VU (during breeding)	confirmed breeding
Hobby	*Falco subbuteo*	VU	possible breeding
Common kestrel	*Falco tinnunculus*	VU (during breeding)	confirmed breeding
Black-winged stilt	*Himantopus himantopus*	EN	possible breeding
Olive-tree warbler	*Hippolais olivetorum*	Data deficient	confirmed breeding
Yellow-legged gull	*Larus michahellis*	EN (during breeding)	possible breeding
European bee-eater	*Merops apiaster*	EN	confirmed breeding
European hoopoe	*Upupa epops*	VU	confirmed breeding

Likely significant effects from construction phase for migratory and nesting birds under criterion 4 have been identified from:

- habitat loss
- change in surface water quality
- disturbance (noise and vibration)

- direct mortality through vehicle collision and site clearance

Potential impacts on migratory birds are described under criterion 3 above.

The Ramsar site is a nesting site for bird species of European conservation concern as listed in Table 9.

Table 9: Summary of nesting birds listed under criterion 4 and their habitat associations

Common name	Scientific name	IUCN conservation status	Albanian red list status	Habitat association	Identified during breeding bird survey
Levant Sparrow Hawk	*Accipiter brevipes*	LC	CR	Forest, Grassland, Wetlands (inland), Artificial/Terrestrial, Shrubland	N
European Roller	*Coracias garrulus*	LC	CR	Forest, Artificial/Terrestrial, Grassland, Savanna, Shrubland	N
Black-headed Bunting	*Emberiza melanocephala*	LC		Grassland, Shrubland, Artificial/Terrestrial	N
Lesser Grey Shrike	*Lanius minor*	LC	DD	Grassland, Shrubland, Savanna, Artificial/Terrestrial	N
Woodchat Shrike	*Lanius senator*	LC		Forest, Artificial/Terrestrial, Shrubland, Grassland	Y (breeding)
Black-eared Wheatear	*Oenanthe hispanica*	LC		Rocky areas (eg. inland cliffs, mountain peaks), Shrubland, Artificial/Terrestrial	Y (breeding)
Eurasia Scops-Owl	*Otus scops*	LC		Forest, Shrubland, Artificial/Terrestrial	Y (possible breeding)
Eurasian Spoonbill	*Platalea leucorodia*	LC	EN	Forest, Marine Neritic, Wetlands (inland), Artificial/Aquatic & Marine, Marine Coastal/Supratidal	N
Common Redshank	*Tringa totanus*	LC		Marine Intertidal, Marine Coastal/Supratidal, Artificial/Terrestrial, Wetlands (inland), Marine Neritic	Y (possible breeding)

Common Sandpiper	*Actitis hypoleucos*	LC		Marine Intertidal, Forest, Marine Neritic, Artificial/Terrestrial, Artificial/Aquatic & Marine, Grassland, Wetlands (inland)	N
Kentish Plover	*Charadrius alexandrinus*	LC		Marine Intertidal, Marine Neritic, Wetlands (inland), Grassland, Artificial/Aquatic & Marine, Marine Coastal/Supratidal, Desert	Y (breeding)
European Nightjar	*Caprimulgus europaeus*	LC	LR	Forest, Grassland, Shrubland	Y (possible breeding)
Little Ringed Plover	*Charadrius dubius*	LC		Forest, Marine Neritic, Wetlands (inland), Marine Intertidal, Artificial/Terrestrial, Artificial/Aquatic & Marine, Grassland	N
Stone Curlew	*Burhinus oedicnemus*	LC	CR	Grassland, Shrubland, Artificial/Terrestrial	N
Oystercatcher	*Haematopus ostralegus*	NT	VU	Marine Intertidal, Marine Neritic, Wetlands (inland), Artificial/Terrestrial, Marine Coastal/Supratida	Y (probable breeding)

Species that utilise forest, scrub and scree habitats will be directly affected by habitat loss during the pre-construction (habitat clearance) stage. If the clearance is undertaken during the nesting season this may result in direct mortality of birds and disturbance of nesting species resulting in failed breeding attempts.

Wading and water birds that nest in aquatic habitats will not be directly affected by construction but indirect effects from sedimentation and nutrient loading of receiving waters may reduce biological fitness. Disturbance from noisy activities during pre-construction and construction (earthmoving, vehicle tracking, machine operation etc) and the physical presence of people in close proximity to nesting sites may result in birds abandoning nest sites. This impact has the potential to affect any species nesting on the coastal lagoon and those species utilising the woodland, maquis scrub and other habitats through which the construction passes.

Migratory mammals

Likely significant effects from construction phase for migratory mammals under criterion 4 have been identified from:

- habitat loss

- barrier to movement
- disturbance (noise and vibration)
- direct mortality through vehicle collision and site clearance

Mammals with large home ranges such as golden jackal may be affected by direct loss of habitat and barrier to movement formed by construction activities. The Ramsar citation suggests that large mammals use Mount Renci as a migration corridor to move through the landscape. This movement is important for access to forage resources but also allows for some genetic exchange between populations aiding the biological fitness of the species. The road may cause some displacement of species from parts of their range and cause a reduction in the carrying capacity of the landscape from lack of movement from coastal to mountain habitats.

Collisions with vehicles and disturbance are described under criterion 3.

3.1.4.3 *Potential impacts during operation*

Avifauna

Likely significant effects from operation phase for nesting birds under criterion 4 have been identified from:

- disturbance (noise and vibration)
- direct mortality through vehicle collision
- in-migration

Densities of breeding birds in woodland and open habitats adjacent to roads are often lower than in undisturbed habitat due to the reduction in habitat quality. Although species may become habituated to noise most species tend to avoid nesting on road verges and close to roads due to perceived threat, noise and lack of cover. The area of total habitat loss (8.09 ha) compared to the overall resource is low so nesting will likely occur in other areas of suitable habitat.

Likely significant effects from in-migration include habitat loss and degradation from increased development and increased disturbance from people and pets which can have an effect on bird nesting success.

Migratory mammals

Likely significant effects from operation phase for migratory mammals under criterion 4 have been identified from:

- disturbance (noise and vibration)
- direct mortality through vehicle collision
- barrier to movement
- in-migration

Barrier effects from the road will continue into the operation phase as mammals avoid the road. The design of the road through the mountainous section of the route may create a physical barrier to movement as sides will be near vertical as a result of the topography. Where animals do attempt to cross the risk of collision depends on the speed and

frequency of vehicles and risks are higher at dawn and dusk when animals are more likely to be moving through the landscape.

Effects from in-migration and disturbance are described under criterion 4.

3.1.5 Criterion 5

3.1.5.1 *Summary of qualifying information*

According to bird counts in Shkodra Lake, Buna River, Velipoja Reserve, seashore, Viluni Lagoon and marshes in surrounding areas (Domni, Pentari, Murtemza) included in the proposed Ramsar area, the maximal number of wintering water birds has reached 24,000 – 30,000 individuals.

3.1.5.2 *Potential impacts during construction*

The region is of importance for wintering wading birds. Likely significant effects on bird species are described under criterion 3 above and include:

- change in surface water quality
- disturbance (noise and vibration)
- direct mortality through vehicle collision

3.1.5.3 *Potential impacts during operation*

The region is of importance for wintering wading birds. Likely significant effects on bird species are described under criterion 3 above and include

- change in surface water quality
- disturbance from vehicles using the road during operation (particularly during breeding and migration periods when birds are most sensitive)
- direct mortality from vehicles using the road during operation (particularly if the road crosses a migration flight path)
- in-migration

3.1.6 Criterion 6

3.1.6.1 *Summary of qualifying information*

The site regularly supports 1% of the individuals in a population of the following species:

- *Phalacrocorax carbo*
- *Pelecanus crispus*
- *Tringa erythropus*

3.1.6.2 *Potential impacts during construction*

Likely significant effects on these species are the same as those listed for birds under other criteria:

- change in surface water quality from sediment laden run-off

- disturbance from noise and vibration from construction operations
- direct mortality from collision with vehicles and machinery

However, none of these three species were identified as breeding on or near the project area during the survey undertaken in June 2019.

3.1.6.3 *Potential impacts during operation*

Likely significant effects on these birds are described under criterion 3 above and include:

- change in surface water quality from polluted road runoff
- disturbance from vehicles using the road during operation (particularly during breeding and migration periods when birds are most sensitive)
- direct mortality from vehicles using the road during operation (particularly if the road crosses a migration flight path)
- effects of in-migration such as increased disturbance from tourists, waste, habitat loss from increased development

3.1.7 Criterion 7

3.1.7.1 *Summary of qualifying information*

Buna River is a migration road for reproduction or feeding of 13 fish species and subspecies, 6 of them are globally threatened species:

- *Acipenser sturio,*
- *Acipenser naccarii,*
- *Acipenser stellaus,*
- *Alosa fallax,*
- *Lampetra fluviatilis*
- *Lampetra planeri.*

3.1.7.2 *Potential impacts during construction*

Potential impacts on the three sturgeon were discussed under criterion 2. Three additional species have been identified under criterion 7:

- twaite shad – *Alosa falla*

Found off the southern shores of the Baltic, North Sea northward to Norway and the Atlantic coasts from Scotland and Ireland to Morocco. Adults migrate upstream to spawn, usually short distances – only a few kilometres above the limit of brackish water - but have been known to migrate further. In Albania, the species has ascended the River Drin to Lake Ohrid. At sea, the species is pelagic.

- river lamprey - *Lampetra fluviatilis*

Adults live in coastal waters and estuaries and spawn in strong-current habitats of rivers and streams. Widespread across western Europe. Occasionally recorded in Adriatic Sea and along coast of the Iberian peninsula and the species migrates into rivers in this area.

- brook lamprey - *Lampetra planeri*

Fairly widespread in western Europe, with some isolated populations found the Danube, Volga and as Pescara drainage on the Adriatic coast of Italy. Found in the lowland, piedmont and montane zone in clear, well oxygenated brooks. Ammocoetes (larval stage) live in detritus-rich sands or clay sediments.

The only potential impacts on migratory fish is possible sedimentation of surface waters leading to reduced biological fitness of fish as described under criterion 1.

The sturgeon species and shad will be restricted to the Buna and Drin rivers and therefore sedimentation is not a risk as the river is more than 1km away. Any accidental spills of fuel or oil would cause a pollution risk but because of the flat topography around the river the risks to aquatic habitats in these rivers is low.

3.1.7.3 *Potential impacts during operation*

Likely significant effects from operation phase for fish under criterion 7 have been identified from:

- change in surface water quality
- in-migration

Sedimentation levels are likely to be lower during the operational phase than construction. There is also the potential for runoff from the road during rainfall events causing short pollution of receiving waters.

Likely significant effects from in-migration leading to reduced water quality, increased fishing and habitat degradation may result in the effects on the local population of these species if their presence is established.

3.1.8 Criterion 8

3.1.8.1 *Summary of qualifying information*

The proposed Ramsar area offers important food sources for fish, spawning grounds, nursery and migration paths on which fish stocks depend (either within the wetland or other habitats connected to them).

3.1.8.2 *Potential impacts during construction*

As above the only potential impacts on fish, spawning grounds, nursery and migration paths is possible sedimentation of surface waters leading to reduced biological fitness of fish as described under criterion 1. These short-term impacts are not considered to be of a sufficient magnitude to affect feeding, spawning, nursery and migration paths for fish and therefore no likely significant effects are expected.

3.1.8.3 *Potential impacts during operation*

Likely significant effects from operation phase for fish under criterion 7 have been identified from:

- change in surface water quality
- in-migration

These impacts are described under criterion 7 in section 3.1.7.3.

3.1.9 In combination effects

The Albanian Development Fund have submitted an information request to the Albanian authorities and we are waiting for information in order to complete this section.

Activities within the study area, or that could have the potential for cumulative impacts include:

- Other road upgrades in the surrounding area including the transnational Adriatic Ionian highway. The Albanian stretch is part of the Blue Highway which connects the coast of Montenegro with Greece.
- upgraded infrastructure within Velipoje
- Shengjin Europort

Velipoje is a town that depends heavily on tourism, particularly during the summer months. In 2017, the official number of tourists visiting Velipoje was 830,000 and in Shengjin, the number was over 1 million. With an upgraded road between the two towns, these numbers are likely to increase as the road provides better access for those with cars and via bus. Recent news reports (May 3rd 2019) suggested that the Minister for Infrastructure and Environment would attempt to address the problems that arise during the tourist season. Meetings were held with tour operators in Shengjin and representatives of the chamber of commerce with pollution and road infrastructure both on the agenda.

As part of a wider national and regional roads project, linking the entire of Albania's coast with Macedonia to the north and Greece to the south, an increase in numbers of visitors to the region is even more likely.

The area is also characterized by recent rapid development, particularly along a narrow strip within 5 km of the coastline and highways (GWP-Med, PAP/RAC, UNESCO-IHP 2015). A construction boom, mainly affecting the coastal zone and the urban centres, in the 1990s was followed by increased informal development, of which there is insufficient control and inadequate mechanisms for the sanctioning of illegal buildings.

Anthropogenic activities in the region, mainly through the uncontrolled coastal development, population growth, increased economic activities and poor management of urban waste and wastewater are adding pressure on the watershed of the Buna Bojana watershed, affecting both the environment and human wellbeing.

The Shengjin Europort is a proposed development of the port of Shengjin, with aims to make it Albania's largest industrial port. This will enhance the connections between the South Adriatic and East Mediterranean with the rest of Europe. With an estimated capacity of 60 million tonnes per year, the port is expected to significantly increase the connectivity of neighbouring countries such as Kosovo, Serbia and Macedonia. Along with the port development, two tunnels were proposed to link the port beyond the Renci mountain rage. As of the time of writing, no investment has been made in this project.

Cumulative impacts from the operational phase of the road and the proposed projects described here are likely to exacerbate impacts on the qualifying features of the Ramsar site.

4 SCREENING MATRIX AND CONCLUSIONS

Impact	Habitat Loss / degradation		Barrier to movement		Change in surface water quality		Disturbance (noise and vibration)		Direct mortality		Light spill		Air quality		In migration
Phase	C	O	C	O	C	O	C	O	C	O	C	O	C	O	O
Criterion 1: Habitats	y[4]	n	n	n	y[5]	y[6]	n	n	n	n	n	n	y[7]	y[8]	y[9]
Criterion 2: IUCN Globally threatened species (great capricorn beetle)	y[10]	n	n	n	n	n	n	n	n	n	n	n	n	n	n
Criterion 2: IUCN Globally threatened species – Fish (*Acipenser sturio Acipenser naccarii Acipenser stellatus Salmothymus obtusirostris Chondrostoma scodrensis)*	n	n	n	n	y	y	n	n	n	n	n	n	n	n	y[11]

[4] Habitat loss within in Ramsar boundary but not affecting wetland habitats
[5] Nutrient loading from sediment laden run-off
[6] Sediment loading is considered to be significantly smaller during the operation phase
[7] Precautionary approach taken considering fugitive dust emissions
[8] Air quality modelling has not been undertaken but potential for raised Nox levels
[9] People moving to the region will put additional stress on resources from agro-pastoral activities, development and resource use (fuel, food)
[10] As impacts are easily avoidable this is not considered to be an LSE
[11] In migration may lead to increase in fishing activities and impacts on water quality

Impact	Habitat Loss / degradation		Barrier to movement		Change in surface water quality		Disturbance (noise and vibration)		Direct mortality		Light spill		Air quality		In migration
Phase	C	O	C	O	C	O	C	O	C	O	C	O	C	O	O
Criterion 2: IUCN Globally threatened species – birds (*Pelecanus crispus, Anser erythropus Branta ruficollis, Oxyura leucocephala, Marmaronetta angustirostris, Numenius tenuirostris*)	n	n	n	n	y[12]	y[13]	y[14]	y	n	n	n	n	n	n	y[15]
Criterion 2: IUCN Globally threatened species – mammals (*Rhinolophus Euryale, Myotis capaccinii*)	y[16]	n	n	n	n[17]	n	y	y	n	y	y[18]	y[19]	n	n	n

[12] Ingestion of sediment laden water reducing biological fitness
[13] Considered to be significantly smaller during operation phase
[14] No noise assessment has been undertaken so precautionary approach is used
[15] In migration may cause increased risk to birds from hunting and disturbance
[16] Precautionary approach taken until potential roost sites are confirmed or denied
[17] Although Myotis capaccinii feed on aquatic habitats any changes to water quality will not affect availability of prey
[18] Assumed some lighting during construction
[19] Assumed parts of the road will be lit when opertional

Impact	Habitat Loss / degradation		Barrier to movement		Change in surface water quality		Disturbance (noise and vibration)		Direct mortality		Light spill		Air quality		In migration
Phase	C	O	C	O	C	O	C	O	C	O	C	O	C	O	O
Criterion 3: Vascular plants of importance for the region	y[20]	n	n	n	y[21]	y	n	n	n	n	n	n	y[22]	y[23]	y
Criterion 3: regionally important for molluscs	y[24]	n	n	n	n[25]	n	n	n	n	n	n	n	n	n	n
Criterion 3: regionally important for amphibians	n	n	n	n	y[26]	n	n	n	n	y[27]	n	n	n	n	n
Criterion 3: regionally important for reptiles	y[28]	n	y[29]	y	n	n	n	n	y[30]	y[31]	n	n	y[32]	n	y[33]

[20] Precautionary approach taken assuming species may be present in the construction footprint
[21] Affecting aquatic plants only
[22] Assumed that there will be some impacts from dust – modelling required
[23] Lesser impacts from dust but potential for NoX
[24] Precautionary approach taken as details of habitat association for molluscs not known
[25] Although some changes to water quality may occur not considered to of a magnitude to affect these species
[26] As per molluscs
[27] Precautionary approach taken as some amphibians may attempt road crossing even though no ponds within construction footprint.
[28] Direct loss of scree, scrub and woodland
[29] Construction activities will hinder movement across the route
[30] Reptiles may be affected through habitat clearance
[31] Reptiles may be affected by vehicle collisions on the operational road
[32] Precautionary approach taken to dust until more information is provided
[33] In migration may lead to additional habitat loss and disturbance

Impact	Habitat Loss / degradation		Barrier to movement		Change in surface water quality		Disturbance (noise and vibration)		Direct mortality		Light spill		Air quality		In migration
Phase	C	O	C	O	C	O	C	O	C	O	C	O	C	O	O
Criterion 3: regionally important for fish (including migration)	n	n	n	n	y	y	n	n	n	n	n	n	n	n	y
Criterion 3: regionally important for birds (migratory and wintering)	n	n	n	n	y	y	y	y	y	y	n	n	n	n	y
Criterion 3: regionally important for mammals	y[34]	n	y	y[35]	n	n	y	y	y[36]	y[37]	n	y[38]	n	n	y
Criterion 4: nesting birds	y	n	n	n	y	n	y	y	y	n	n	n	n	n	y
Criterion 4: migratory mammals	y	n	y	y	n	n	y	y	y	y	n	y[39]	n	n	y
Criterion 5: Numbers of wintering water birds	n	n	n	n	y	y	y	y	y	y	n	n	n	n	y

[34] Loss of forage and resting sites
[35] Steep slopes and vehicle movements will hinder movement across road
[36] In particular small mammals may be affected by habitat clearance using machinery
[37] Levels of mortality depend on road speeds
[38] Assuming the road is lit when operational
[39] Assuming the road is lit when operational

Impact	Habitat Loss / degradation		Barrier to movement		Change in surface water quality		Disturbance (noise and vibration)		Direct mortality		Light spill		Air quality		In migration
Phase	C	O	C	O	C	O	C	O	C	O	C	O	C	O	O
Criterion 6: *Phalacrocorax carbo*[40]	n	n	n	n	y	y	y	y	n	y	n	n	n	n	y
Criterion 6: *Pelecanus crispus*[41]	n	n	n	n	y	y	y	y	n	y	n	n	n	n	y
Criterion 6: *Tringa erythrpous*[42]	n	n	n	n	y	y	y	y	n	y	n	n	n	n	n
Criterion 7: migration road for reproduction or feeding of fish species	n	n	n	n	y	y	n	n	n	n	n	n	n	n	y
Criterion 8: fish, spawning grounds, nursery and migration paths	n	n	n	n	y	y	n	n	n	n	n	n	n	n	y

[40] Assuming threshold is met based on up to date counts
[41] Assuming threshold is met based on up to date counts
[42] Assuming threshold is met based on up to date counts

4.1 Conclusions

The proposed development has the potential to give rise to some likely significant effects on the Candidate Emerald / Ramsar site; hence an Appropriate Assessment is required.

5 STAKEHOLDER CONSULTATION

5.1 Methodology

A stakeholder consultation workshop was held in Tirana on the 23rd January 2019. The following local and regional government and non-governmental organisations were represented:

- ADZM Lezhe (Regional Protected Areas Agency Lezhe)
- ADZM Shkoder (Regional protected areas Agency Shkroder)
- AKZM (National Protected Areas Agency)
- Albanian Development Fund (ADF)
- Protection and Preservation of Natural Environment in Albania (PPNEA)
- Albanian Ornithological Society (AOS)
- University Marin Barleti
- Albaglobal
- Ministry of Tourism and Environment (MTM)
- Klodioda (Designer)

The workshop involved a discussion of the current ecological understanding of the site, identified data gaps, likely significant effects for each qualifying feature and possible mitigation measures. Feedback was collated on feedback forms for analysis and notes were made of points raised during discussions.

5.2 Results

Collated answers from the feedback form are provided in Appendix 3 and a summary of answers is provided here.

When asked whether the attendees considered the scope of the HRA to be sufficient all attendees answered yes but one had concerns over the next phases of the road project that may lead to a bridge over the coastal lagoon, which could have significant impacts on birds.

The main impacts expected to arise from the project were listed as:

- Habitat loss
- Habitat fragmentation
- Disturbance (noise)
- Increase human pressure on traditionally used habitats
- Increased human pressure from poachers
- Effects on water quality from dumped materials

When asked specific questions about birds the concerns raised included the lack of information on the use of the area by non-waterbirds. Large roaming birds and passerines use the area but abundance and distribution is not so well known. The sensitive period for birds was considered to be breeding (February to April) and possibly migrating for terrestrial birds depending on how important this region is.

No particular concerns were raised over amphibians, reptiles or invertebrates.

Impacts on mammals that were discussed focused on habitat fragmentation and disturbance. Mitigation and or conservation measures considered important for mammals was securing connectivity among habitats throughout the region and helping the regional and national administration of protected areas protect the area against poachers.

No particular concerns were raised regarding Alien Invasive Species but it was thought that it was important to ensure the construction area was successfully returned to pre-construction state and habitat rehabilitation undertaken.

6 APPROPRIATE ASSESSMENT

6.1 Scoping and additional information

In order to fully understand the potential impacts from noise and vibration and from effects of air quality on habitat and species additional monitoring to establish a baseline and model the potential response is required. An assessment of potential impacts of noise, air quality and water quality has not been undertaken, so a precautionary approach has been taken for this assessment. Additional data will be used to adjust the mitigation measures once available.

6.1.1 Additional biological data

Data gaps for the following species groups were highlighted during the screening stage:

- birds
- fish
- bats
- plants

After the stakeholder consultation some correspondence was received from:

- a local fish expert but it did not provide significant data that can be used to inform the assessment.
- a local expert including some wintering bird counts. Information is still lacking on nesting and roaming species
- bat data for the Buna River area

Additional field survey work was undertaken in spring 2019 for:

- breeding birds
- vascular plants
- large mammals
- bats

6.2 Avoidance and Mitigation Measures

Mitigation measures are provided in Appendix 4 and full details can be found in the Biodiversity Management Plan (RSK 2019).

6.3 Assessment of Impacts on the Integrity of the site

6.3.1 Criterion 1

The proposed construction will result in the loss of the habitat types listed in Table 6.

The overall percentage loss compared to the available resource is small for all habitats and the construction does not result in the loss of any wetland or aquatic habitat. A Habitat and Species Rehabilitation / Restoration Pan and Landscaping Scheme will be devised and implemented to restore any habitats temporarily removed during construction for temporary worksites and other associated facilities. This plan will also include proposals for compensatory restoration to replace habitats permanently lost through the road construction. Mitigation measures provided in Appendix 4 will manage impacts associated with surface water quality and air pollution during the construction and operation phases. The project will work with the National Agency for Protected Areas and the Regional Agency of Protected Areas (Shkoder and Lezhe) to minimise and monitor project-related impacts to habitats arising from project-related in-migration including:

- collaboration with protected area managers to ensure indirect impacts to the Buna River Protected Landscape are adequately mitigated
- consultation with local authorities to minimise the impacts of in-migration on natural resource exploitation (including the collection of timber, non-timber products and hunting)

With this mitigation in place there will be no adverse effects on the integrity of the reserve from habitat loss.

6.3.2 Criterion 2

6.3.2.1 *Great Capricorn Beetle*

Additional information on this beetle was requested through stakeholder consultation but no further information was available.

With this paucity of data, it is considered that this beetle may be present in the Quercus forests and a precautionary approach has been taken to this assessment. Mitigation will involve a pre-construction survey to confirm presence or absence of this species and deadwood habitat that it uses. A mitigation plan for this species will be produced and implemented which will include the following:

- Standing deadwood will be retained in situ where possible. If deadwood habitat cannot be retained the wood will be moved to a suitable location outside of the road alignment.
- environmentally sensitive areas will be clearly marked and mapped as ‘No Go Areas’ (i.e. deadwood habitat) and access by staff and contractors will be strictly forbidden

With this mitigation in place there will no impacts on this beetle and therefore no effects on the integrity of the reserve.

6.3.2.2 *Fish*

Additional information was requested during the stakeholder consultation to gain a better understanding of the fish species discussed under criterion 2. Information received from a local expert provided confirmation of the following species:

- *Salmothymus obtusirostris zetensis,*
- *Acipenser sturio,*
- *Chondrostoma ohridanus,*
- *Scardinius erythrophthalmus scardafa*

Anecdotal evidence was provided during the workshop confirming that no sturgeon species had been caught by recreational or commercial fishing but this has not been confirmed with catch data. This assessment assumes all the species listed are present or potentially present.

Mitigation measures to protect surface water quality during construction and operation phases are described in Appendix 4 and include:

- staff and contractors will adhere to SOP2 (Appendix 4): Emission and Dust Control, Erosion and Suspended Sediment Control
- install sediment control systems (i.e. traps and dams) where necessary
- use and maintenance of an effective draining system to minimise the risk of suspended sediment loading and runoff

The project will work with the National Agency for Protected Areas and the Regional Agency of Protected Areas (Shkoder and Lezhe) to minimise and monitor project-related indirect impacts to fish arising from project-related in-migration.

With this mitigation in place there will be no significant impacts on these fish species and therefore no impacts on the integrity of the site.

6.3.2.3 *Birds*

Additional information was requested during the stakeholder consultation on some of the birds listed under criterion 2. Data provided by the Albanian Ornithological Society (AOS) for the Buna Vilopja area of the site shows no records of *Anser erythropus, Branta ruficollis, Oxyura leucocephala, Marmaronetta angustirostris* and *Numensis tenuirostris* from 1993. Additional field survey data was undertaken in June 2019 and incorporated into this assessment.

In 2017 Dalmatian pelican was downlisted by the IUCN to near threatened from previous vulnerable status due to successful conservation efforts in Europe and stable populations in parts of its range (Birdlife 2018). In addition, data from the bird census shows this species is only rarely identified in the area with five birds noted in 2018 and field surveys identified this species but not within the project footprint.

Mitigation measures to protect surface water quality during construction and operation will reduce impacts on aquatic birds.

As these species are very rare in this part of the protected landscape the potential impacts are unlikely to affect the abundance of local populations of these species. With mitigation in place there will be no significant impacts on the birds listed under criterion 2 and therefore no effects on the integrity of the site.

6.3.2.4 *Mammals*

Additional information on any known roost sites within the region was requested during the stakeholder consultation exercise. Information from the Conservation Action Plan for Bats in Shkoder / Skadar Lake Area revealed one confirmed bat roost in the project AOI (disused military bunker located *c*. 500m from the route on the beach; 8 species of bat including the listed *R. euryale.*) In addition, the field surveys identified 18 species of bat active in the region and four bat roosts located within 1.5 km of the project area (including an abandoned house located within the project footprint containing a possible maternity roost of *Rhinolophus hipposideros*, concluding that the area is important for bats.

As modelling of potential noise impacts has not been undertaken as part of the EIA, this assessment is written using assumptions based on our understanding of the construction methods and available literature on the impacts of noise on bats. Construction activities are likely to generate noise in the region of 41 db (normal speech) to 110db (jack hammer) based on a study by Caltrans (Caltrans 2016.) The excavation of the rocky substrate on Mount Renci is likely to generate the highest level of noise for the longest period, based on assumed levels of attenuation this sound is likely to affect species in an approximate 1km radius of the source based on a 84db source noise and a low background noise level (Caltrans 2016).

During the construction phase expected vehicle use per hour has been calculated at 1238 vehicle movements per day which is likely to generate 65db of noise if vehicles are moving at 70 mph based on study by Caltrans (2016.)

The road will be mainly unlit with just sections at the two ends within the towns of Shengjin and Baks Rrojlle being lit. There are no significant operational impacts on bats from lighting.

A detailed mitigation plan for bats will be produced and implemented and will include measures such as:

- Demarcation and mapping of habitat / land cleared areas. These mapped areas will be incorporated and implemented in the Habitat and Species Rehabilitation / Restoration Plan
- environmentally sensitive areas (including known bat roosts) will be clearly marked and mapped as ‘No Go Areas’ and access by staff and contractors will be strictly forbidden
- the project will work with protected area managers to secure the conservation and protection of bats roosts within the protected landscape
- production and implementation of a bat mitigation plan to devise methods to demolish the abandoned farm building without detrimental impacts to bats
- avoid using artificial lighting where possible, particularly in the Buna River Protected Landscape
- project vehicles will not be used at night within the project area
- use of capped / directional artificial lighting to focus lighting away from sensitive areas, particularly in the Buna River Protected Landscape
- the use of curtains and blinds in onsite project office and buildings

- avoidance of night working to avoid impacts to priority nocturnal, crepuscular fauna
- 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 Buna River Protected Landscape and regular vehicle / machinery maintenance to minimise noise and vibration.

Based on our current understanding of noise levels and with this mitigation in place, although there may be some minor impacts on bats from noise, there will be no significant effects on the integrity of the Ramsar / cEmerald site.

6.3.3 Criterion 3

6.3.3.1 *Vascular plants*

The majority of the plants listed under this criterion are associated with aquatic habitats which will not be directly affected by the development. Some are terrestrial and may be found within the construction footprint. A pre-construction survey for vascular plant species listed on the Albanian red list will be undertaken and a mitigation strategy devised and implemented based on the findings. Measures will include, where necessary:

- Demarcation and mapping of habitat / land cleared areas. These mapped areas will be incorporated into the 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
- preparation and implementation of a Habitat and Species Rehabilitation / Restoration Plan
- progressive habitat restoration along the margins of the right of way

Mitigation measures described for surface water quality under criterion 2 are also valid here to protect aquatic plants. Mitigation to control adverse impacts of air pollution during both construction and operation are described in Appendix 4. No emission modelling has been undertaken at this stage of the assessment, so a precautionary approach has been taken. Monitoring will be undertaken to inform the updated EIA and information from this assessment used to ensure mitigation measures described are adequate.

With this mitigation in place no significant impacts on vascular plants are expected, hence no effects on the integrity of the reserve.

6.3.3.2 *Molluscs*

A pre-construction survey will be undertaken to gain a better understanding of the species of mollusc that may be affected by the development. This will help guide mitigation measures which will include:

- measures to protect water quality during construction and operation which will protect aquatic snails
- 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
- preparation and implementation of a Habitat and Species Rehabilitation / Restoration Plan
- progressive habitat restoration along the margins of the right of way

With this mitigation in place there may be some minor residual effects from direct mortality of snails but these impacts are not considered to be of sufficient magnitude to affect the integrity of the Ramsar or cEmerald site.

6.3.3.3 *Amphibians*

Likely significant effects were identified from changes in surface water quality (construction and operation) and direct mortality during operation from vehicle movements. Mitigation measures described to protect water quality are described under in Appendix 4. In order to protect amphibians during the operational phase the road design includes a variety of wildlife passages that will allow safe movement of amphibians across the road. Movement of amphibians across the road is not likely to be in very high numbers as the wetland habitats are generally located to the south of the road meaning movement between ponds is likely to be in that region only. Seasonal streams which take flood water from the mountain will have culverts to take the water beneath the road, these will also double as amphibian underpasses.

With the road design and mitigation the effects on amphibians are considered to be minor and there will be no impacts on the integrity of the reserve.

6.3.3.4 *Reptiles*

Likely significant effects on reptiles include direct loss of woodland and scrub habitat and direct mortality during this work. Mitigation will involve a progressive and sensitive habitat clearance to minimise the risk of collisions and 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. The wildlife underpasses described for amphibians are also of use to reptiles to minimise the effects of the barrier to movement and direct mortality caused by the road during both construction and operation. The effects from air quality will be minimised using the mitigation measures and standard operating procedures described in Appendix 4.

With this mitigation in place there will be no significant effects on reptiles and hence no effects on the integrity of the Ramsar / cEmerald site.

6.3.3.5 *Fish*

Likely significant effects on fish have been identified from changes to water quality affecting biological fitness of fish and increased pressure from people during the operational phase using the natural resources and affecting fish habitat. Mitigation measures for water quality and in-migration described in section 6.3.2.1 are applicable here.

With this mitigation in place there are no significant residual effects on fish and hence no effects on the integrity of the Ramsar / cEmerald site.

6.3.3.6 *Birds*

Likely significant effects and mitigation measures for birds are described in section 6.3.2.2 and are also applicable under this criterion.

Although the region is important for migrating and wintering water birds the key migratory routes are the coastline and the waterways (Rivers Buna and Drin.) There will be no direct impacts on these routes or on the open water bodies used primarily for wintering and as such no significant impacts on migrating and wintering birds during construction.

As noise modelling has not been undertaken as part of the EIA this assessment is written using assumptions based on our understanding of the construction methods and available literature on the impacts of noise on birds. Noise attenuation measures will be used for any operations likely to exceed noise of 80 decibels (likely to include piling for pillars and work with excavators with jack hammers for breaking through rocky substrate on Renci mountain.) In addition, construction activities generating significant noise will not be undertaken close to sensitive habitats during the nesting and spring migration (March to June.) Noise monitoring in key sensitive habitats will be undertaken throughout construction and adaptive management implemented if necessary.

Potential impacts from in-migration will be managed through partnership working with the National and Regional Protected Area Agency's and will include measures to control illegal hunting.

The effects of in-migration and the success of mitigation is harder to quantify because these measures fall outside of the control of the project. One of the biggest threats to the region is poaching and the control of poaching will be critical in the conservation of the site. In addition to the project working with the National and Regional protected areas agencies the project should also commit to an ongoing monitoring and conservation initiative for birds. This may include increased policing to prevent poaching, educational programmes and other conservation initiatives for specific birds based on data from monitoring.

With this mitigation and the commitment to manage the impacts of in-migration there will be no significant impacts on birds and hence no effects on the integrity of the reserve.

6.3.3.7 *Mammals*

Likely significant effects on mammals include direct loss of habitat, barrier to movement during construction and operation, direct mortality and disturbance during both phases, light spill during the operation and in-migration during the operation phase.

As described for amphibians and reptiles the impacts created by the barrier to movement and direct mortality from vehicle collision will be in part minimised by reduced speeds in sections where risk of collision is great, the use of safety netting in places deemed necessary and signage to warn people at commonly crossed parts of the route.

Light spill will be minimised by eliminating lighting along the majority of the route (limited to just the urban areas or Baks Rrjolle and Shengjin.) Lighting from vehicle headlights cannot be controlled but as vehicle movement is only expected to reach levels of 1238 vehicles per day and levels are likely to be lower at night the impact is not considered

significant. As described for birds above, the effects and mitigation of in-migration are hard to quantify but the project will commit to control of poaching and illegal development causing increased habitat loss.

With these design and mitigation measures in place there will be no adverse impacts on mammals and hence no impacts on the integrity of the Ramsar / cEmerald site.

6.3.4 Criterion 4

6.3.4.1 *Nesting birds*

Mitigation for nesting birds during the construction phase will involve pre-construction nesting bird surveys and the cessation of construction activities around active nests (described in Appendix 4).

Impacts from in-migration are likely to come from an increase in use of the land for grazing, illegal development and deforestation, all of which can lead to affects on nesting birds. As long as these activities are controlled through partnership working between the project and the National and Regional Protected Areas Agency then adverse impacts on birds can be avoided. With this mitigation in place there will be no impacts on the integrity of the reserve.

6.3.4.2 *Migratory mammals*

Likely significant effects and mitigation for mammals are described in section 6.3.3.7 and are of relevance here.

With this mitigation and the commitment to manage the impacts of in-migration there will be no significant impacts on migrating mammals and hence no effects on the integrity of the reserve.

6.3.5 Criterion 5

6.3.5.1 *Numbers of wintering water birds*

Likely significant effects and mitigation for wintering birds are described in section 6.3.3.6 and are of relevance here.

With this mitigation and the commitment to manage the impacts of in-migration there will be no significant impacts on wintering birds and hence no effects on the integrity of the reserve.

6.3.6 Criterion 6

6.3.6.1 *Phalacrocorax carbo*

There are no direct likely significant effects on this species from the proposed construction. Indirect impacts from change in water quality and disturbance have been described in section 6.3.3.6 and mitigation measures discussed.

According to the recent Wetlands International Waterbird Population Estimates 2015 cormorant have increased and the threshold is now 4000 birds. Latest figures for great cormorants in the Ramsar site for the Buna – Vilipoja area suggests counts of 247 in 2017, 33 in 2018 and 85 in 2019. Minor significant effects from disturbance and

sedimentation will not be of a magnitude to affect the proportion of birds and therefore the 1% criterion; hence the integrity of the Ramsar / cEmerald site will not be affected.

This species has a large forage range (up to 20-25 km but most commonly within 10 km of the colony) and extensive habitat use (both marine and inland aquatic habitats). Impacts from construction are likely to cause short term displacement to other areas of suitable habitat within the area. This, combined with the general increase in great cormorant numbers worldwide and in Europe (BirdLife International 2015), suggests that effects are unlikely to significantly affect the local population.

6.3.6.2 *Pelecanus crispus*

There are no direct likely significant effects on this species from the proposed construction. Indirect impacts from change in water quality, disturbance and in-migration have been described in section 6.3.3.6 and mitigation measures discussed.

According to the recent Wetlands International Waterbird Population Estimates (2015) cormorant have increased and the threshold is now 65 birds. Census figures for the Buna – Vilipoja area suggests that this bird is not regularly seen with just 5 individuals observed in 2018 and none observed during the field surveys in 2019. Minor significant effects from disturbance and sedimentation will not be of a magnitude to affect the proportion of birds and therefore the 1% criterion; hence the integrity of the Ramsar / cEmerald site will not be affected.

6.3.6.3 *Tringa erythrpous*

There are no direct likely significant effects on this species from the proposed construction. Indirect impacts from change in water quality, disturbance and in-migration have been described in section 6.3.3.6 and mitigation measures discussed.

According to data from the wintering bird census this species has not been identified in the Buna – Vilipoja area and were not observed during the field surveys in 2019. As such impacts from the proposed road will not affect the proportion of birds using the Ramsar site and there're the 1% criterion; hence the integrity of the Ramsar / cEmerald site will not be affected.

6.3.7 Criterion 7

6.3.7.1 *Migration road for reproduction or feeding of fish species*

The construction will not have any direct effects on aquatic habitats, but where the road crosses seasonal streams carrying rainwater, culverts will be installed and designed to allow unimpeded flow of water from the mountain side beneath the road. No impacts on the hydrology of the wetland complex are expected and therefore no impacts on migrating fish. Potential effects of sedimentation and pollution on water courses and effects of pressure in natural resources from in-migration are discussed under criterion 1 and 2 above.

Taking into account the mitigation measures provided in Appendix 4 there will be no significant impacts on migrating fish that will affect the integrity of the Ramsar / cEmerald site.

6.3.8 Criterion 8

6.3.8.1 *Fish, spawning grounds, nursery and migration paths*

As described under criterion 7 no significant effects on fish during any stage of their life cycle are expected and hence no impacts on the integrity of the Ramsar / cEmerald site.

6.4 Summary of HRA findings

Although likely significant effects were identified during the screening stage under each of the eight criteria, after mitigation none of these impacts will affect the integrity of the reserve. Standard Operating Procedures for construction activities will mitigate for impacts on surface water quality, noise and fugitive emissions affecting air quality. A Habitat and Species Rehabilitation / Restoration Plan and Landscaping Scheme will ensure that all loss of habitats will be adequately compensated for, and where impacts on species such as birds or bats are identified through pre-construction surveys, mitigation strategies for these species will be produced and implemented through a Biodiversity Management Plan.

Some uncertainties arise for noise, changes to surface water quality and fugitive emissions as modelling of the potential impacts have not yet been undertaken. A precautionary approach has been taken with regards to impacts on biodiversity from these sources.

Impacts from the movement of people into the area from improved access provided by the road has been qualified and where possible quantified. However, the magnitude of the impact is hard to assess at this stage in project development. Additionally, mitigation required for these impacts relies not only on the project team but partnership working with the National and Regional Protected Areas Agencies and municipalities. The success of the mitigation is hard to assess as it will fall outside of the remit of the project.

It is anticipated that the Sustainable and Eco Tourism Project will be implemented to develop a sustainability / Eco tourism programme. This programme will support increased environmental awareness, sustainable and safe communities within the Shengjin and Velipoje region, promoting environmental preservation and conservation practices, circular economy through establishing stakeholder engagement networks, capacity building (through the provision of tools, management plans and awareness raising materials) and supporting policy dialogue. This project is expected to contribute toward minimising the indirect impacts to the project area and surrounding environs from increased tourism.

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APPENDIX 1: CRITERIA FOR IDENTIFYING WETLANDS OF INTERNATIONAL IMPORTANCE

Adopted by the 7th (1999) and 9th (2005) Meetings of the Conference of the Contracting Parties, superseding earlier Criteria adopted by the 4th and 6th Meetings of the COP (1990 and 1996), to guide implementation of Article 2.1 on designation of Ramsar sites.

Group A of the Criteria. Sites containing representative, rare or unique wetland types

Criterion 1: A wetland should be considered internationally important if it contains a representative, rare, or unique example of a natural or near-natural wetland type found within the appropriate biogeographic region.

Group B of the Criteria. Sites of international importance for conserving biological diversity

Criteria based on species and ecological communities

Criterion 2: A wetland should be considered internationally important if it supports vulnerable, endangered, or critically endangered species or threatened ecological communities.

Criterion 3: A wetland should be considered internationally important if it supports populations of plant and/or animal species important for maintaining the biological diversity of a particular biogeographic region.

Criterion 4: A wetland should be considered internationally important if it supports plant and/or animal species at a critical stage in their life cycles, or provides refuge during adverse conditions.

Specific criteria based on waterbirds

Criterion 5: A wetland should be considered internationally important if it regularly supports 20,000 or more waterbirds.

Criterion 6: A wetland should be considered internationally important if it regularly supports 1% of the individuals in a population of one species or subspecies of waterbird.

Specific criteria based on fish

Criterion 7: A wetland should be considered internationally important if it supports a significant proportion of indigenous fish subspecies, species or families, life-history stages, species interactions and/or populations that are representative of wetland benefits and/or values and thereby contributes to global biological diversity.

Criterion 8: A wetland should be considered internationally important if it is an important source of food for fishes, spawning ground, nursery and/or migration path on which fish stocks, either within the wetland or elsewhere, depend.

Specific criteria based on other taxa

Criterion 9: A wetland should be considered internationally important if it regularly supports 1% of the individuals in a population of one species or subspecies of wetland-dependent non-avian animal species.

APPENDIX 2: DETAIL OF CRITERION 3

Biological groups	Number of species	National %
Vascular plants	900-1000	28%
Molluscs	115 - 130	22%
Fish	150	47%
Amphibians	11	68%
Reptiles	31	81%
Birds	246	74%
Mammals	34	48%

As it is seen from the table above, the role of that area is particularly important for certain groups of species such as birds, reptiles, amphibians, mammals and fish.

APPENDIX 3: RESULTS OF THE STAKEHOLDER CONSULTATION

Question	Organisation	Response
Habitats Flora		
Do you consider the scope of the HRA to be sufficient?	National Agency of Protected Areas	Yes
Do you consider the scope of the HRA to be sufficient?	Ministry of tourism and the environment	Yes, but these data should be included in the report
Do you consider the scope of the HRA to be sufficient?	PPNEA	
Do you consider the scope of the HRA to be sufficient?	Albanian Ornithological Society	
What do you think the impacts on habitats and flora from the project will be?	National Agency of Protected Areas	During works, but with mitigation measures they can be reduced
What do you think the impacts on habitats and flora from the project will be?	Ministry of tourism and the environment	Through the relevant measures
What do you think the impacts on habitats and flora from the project will be?	PPNEA	
What do you think the impacts on habitats and flora from the project will be?	Albanian Ornithological Society	
Do you think the proposed mitigation measures for habitats and flora discussed are adequate?	National Agency of Protected Areas	Yes
Do you think the proposed mitigation measures for habitats and flora discussed are adequate?	Ministry of tourism and the environment	Yes but these data should be included in detail in the report
Do you think the proposed mitigation measures for habitats and flora discussed are adequate?	PPNEA	
Do you think the proposed mitigation measures for habitats and flora discussed are adequate?	Albanian Ornithological Society	
Is there a significant risk from AIS and is so which species are of concern?	National Agency of Protected Areas	No information on the specific area, better knowledge is needed
Is there a significant risk from AIS and is so which species are of concern?	Ministry of tourism and the environment	There is a need for knowledge/data on AIS
Is there a significant risk from AIS and is so which species are of concern?	PPNEA	
Is there a significant risk from AIS and is so which species are of concern?	Albanian Ornithological Society	

After mitigation do you think there are residual effects on habitats?	National Agency of Protected Areas	No
After mitigation do you think there are residual effects on habitats?	Ministry of tourism and the environment	No but they should be continuously monitored
After mitigation do you think there are residual effects on habitats?	PPNEA	
After mitigation do you think there are residual effects on habitats?	Albanian Ornithological Society	
What are the biggest threats to habitat and flora in the region and what conservation initiatives for flora and habitats should be considered?	National Agency of Protected Areas	No risks identified, the road will create better access for emergency measures
What are the biggest threats to habitat and flora in the region and what conservation initiatives for flora and habitats should be considered?	Ministry of tourism and the environment	Fragmentation
What are the biggest threats to habitat and flora in the region and what conservation initiatives for flora and habitats should be considered?	PPNEA	
What are the biggest threats to habitat and flora in the region and what conservation initiatives for flora and habitats should be considered?	Albanian Ornithological Society	
Do you have any concerns regarding the proposed project and if so what are they?	National Agency of Protected Areas	No
Do you have any concerns regarding the proposed project and if so what are they?	Ministry of tourism and the environment	No
Do you have any concerns regarding the proposed project and if so what are they?	PPNEA	
Do you have any concerns regarding the proposed project and if so what are they?	Albanian Ornithological Society	
How should the project address potential impacts from in-migration (increased population pressure), in particular managing planned and unplanned developments?	National Agency of Protected Areas	Potential risks exist but with the existence of local plans this threat is minimised
How should the project address potential impacts from in-migration (increased population pressure), in particular managing planned and unplanned developments?	Ministry of tourism and the environment	
How should the project address potential impacts from	PPNEA	

in-migration (increased population pressure), in particular managing planned and unplanned developments?		
How should the project address potential impacts from in-migration (increased population pressure), in particular managing planned and unplanned developments?	Albanian Ornithological Society	
Mammals		
Do you consider the scope of the HRA to be sufficient?	National Agency of Protected Areas	Yes
Do you consider the scope of the HRA to be sufficient?	Ministry of tourism and the environment	Yes, but there is a need for data to be presented in the report.
Do you consider the scope of the HRA to be sufficient?	PPNEA	The scope of the HRA is sufficient. However further data from the field is needed as there is scarcity of information from existing literature.
Do you consider the scope of the HRA to be sufficient?	Albanian Ornithological Society	
What do you think the impacts on mammals from the project will be?	National Agency of Protected Areas	Fragmentation of habitats
What do you think the impacts on mammals from the project will be?	Ministry of tourism and the environment	Fragmentation: works during the project development
What do you think the impacts on mammals from the project will be?	PPNEA	Fragmentation of habitats. Increased disturbance on feeding/resting/denning sites.
What do you think the impacts on mammals from the project will be?	Albanian Ornithological Society	
Is there any information on roosting bats in bunkers, caves or tunnels in the area and do you think they could be affected by the development?	National Agency of Protected Areas	No information
Is there any information on roosting bats in bunkers, caves or tunnels in the area and do you think they could be affected by the development?	Ministry of tourism and the environment	
Is there any information on roosting bats in bunkers, caves or tunnels in the area and do you think they could be affected by the development?	PPNEA	Best is to contact Philippe Theou – a French expert living in Albania who has vast expertise on bats in the country. Also Ferdinand Bego has knowledge on bats.
Is there any information on roosting bats in bunkers, caves or tunnels in the area and do you think they could be affected by the development?	Albanian Ornithological Society	
Which species of mammals are most likely to be affected by	National Agency of Protected Areas	Mammals identified in the study, as well as wild pigs

the proposals and how will they be affected?		
Which species of mammals are most likely to be affected by the proposals and how will they be affected?	Ministry of tourism and the environment	
Which species of mammals are most likely to be affected by the proposals and how will they be affected?	PPNEA	Large mammals will be disturbed with habitat fragmentation. Small mammals can be affected by denning /burrows sites destruction
Which species of mammals are most likely to be affected by the proposals and how will they be affected?	Albanian Ornithological Society	
Do you think the proposed mitigation measures for mammals is adequate?	National Agency of Protected Areas	Yes, culverts are foreseen
Do you think the proposed mitigation measures for mammals is adequate?	Ministry of tourism and the environment	Yes, but they will have to be included in the respective report
Do you think the proposed mitigation measures for mammals is adequate?	PPNEA	Haven't consulted yet the proposed mitigation measures for mammals
Do you think the proposed mitigation measures for mammals is adequate?	Albanian Ornithological Society	
After mitigation do you think there are residual effects on mammals?	National Agency of Protected Areas	Not significant if mitigation measures there will be minimal impact
After mitigation do you think there are residual effects on mammals?	Ministry of tourism and the environment	No
After mitigation do you think there are residual effects on mammals?	PPNEA	Haven't consulted yet the proposed mitigation measures for mammals
After mitigation do you think there are residual effects on mammals?	Albanian Ornithological Society	
What are the biggest threats to mammals in the region and what conservation initiatives should be considered?	National Agency of Protected Areas	Illegal hunting, continue with monitoring and moratorium
What are the biggest threats to mammals in the region and what conservation initiatives should be considered?	Ministry of tourism and the environment	Loss of quietness, fragmentation, increase of population in the area,
What are the biggest threats to mammals in the region and what conservation initiatives should be considered?	PPNEA	Habitat loss and fragmentation. Securing connectivity among habitats should be considered as a primary conservation initiative.
What are the biggest threats to mammals in the region and what conservation initiatives should be considered?	Albanian Ornithological Society	

Do you have any concerns regarding the proposed project and if so what are they?	National Agency of Protected Areas	No
Do you have any concerns regarding the proposed project and if so what are they?	Ministry of tourism and the environment	No
Do you have any concerns regarding the proposed project and if so what are they?	PPNEA	The visual impact of the road seem to be high especially when Mount Renci is viewed from the beach
Do you have any concerns regarding the proposed project and if so what are they?	Albanian Ornithological Society	
How should the project address potential impacts from in-migration (increased population pressure), in particular managing illegal hunting?	National Agency of Protected Areas	No relation
How should the project address potential impacts from in-migration (increased population pressure), in particular managing illegal hunting?	Ministry of tourism and the environment	
How should the project address potential impacts from in-migration (increased population pressure), in particular managing illegal hunting?	Buna river project	Helping the local administration of protected areas and the environmental inspectorate to actively fight poachers
How should the project address potential impacts from in-migration (increased population pressure), in particular managing illegal hunting?	Albanian Ornithological Society	
Fish		
Do you consider the scope of the HRA to be sufficient?	National Agency of Protected Areas	Yes
Do you consider the scope of the HRA to be sufficient?	Ministry of tourism and the environment	
Do you consider the scope of the HRA to be sufficient?	PPNEA	
Do you consider the scope of the HRA to be sufficient?	Albanian Ornithological Society	
What do you think the impacts on fish from the project will be?	National Agency of Protected Areas	During excavations, to not dump materials in water
What do you think the impacts on fish from the project will be?	Ministry of tourism and the environment	
What do you think the impacts on fish from the project will be?	PPNEA	
What do you think the impacts on fish from the project will be?	Albanian Ornithological Society	
Are sturgeon species present in the area and if so what can the project do to protect them?	National Agency of Protected Areas	No, no significant studies

Are sturgeon species present in the area and if so what can the project do to protect them?	Ministry of tourism and the environment	
Are sturgeon species present in the area and if so what can the project do to protect them?	PPNEA	
Are sturgeon species present in the area and if so what can the project do to protect them?	Albanian Ornithological Society	
Which species of fish are most likely to be affected by the proposals and how will they be affected?	National Agency of Protected Areas	No impact of fish
Which species of fish are most likely to be affected by the proposals and how will they be affected?	Ministry of tourism and the environment	
Which species of fish are most likely to be affected by the proposals and how will they be affected?	PPNEA	
Which species of fish are most likely to be affected by the proposals and how will they be affected?	Albanian Ornithological Society	
Do you think the proposed mitigation measures for fish is adequate?	National Agency of Protected Areas	Yes
Do you think the proposed mitigation measures for fish is adequate?	Ministry of tourism and the environment	
Do you think the proposed mitigation measures for fish is adequate?	PPNEA	
Do you think the proposed mitigation measures for fish is adequate?	Albanian Ornithological Society	
After mitigation do you think there are residual effects on fish?	National Agency of Protected Areas	No
After mitigation do you think there are residual effects on fish?	Ministry of tourism and the environment	
After mitigation do you think there are residual effects on fish?	PPNEA	
After mitigation do you think there are residual effects on fish?	Albanian Ornithological Society	
What are the biggest threats to fish in the region and what conservation initiatives should be considered?	National Agency of Protected Areas	Illegal fishing, uncontrolled
What are the biggest threats to fish in the region and what conservation initiatives should be considered?	Ministry of tourism and the environment	

What are the biggest threats to fish in the region and what conservation initiatives should be considered?	PPNEA	
What are the biggest threats to fish in the region and what conservation initiatives should be considered?	Albanian Ornithological Society	
Do you have any concerns regarding the proposed project and if so what are they?	National Agency of Protected Areas	In principle no, but the impacted area to be returned to its normal state, using authothtonous or local species, rehabilitate embankments
Do you have any concerns regarding the proposed project and if so what are they?	Ministry of tourism and the environment	
Do you have any concerns regarding the proposed project and if so what are they?	PPNEA	
Do you have any concerns regarding the proposed project and if so what are they?	Albanian Ornithological Society	
How should the project address potential impacts from in-migration (increased population pressure), in particular managing fishing?	National Agency of Protected Areas	Appropriate monitoring by authorities
How should the project address potential impacts from in-migration (increased population pressure), in particular managing fishing?	Ministry of tourism and the environment	
How should the project address potential impacts from in-migration (increased population pressure), in particular managing fishing?	PPNEA	
How should the project address potential impacts from in-migration (increased population pressure), in particular managing fishing?	Albanian Ornithological Society	
Birds		
Do you consider the scope of the HRA to be sufficient?	National Agency of Protected Areas	Yes, more data is needed
Do you consider the scope of the HRA to be sufficient?	Ministry of tourism and the environment	Yes, but there is a need for other information to be analysed more deeply in the report
Do you consider the scope of the HRA to be sufficient?	PPNEA	
Do you consider the scope of the HRA to be sufficient?	Albanian Ornithological Society	HRA should potentially express on the potential impact of the road connection between Rrjoll and Velipoje. Any bridge (future) over Viluni lagoon would have huge impacts upon the Ramsar Site.

		Bird species at the focus should include those Globally Endangered Potentially NT and upward.
What do you think the impacts on birds from the project will be?	National Agency of Protected Areas	Noise, recommend mitigating measures
What do you think the impacts on birds from the project will be?	Ministry of tourism and the environment	Noise, loss of quietness
What do you think the impacts on birds from the project will be?	PPNEA	
What do you think the impacts on birds from the project will be?	Albanian Ornithological Society	Habitat loss. Habitat degradation. Disturbance during construction/operation phase Increased human pressure in the traditionally used habitats Increased pressure from poachers due to easier access.
Is the migration flight path for birds known and if so what is the risk of collision with vehicles or severance of the flight path from the road?	National Agency of Protected Areas	Not a definite migratory path
Is the migration flight path for birds known and if so what is the risk of collision with vehicles or severance of the flight path from the road?	Ministry of tourism and the environment	
Is the migration flight path for birds known and if so what is the risk of collision with vehicles or severance of the flight path from the road?	PPNEA	
Is the migration flight path for birds known and if so what is the risk of collision with vehicles or severance of the flight path from the road?	Albanian Ornithological Society	Waterbirds use mainly the water roads. Other non-waterbirds use the area for migration it includes large roaming birds as well as passerines. Not much is known about the bird importance of terrestrial habitats in recent years. This could be further extended in potential research/surveys.
What do you think is the sensitive time period for birds?	National Agency of Protected Areas	During nesting/breeding, February-April
What do you think is the sensitive time period for birds?	Ministry of tourism and the environment	February-April
What do you think is the sensitive time period for birds?	PPNEA	
What do you think is the sensitive time period for birds?	Albanian Ornithological Society	The most sensitive time period is the breeding season. Migration period could also be sensitive depending on the

		areas importance for migratory terrestrial birds.
Do you think the proposed mitigation measures for birds discussed are adequate?	National Agency of Protected Areas	Yes, to be included in EIA
Do you think the proposed mitigation measures for birds discussed are adequate?	Ministry of tourism and the environment	Yes, but the measures must be included in the respective report.
Do you think the proposed mitigation measures for birds discussed are adequate?	PPNEA	
Do you think the proposed mitigation measures for birds discussed are adequate?	Albanian Ornithological Society	
After mitigation do you think there are residual effects on birds (migrating and nesting?)	National Agency of Protected Areas	No
After mitigation do you think there are residual effects on birds (migrating and nesting?)	Ministry of tourism and the environment	No
After mitigation do you think there are residual effects on birds (migrating and nesting?)	PPNEA	
After mitigation do you think there are residual effects on birds (migrating and nesting?)	Albanian Ornithological Society	
What are the biggest threats to birds in the region and what conservation initiatives should be considered?	National Agency of Protected Areas	Illegal hunting, habitat destruction, habitats to not be fragmented
What are the biggest threats to birds in the region and what conservation initiatives should be considered?	Ministry of tourism and the environment	Illegal hunting, intervention, fragmentation of habitats
What are the biggest threats to birds in the region and what conservation initiatives should be considered?	PPNEA	
What are the biggest threats to birds in the region and what conservation initiatives should be considered?	Albanian Ornithological Society	
Do you have any concerns regarding the proposed project and if so what are they?	National Agency of Protected Areas	No
Do you have any concerns regarding the proposed project and if so what are they?	Ministry of tourism and the environment	No
Do you have any concerns regarding the proposed project and if so what are they?	PPNEA	
Do you have any concerns regarding the proposed project and if so what are they?	Albanian Ornithological Society	
How should the project address potential impacts from in-migration (increased population pressure), in	National Agency of Protected Areas	No increase of population is foreseen since no new settlements are planned to be constructed.

particular managing recreational use of the beaches and wetlands and pollution to water?		
How should the project address potential impacts from in-migration (increased population pressure), in particular managing recreational use of the beaches and wetlands and pollution to water?	Ministry of tourism and the environment	
How should the project address potential impacts from in-migration (increased population pressure), in particular managing recreational use of the beaches and wetlands and pollution to water?	PPNEA	
How should the project address potential impacts from in-migration (increased population pressure), in particular managing recreational use of the beaches and wetlands and pollution to water?	Albanian Ornithological Society	
Other		
Do you consider the scope of the HRA to be sufficient?	National Agency of Protected Areas	Yes
Do you consider the scope of the HRA to be sufficient?	Ministry of tourism and the environment	
Do you consider the scope of the HRA to be sufficient?	PPNEA	
Do you consider the scope of the HRA to be sufficient?	Albanian Ornithological Society	
What do you think the impacts on reptiles, amphibians and invertebrates from the project will be?	National Agency of Protected Areas	No impacts
What do you think the impacts on reptiles, amphibians and invertebrates from the project will be?	Ministry of tourism and the environment	
What do you think the impacts on reptiles, amphibians and invertebrates from the project will be?	PPNEA	
What do you think the impacts on reptiles, amphibians and invertebrates from the project will be?	Albanian Ornithological Society	
Which species are most likely to be affected by the proposals and how will they be affected?	National Agency of Protected Areas	Mammals only

Which species are most likely to be affected by the proposals and how will they be affected?	Ministry of tourism and the environment	
Which species are most likely to be affected by the proposals and how will they be affected?	PPNEA	
Which species are most likely to be affected by the proposals and how will they be affected?	Albanian Ornithological Society	
Do you think the proposed mitigation measures for reptiles, amphibians and invertebrates is adequate?	National Agency of Protected Areas	yes
Do you think the proposed mitigation measures for reptiles, amphibians and invertebrates is adequate?	Ministry of tourism and the environment	
Do you think the proposed mitigation measures for reptiles, amphibians and invertebrates is adequate?	PPNEA	
Do you think the proposed mitigation measures for reptiles, amphibians and invertebrates is adequate?	Albanian Ornithological Society	
After mitigation do you think there are residual effects on reptiles, amphibians and invertebrates?	National Agency of Protected Areas	no
After mitigation do you think there are residual effects on reptiles, amphibians and invertebrates?	Ministry of tourism and the environment	
After mitigation do you think there are residual effects on reptiles, amphibians and invertebrates?	PPNEA	
After mitigation do you think there are residual effects on reptiles, amphibians and invertebrates?	Albanian Ornithological Society	
What are the biggest threats to reptiles, amphibians and invertebrates in the region and what conservation initiatives should be considered?	National Agency of Protected Areas	Loss of habitats, Pollution
What are the biggest threats to reptiles, amphibians and invertebrates in the region and what conservation initiatives should be considered?	Ministry of tourism and the environment	
What are the biggest threats to reptiles, amphibians and invertebrates in the region and what conservation initiatives should be considered?	PPNEA	
What are the biggest threats to reptiles, amphibians and	Albanian Ornithological Society	

invertebrates in the region and what conservation initiatives should be considered?		
Do you have any concerns regarding the proposed project and if so what are they?	National Agency of Protected Areas	No
Do you have any concerns regarding the proposed project and if so what are they?	Ministry of tourism and the environment	
Do you have any concerns regarding the proposed project and if so what are they?	PPNEA	
Do you have any concerns regarding the proposed project and if so what are they?	Albanian Ornithological Society	
How should the project address potential impacts from in-migration (increased population pressure), in particular increased vehicle presence?	National Agency of Protected Areas	Include safety nets
How should the project address potential impacts from in-migration (increased population pressure), in particular increased vehicle presence?	Ministry of tourism and the environment	
How should the project address potential impacts from in-migration (increased population pressure), in particular increased vehicle presence?	PPNEA	
How should the project address potential impacts from in-migration (increased population pressure), in particular increased vehicle presence?	Albanian Ornithological Society	

APPENDIX 4
PROPOSED BIODIVERSITY MITIGATION MEASURES

Project-related Impacts	Avoidance Measures	Minimisation Measures	Rehabilitation / Restoration Measures
Pre-Construction and Construction Phase			
Habitat loss	• Avoid habitat clearance in zone 1a of the Buna River Protected Landscape • Avoid the use of herbicides to clear vegetation • Bushfire controls including a Project ban on open-burning of waste	• 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	• Preparation and implementation of a Habitat and Species Rehabilitation / Restoration Pan • Progressive habitat restoration along the margins of the right of way.
Noise and vibration	• Avoidance of night working to avoid impacts to priority nocturnal, crepuscular fauna	• 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 Buna River Protected Landscape and regular vehicle / machinery maintenance to minimise noise and vibration.	

Project-related Impacts	Avoidance Measures	Minimisation Measures	Rehabilitation / Restoration Measures
Invasive species transfer and pest immigration	• 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	• Vehicle and machinery operation to be restricted to daylight hours to avoid collisions with priority nocturnal, crepuscular fauna	• 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 • 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	

Project-related Impacts	Avoidance Measures	Minimisation Measures	Rehabilitation / Restoration Measures
Spills: hydrocarbon, other hazardous materials (i.e. paint, solvents etc.)	• 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	• 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 Adherence to the Injured Wildlife Protocol.	• Preparation and implementation of a Habitat and Species Rehabilitation / Restoration Pan
Artificial lighting	• Avoid using artificial lighting where possible, particularly in the Buna River Protected Landscape • Project vehicles will not be used at night within the Project area	• Use of capped / directional artificial lighting to focus lighting away from sensitive areas, particularly in the Buna River Protected Landscape • The use of curtains and blinds in onsite Project office and buildings	
Dust		• 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. • Use of geotextiles to cover exposed topsoil prior to the establishment of vegetation in areas of biodiversity sensitivity.	• Preparation and implementation of a Habitat and Species Rehabilitation / Restoration Pan • Progressive habitat restoration along the margins of the right of way.
Transfer of pathogens to and from wildlife	• Avoid direct contact with wildlife • Adhere to hygiene procedures • Avoid direct contact with wildlife • Adherence to best practice waste management and disposal procedures • Raise awareness of the risks of disease transmission, general hygiene procedures, the management of road kill and waste management procedures. To be communicated through induction and training to all personnel (employees and contractors).		

Project-related Impacts	Avoidance Measures	Minimisation Measures	Rehabilitation / Restoration Measures
Suspended sediments		• 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 Habitat and Species Rehabilitation / Restoration Pan
Emissions (NOx, SOx, CO) from vehicle and machinery use		• 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		• 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 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 traffic vehicles and human disturbance		• Use of natural and artificial sound barriers near biodiversity sensitive habitats. • Speed restrictions within the Buna River Protected Landscape. •	
Invasive species transfer and pest in-migration		• Actively monitor and eradicate invasive vascular plant species along the right of way	
Accidental vehicle traffic collisions with		• Enforcement of restricted speed limits, particularly in the Buna River Protected Landscape, communicated through signage • Rumble strips or speedbumps will also be installed near biodiversity sensitive areas (e.g. on the approach to Rrjolli to slow	

Project-related Impacts	Avoidance Measures	Minimisation Measures	Rehabilitation / Restoration Measures
fauna		vehicle traffic near sensitive fauna habitats in the Buna River Protected Landscape).	
Artificial lighting		• Use of capped / directional lighting to focus lighting away from sensitive habitats. • Retain natural barriers to minimise light spill artificial light, particularly near the Buna River Protected Landscape (i.e. woodland canopy, earth bund etc.).	
Emissions (NOx, SOx, CO) from vehicle and machinery use		• Continued air quality monitoring to inform adaptive management	
Dust		• Continued air quality monitoring to inform adaptive management	
Suspended sediments		• Use and maintenance of an effective draining system to minimise the risk of suspended sediment loading and runoff.	
Habitat Loss		• Specific emergency response procedures developed for managing bushfires	
Exploitation of natural resources and illegal hunting from Project-related in-migration		• Collaboration with protected area managers to ensure indirect impacts to the Buna River Protected Landscape are adequately mitigated; • Consultation with local authorities to minimise the impacts of in-migration on 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).	

Table 0.1: SOP1: 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:	✓	
	• 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.		
	• Environmentally sensitive areas will be clearly marked and mapped as 'No Go Areas' (i.e. Wooded areas, wetlands, the beach and dune system at the foot of Mount Renci) and access by staff and contractors will be strictly forbidden.		
	• 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		
	• 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.		
	• Slow moving fauna will be translocated to a designated receptor site during the clearance works.		
	•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.		
	• Salvage stripped topsoil and subsoil, where feasible, in stockpiles for future reuse		
	• Where possible, soil seed bank in the topsoil will be preserved for future rehabilitation, to maintain local genetic diversity		

	• Storage areas will be located in areas away from existing trees, hedgerows and drainage (see EIA page 25)		
	• An ecologist will be on hand to supervise the habitat clearance works and provide advice to the workforce.		
	• 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 for the project wide is 9 m (ESIA ref). 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 be also 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:	✓	
	• 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.		
	• 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.		
	• Slope ratios will be no more than 2:1 (horizontal/vertical).		
	• Compaction of stockpiles will be avoided as this will hinder establishment of vegetation during rehabilitation / restoration		
	• 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.		
	• 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:	✓	
	•A washdown procedure will be employed to prevent invasive weed spread and potential contamination of the project area from the receiving environment.		
	• 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.		

	• Uncontaminated soil will be used for construction, restoration and rehabilitation.		

Table 0.2: 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 green house 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 summon 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. (Adapted from EIA p39).	✓	
SOP2.6	Enforce speed restrictions of mobile plant on roads to minimise dust generation (EIA p 39)	✓	
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 (ESIA p29)		
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 (EIA p28)	✓	
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 the steep slopes of Mount Renci 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 (i.e. the coastal lagoon, wetlands and other bodies of standing water)	✓	
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 0.3: 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. (EIA p44)	✓	
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 (EIA p42).	✓	✓
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 (EIA p44 in part)	✓	✓
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 (EIA p44)	✓	
SOP3.11	All ancillary pneumatic tools will be fitted with suitable silencers (EIA p44)	✓	
SOP3.12	Machinery that is used intermittently will be shut down or throttled back to a minimum during periods when not in use (EIA p44)	✓	
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 (EIA p44)	✓	
SOP3.14	Working hours during construction will be limited between 7am and 7pm to avoid disturbance to fauna at night. (EIA p53)	✓	

Table 0.4: SOP4: Water Quality and Pollution Management

Action		Project Phase	
Number	Measures for the Management of Water Quality and Pollution events	Pre-construction / Construction	Operation
Pollution Controls:			
SOP4.1	Pollution controls will be put in place during the construction process. (EIA p29). 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. (EIA p 29)	✓	
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 (EIA p 29).	✓	

SOP4.4	Stockpiles will be protected against vandalism and theft that can lead to spills (EIA p 29)	✓	
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 (EIA p 29)	✓	
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. (EIA implied p29)	✓	
SOP4.8	Only licenced operators will be used to clean-up solid waste (EIA p53)	✓	