Annex 2 – Critical Habitat Assessment
To ESIA Volume 2. Biodiversity

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1 INTRODUCTION

This report (Annex 2 to ESIA Volume 2. Biodiversity) constitutes the Critical Habitat Assessment (CHA) for the Project.

NB: The photos in this report are taken and the maps prepared by the Consultant unless indicated otherwise.

2 CRITICAL HABITAT ASSESSMENT (CHA)

2.1 Scope of the CHA

2.1.1 Objectives of the CHA

The CHA serves to identify areas of highest biodiversity value and determine if any features in the study area qualify as **priority biodiversity features** or **critical habitat**, per EBRD's and EIB's definitions (see the table below)[1]. These features require particular attention in the next steps of the impact assessment and mitigation planning.

The CHA was conducted as follows (Guidance Note 6, EBRD, 2022 & Environmental and Social Standard 4, EIB, 02/2022):

- Listing of priority ecosystems and/or species in the study area based on literature review and fieldwork;
- Definition of Ecologically Appropriate Area of Analysis (EAAAs) for the targeted habitats and species; and
- Assessment against EBRD and EIB criteria for targeted species and habitats (see the section below).

2.1.2 International Financial Institution Safeguards

A comparative analysis of the EBRD and EIB CH criteria is presented in Appendix 1. ADB CH criteria (see **Section 2.1.2.3**) have not been considered further as the EBRD/EIBs criteria and requirements for CH are more stringent.

2.1.2.1 EBRD Performance Requirement 6 (PR6) Criteria for Priority Biodiversity Feature and Critical Habitats

The objectives of EBRD PR6 are to protect and conserve biodiversity; maintain core ecological functions of ecosystem services and biodiversity they support; apply the mitigation hierarchy; and promote sustainable management of living natural resources through the adoption of good international practice.

PR6 contains two classes of important biodiversity, likewise based on the principles of threat (vulnerability) and geographic rarity (irreplaceability):

- **Priority Biodiversity Features**; and
- **Critical Habitat**.

Priority biodiversity features have a high degree of irreplaceability and/or vulnerability, but not the highest. Although **not critical habitat in sensitivity**, such features still require careful

[1] ADB CH criteria have not been considered further as the EBRD/EIB criteria and requirements for CH are more stringent.

consideration during project assessment and impact mitigation. EBRD PR6 defines **critical habitats as the most sensitive biodiversity features.**

The CHA should distinguish between these two classes through assessment against different criteria and associated thresholds (***cf.* Table 1**) (EBRD PR6 Guidance note, September 2022). Some criteria have no pre-determined conditions (*i.e.*, PR6 paragraphs 12-iii "significant biodiversity features identified by a broad set of stakeholders or governments", 12-iv "ecological structure and functions needed to maintain the viability of priority biodiversity features described in this paragraph", and 14-v "areas associated with key evolutionary processes"). For these criteria, expert judgement was used.

The state of Armenia is in the framework of the European Neighbourhood Policy and its eastern regional dimension, the Eastern Partnership. With regards to application of requirements of EU *environmental acquis,* including requirements of the Habitats and Birds Directives, the legal basis considered in this report was the partnership between Armenia and the European Union, as given in the Comprehensive and Enhanced Partnership Agreement (CEPA) signed on 24 November 2017. The Agreement entered into force on 1 March, 2021.[2] Among its commitments stated in this Agreement, Armenia is to introduce a set of provisions of the *Council Directive 92/43/EC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora* and *Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds*. According to the deadlines stipulated by CEPA and consultations with the MoE (June 2023), Armenia works towards implementing these commitments by 2025. The assessment regarding identification of the lists of species and habitats from the EU Directives have not yet been analysed and transposed by Armenia into the national legislation.

As per the EBRD Guidance Note on PR6[3] and Declaration on the European Principles for the Environment[4], the EBRD adopted the country-sensitive approach for countries that are part of the European Neighbourhood Policy, which further reflects on the application of the criteria and conditions for identifying priority biodiversity features and critical habitats. This means that the requirements of the EU Directives would not be automatically applicable to the analysis below. This, however, did not affect the final outcome of the CHA analysis since the stricter requirements of the EIB policy were applied to this CHA, which call for the full application of the EU Directives (see **Section 2.1.2.2**).

Table 1. Criteria and Conditions for Identifying Priority Biodiversity Features and Critical Habitats (EBRD, GN6 2022)

Note: The criteria in bold present the criteria triggering PBF or CH.

Criterion	Priority Biodiversity Feature (BPF)	Critical Habitat (CH)
1. Priority ecosystems		
Threatened ecosystems Habitats listed in Annex 1 of EU Habitats Directive (EU members only) or Resolution 4 of the Bern Convention (signatory nations only)	(PR6 para. 12-i) **EAAA is habitat type listed in** Annex 1 of EU Habitats Directive **or Resolution 4 of the Bern Convention** EAAA**[5] < 5% of the global extent of an *ecosystem* type with IUCN status of CR or EN	(PR6 para. 14-i) **EAAA is habitat type listed in Annex 1 of EU Habitats Directive marked as "priority habitat type"** EAAA ≥5% of global extent of an ecosystem type with IUCN status of CR or EN

[2] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52017JC0037
[3] https://www.ebrd.com/environment/pdf-guidance-note-ebrd-performance-requirement-6.pdf
[4] https://www.nefco.int/wp-content/uploads/2019/04/European-Principles-for-the-Environment_2006.pdf
[5] EAAA = ecologically appropriate area of analysis, as defined above.

Criterion	Priority Biodiversity Feature (BPF)	Critical Habitat (CH)
IUCN Red-List EN or CR ecosystems		EAAA is ecosystem determined to be of high priority for conservation by national systematic conservation planning
2. Priority Species and their Habitats		
Threatened species Species and their habitats listed in EU Habitats Directive and Birds Directive (EU members only) or Bern Convention (signatory nations only) IUCN Red List EN or CR species IUCN Red List VU species Nationally or regionally (e.g., Europe) listed EN or CR species	(PR6 para. 12-ii) **a) EAAA for species and their habitats listed** in Annex II of Habitats Directive, Annex I of Birds Directive, **or Resolution 6 of the Bern Convention** b) EAAA supports < 0.5% of global population OR < 5 reproductive units of a CR or EN species. **c) EAAA supports VU species** d) EAAA for regularly occurring nationally or regionally listed EN or CR species	(PR6 para. 14-ii) **a) EAAA for species and their habitats listed in Annex IV of the Habitats Directive (See EU restrictions)** **b) EAAA supports ≥ 0.5% of the global population AND ≥ 5 reproductive units of a CR or EN species** c) EAAA supports globally significant population of VU species necessary to prevent a change of IUCN Red List status to EN or CR, and satisfies threshold (b) **d) EAAA for important concentrations of a nationally or regionally listed EN or CR species**
Range-restricted species	(PR6 para. 12-ii) EAAA for regularly occurring range-restricted species	(PR6 para. 14-iii) **EAAA regularly holds ≥ 10% of global population AND ≥ 10 reproductive units of the species**[6]
Migratory and congregatory species	(PR6 para. 12-ii) EAAA identified per Birds Directive or recognized national or international process as important for migratory birds (esp. wetlands)	(PR6 para. 14-iv) EAAA sustains, on a cyclical or otherwise regular basis, ≥ 1 percent of the global population at any point of the species' lifecycle EAAA predictably supports ≥10 percent of global population during periods of environmental stress

2.1.2.2 EIB Environmental and Social Standard 4 (ESS4) on Biodiversity and Ecosystems[7]

The EIB Standard recognises that protecting and conserving biodiversity and ecosystems and maintaining the ecological functions and processes of such ecosystems are fundamental to environmental and social sustainability. The EIB supports projects that are compatible with maintaining the integrity of areas important for biodiversity as well as the core natural functions, processes, and resilience of ecosystems to halt and reverse biodiversity loss, increase biodiversity and ecosystem benefits and, where required, achieve a Net Positive Impact on biodiversity.

[6] The IUCN Key Biodiversity Areas standard cites the following definition for reproductive unit: "the minimum number and combination of mature individuals necessary to trigger a successful reproductive event at a site. Examples of five reproductive units include five pairs, five reproducing females in one harem, and five reproductive individuals of a plant species."

[7] European Investment Bank – Environmental and Social Standards, 2 February 2022

Critical habitat is the most sensitive of the high-value biodiversity features and is defined as comprising one of the following criteria and which is also needed to sustain it in a viable state (paragraph 16):

- a highly threatened or unique ecosystem;
- a population of a critically endangered, endangered or vulnerable species, as defined by the IUCN Red List of threatened species and in relevant national legislation;
- part of the population, range or distribution of an endemic or restricted-range species, or highly distinctive assemblages of species;
- habitat required for the survival of migratory species and/or congregatory species;
- biodiversity and/or ecosystems with significant social, economic, or cultural importance to local communities and indigenous groups;
- habitat of key scientific value and/or associated with key evolutionary processes.

Table 2. Criteria and Conditions for Identifying Critical Habitats according to the Standard 4 of EIB (EIB, 2022)

Criterion	Critical Habitat (CH)
Criterion 1 : Highly threatened or unique ecosystem	a) Priority Habitats listed in Annex I of the Habitats Directive and habitats considered to be their equivalent in countries outside the EU; b) ≥5% of the global extent of an ecosystem type meeting the criteria for IUCN's Red List of Ecosystems[8] with a status of critically endangered or endangered; c) Examples of ecosystems outside the EU and not yet assessed by IUCN, but determined to be of high priority for conservation on the basis of regional or national-level systematic conservation planning or informed specialist input.
Criterion 2 : Critically endangered, endangered or vulnerable species	a) A population of an IUCN Red-listed endangered or critically endangered species that is ≥ 0.5% of the global population and/or ≥ 5 established reproductive units of an endangered or critically endangered species; b) Significant concentration of an IUCN Red-listed vulnerable species or of multiple IUCN Red-listed vulnerable species, especially where the loss of the area would result in the change of the IUCN Red List status to endangered or critically endangered; c) Nationally or regionally-important concentration of a species listed as endangered or critically endangered on a regional/national IUCN Red List, or equivalent on national/regional listing. d) A population of species listed in Annex II and IV of the Habitats Directive.
Criterion 3 : Endemic or restricted-range species	a) They regularly hold ≥10% of the global population size and support ≥10 reproductive units of an endemic or restricted-range species. b) They are considered by relevant specialists to support unique or rare assemblages of species that occur there habitually, predictably or repeatably. The constituent species may not meet other critical habitat thresholds mentioned here in their own right, but may present assemblages that are considered important to maintain high biodiversity in the area.
Criterion 4 : Migratory species and/or congregatory species	a) Areas sustain ≥ 1%of the global population of a migratory or congregatory species at any point of the species' lifecycle on a cyclical or otherwise regular basis. b) Areas are needed to support migratory or congregatory species during periods of environmental stress.
Criterion 5 : Biodiversity and/or ecosystems with significant social, economic, or cultural importance to local communities and indigenous groups	Areas of semi-natural and natural habitat used by indigenous peoples and local communities to obtain essential or priority benefits will be considered critical from an ecosystem service perspective.

[8] https://www.iucn.org/resources/conservation-tools/iucn-red-list-ecosystems.

Criterion	Critical Habitat (CH)
Criterion 6 : Habitat of key scientific value and/or associated with key evolutionary processes	This may include, but is not limited to, exceptional representations of: a) Landscapes with high spatial heterogeneity and therefore high levels of species diversity; b) Environmental gradients, also known as ecotones, that produce transitional habitat which is associated with the process of speciation and high species and genetic diversity; c) Edaphic interfaces that juxtapose soil types (*e.g.* serpentine outcrops, limestone and gypsum deposits), which have led to the formation of unique plant communities; d) Connectivity between habitats (*e.g*. biological corridors) with importance for species migration and gene flow, which is especially important in fragmented habitats and for the conservation of metapopulations. This also includes biological corridors across altitudinal and climatic gradients and from "crest to coast." e) Sites of demonstrated importance to climate change adaptation for either species or ecosystems

2.1.2.3 ADB standard on Biodiversity Conservation and sustainable natural resource management[9]

Critical habitat is a subset of both natural and modified habitat that has high biodiversity value and may include sites that are legally protected or officially proposed for protection (e.g., areas that meet the International Union for Conservation of Nature (IUCN) classification criteria, the Ramsar List of Wetlands of International Importance, and United Nations Educational, Scientific, and Cultural Organization (UNESCO) world natural heritage sites. Critical habitat includes:

- areas with high biodiversity value, including habitat required for the survival of critically endangered or endangered species;
- areas having special significance for endemic or restricted-range species;
- sites that are critical for the survival of migratory species;
- areas supporting globally significant concentrations or numbers of individuals of congregatory species;
- areas with unique assemblages of species or that are associated with key evolutionary processes or provide key ecosystem services;
- and areas having biodiversity of significant social, economic, or cultural importance to local communities.

While ADB requires a CHA to be prepared for the project, ADB's requirements with regards to CHA are less stringent that those of the EBRD and EIB. Thus, they are not specifically referred to in this report, but are covered therein.

2.1.3 Limitations

In general, the main limitation that the Consultant has experienced during development of this report is the lack of biodiversity data, as there is no regular monitoring of biodiversity at the state level. In order to bridge the data gaps, the Consultant has been collecting the data via field surveys and from various stakeholders and has held a series of consultative meetings with the key biodiversity stakeholders in Armenia, including international NGOs, which supported the consultant with biodiversity data.

[9] Asian Development Bank - ENVIRONMENT SAFEGUARDS A GOOD PRACTICE SOURCEBOOK DRAFT WORKING DOCUMENT

Despite consultation with and sourcing information from the Ministry of Environment, researchers, the Director and selected staff of the Zangezur Biosphere Complex SNCO and other local stakeholders and nature conservation NGOs (e.g. WWF Armenia, BirdLinks Armenia, Armenian Society for the Protection of Birds, Institute of Zoology, Bird Lovers, Young Biologists Association), to supplement the fieldwork there is a paucity of knowledge regarding discrete species with a wide territory/dispersal range such as Persian Leopard, Armenian Mouflon, and so forth, which could potentially hinder threshold calculations in CHA. However, whenever possible, estimations were established during consultations with experts, and if not possible, results of previous studies (where existing), were used as proxy. The knowledge of local biodiversity experts and academia have been also extensively used.

2.2 Study Area

The **updated biodiversity study area** for the Project includes:

- The Sisian-Shenatagh and Qirs-Kajaran road sections and the Bargushat tunnel and adjacent areas of direct and indirect impact, including the connecting roads;
- Potential locations of spoil disposal areas;
- The southern portal of the Bargushat tunnel and adjoining section of the road that is mostly located in a mountainous area, with high biodiversity and landscape value;
- A 500m corridor centred on the proposed road (250m on each side of the alignment) as a priority for the biodiversity surveys and then widened as required, depending on the biodiversity (e.g., greater for birds and smaller for flora) and the relevant ecologically appropriate areas of analysis (EAAAs) for potential biodiversity priority features[10] (**Figure 2**);

To note: some of the Project facilities such as a construction camp, quarries, borrow pits, temporary disposal areas, asphalt plant, areas for temporary storage of removed topsoil, locations of the water tanks for the tunnel's fire-lighting system, etc. are not currently defined and will be determined by the Construction Contractor. The SDA sites proposed in the detailed design were assessed resulting in suggested disqualification of some SDAs (see the below section on alternatives and Volume 1). Additionally, no-go areas were preliminarily identified as explained in ESIA Volume 2 Section 2.3.5).

Initially biodiversity surveys were based on the direct footprint of the road with a 500m buffer on both sides of the proposed road (*cf.* figure below). If the project was likely to induce indirect impacts on habitats outside the buffer or if ecological functionalities linked to the project were identified outside this buffer, these areas were also included in the biodiversity survey sampling.

[10] This is a specific landscape approach in the framework of the Critical Habitat Assessment. In the Project's mountainous context, the landmarks that helped define the larger area of influence and EAAAs were ridges, water catchments, protected areas and main vegetation units (e.g., forests). Larger areas of influence were defined further for >1km buffer based on the literature review, stakeholder consultations and focused surveys.

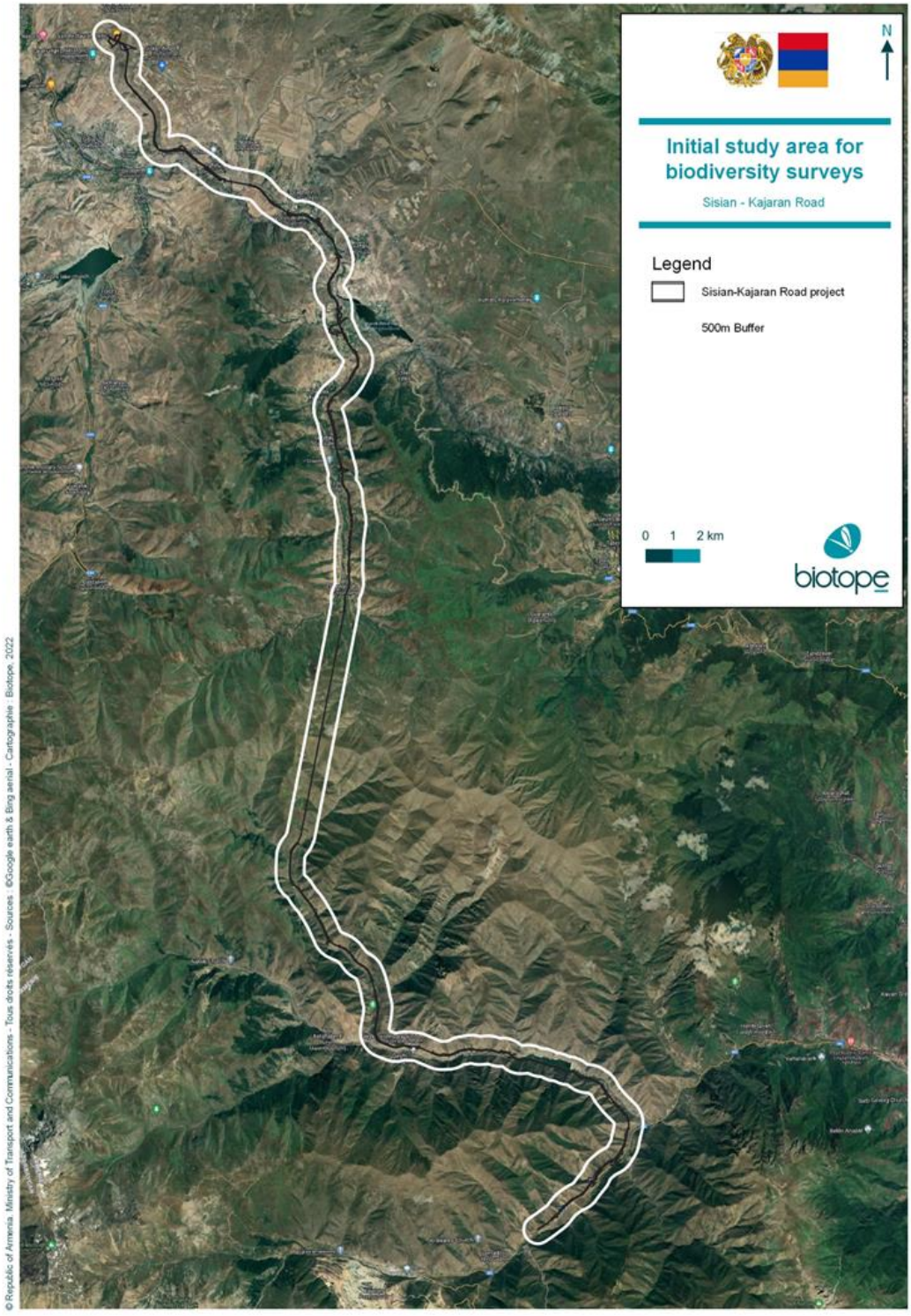

Figure 1. Initial Study Area for Biodiversity Surveys

Following the ESIA scoping, the study area was expanded where required, by the biodiversity experts in order to extend sampling areas on key areas for features that required additional focused study (*cf.* figure below). At the same time, the buffer was reduced to 250m on both sides of the proposed road.

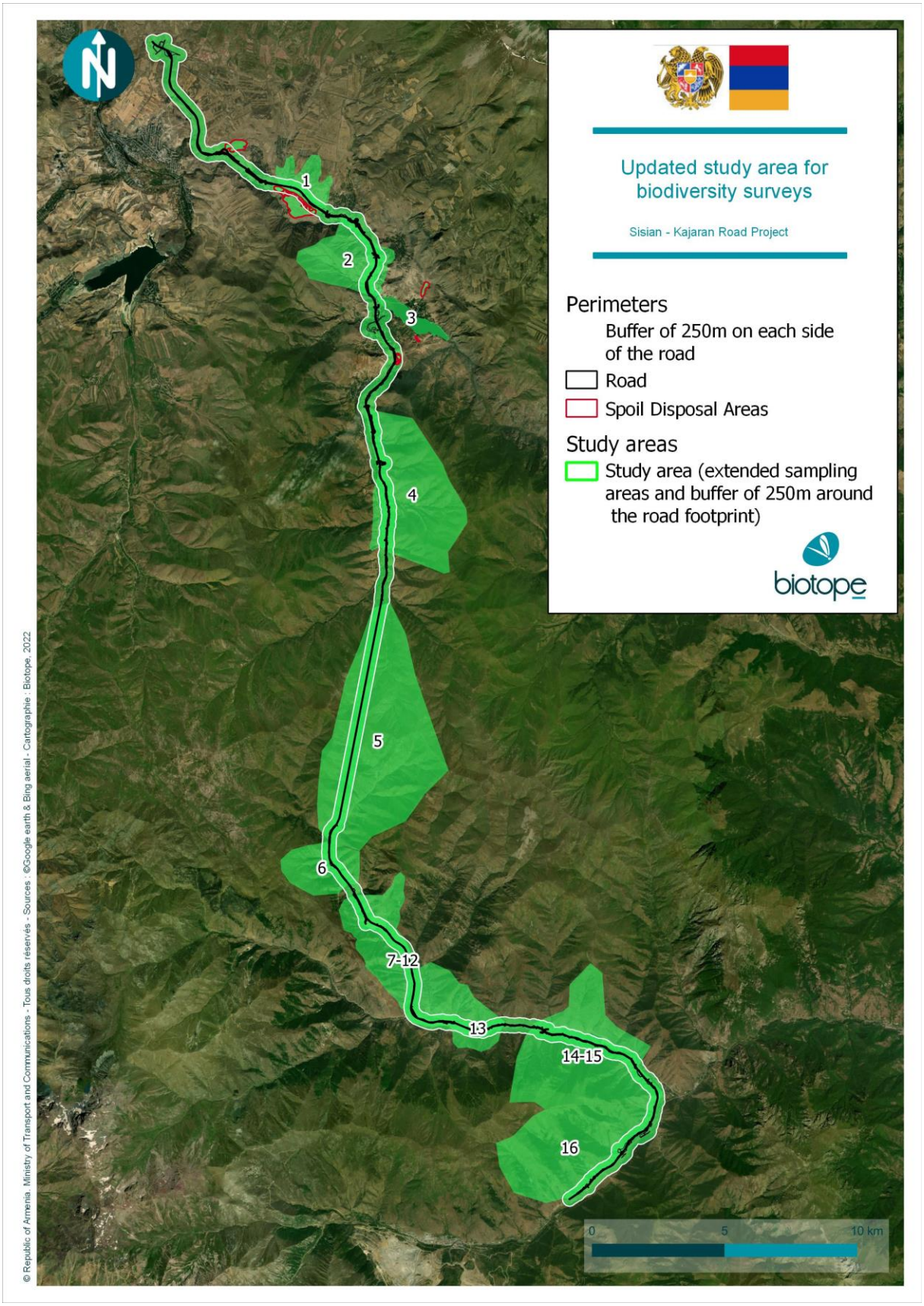

Figure 2. Updated Biodiversity Study Area

Finally, beyond the study area for biodiversity surveys, the figure below presents the geographical area containing all the EAAA dedicated to each species which were used for calculating critical habitat thresholds.

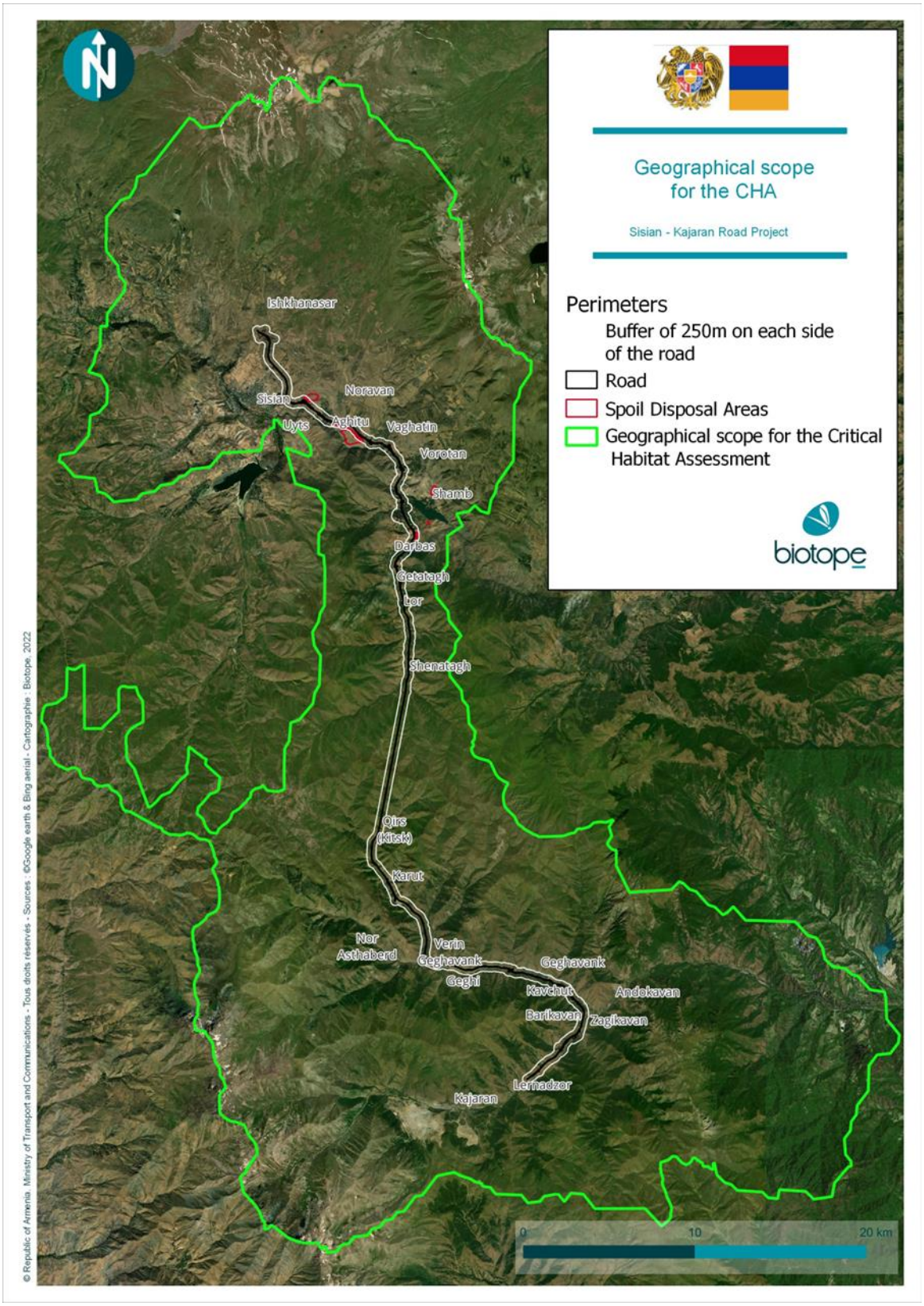

Figure 3. Geographical Scope for the Critical Habitat Assessment (Scale of the Combined EAAAs)

2.3 Targeted biodiversity features

A first screening was conducted to select habitats and species which need to compared to critical habitat criteria. The criteria for the selection **combined the more stringent criteria from both the EBRD PR6 and the EIB ESS4:**

- Habitats listed in Annex 1 of EU Habitats directive or resolution 4 of the Bern Convention.
- Species observed during the surveys and mentioned in the previous EIA (as a precautionary principle):
    - With a status of Critically Endangered (CR), Endangered (EN) and Vulnerable (VU) on the IUCN global red list
    - Species listed **Critically Endangered** (CR) or **Endangered** (EN) on the Armenian National Redbook
    - Species listed in EU Habitats Directive (Annex II and IV[11]) and Birds Directive (Annex I) or Resolution 6 of the Bern Convention
    - **Range-restricted species**, including terrestrial species having an extent of occurrence (EOO) smaller than 50,000 km²; and for aquatic species in habitats that do not exceed 200 km width at any point (for example, rivers), restricted range is defined as having a global range of less than or equal to 500 km linear geographic span (*i.e.,* the distance between occupied locations furthest apart).

Standard 4 of the EIB encompasses endemic species in addition to restricted-range species. However, as the global EAAA for fauna represents only about 2% of the lesser Caucasus area (Area of EAAA= 1,428km² ; Approximative Area of the lesser Caucasus: 75,000km² : 1 ,428/75 000=1.9%) and the threshold to trigger critical habitat is set to ≥10% of the EOO in absence of population data, the endemic species of the lesser Caucasus or at a bigger scale (*e.g.* Caucasus) are scoped out of the assessment as they would not reach thresholds to trigger critical habitats.

Following this screening, the targeted habitats listed in Annex I are presented on the map below in a buffer of 250 m on both sides of the road to be able to present the critical habitats in the Area of Influence (AoI) of the Project.

[11] In the Guidance Note PR6, EBRD, 2022, it is stated that in non-member countries, clients should conduct expert assessment of Critical Habitat using the other criteria and thresholds listed in this guidance to determine the appropriate restrictions and requirements. Expert's assessments were conducted by local biologists (with specialized experience with the species in that particular geographic context). The intent was to avoid inappropriate application of Annex IV species list to non-member countries with significantly different ecological contexts and/or more favorable species conservation status.

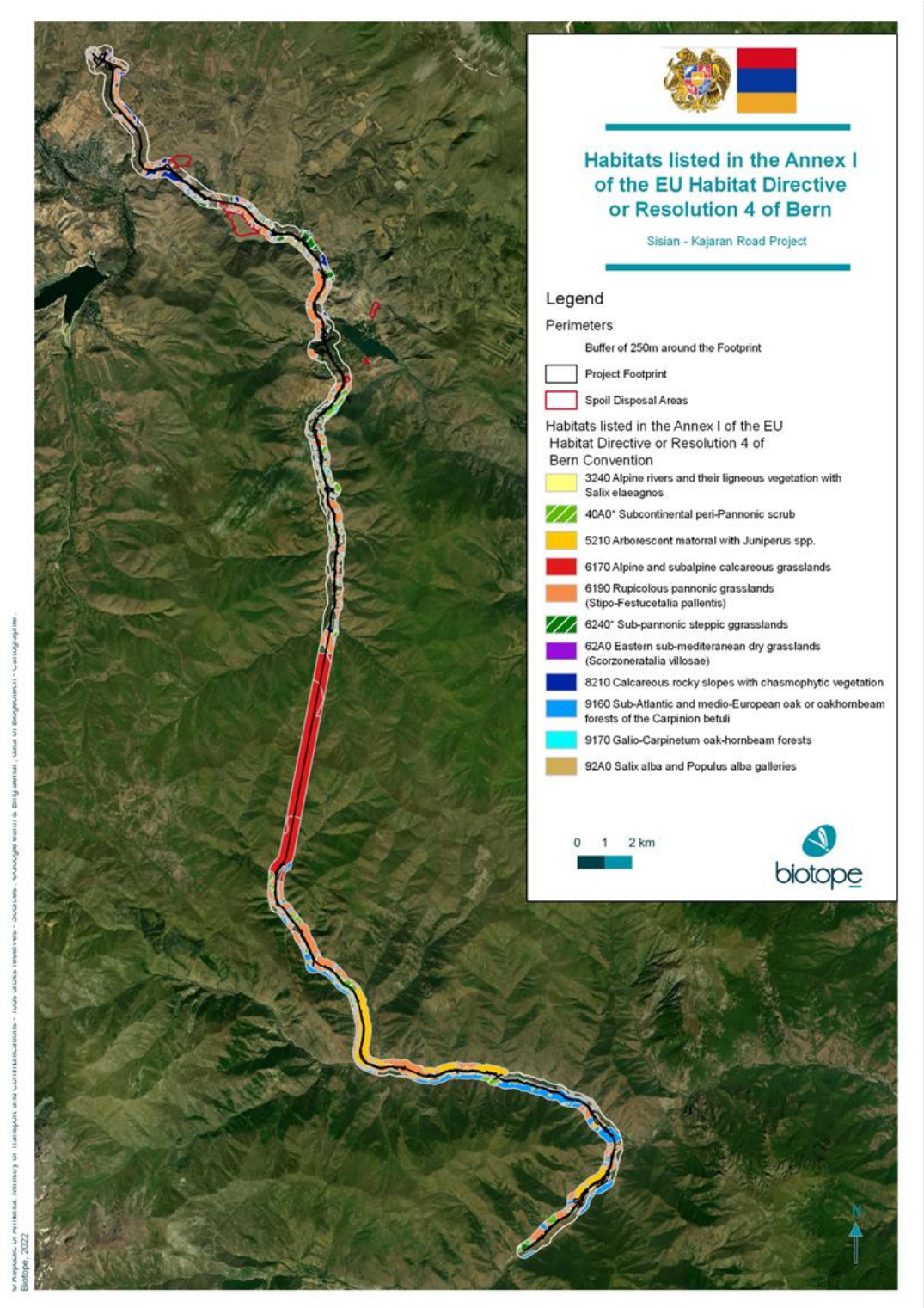

Figure 4. Habitat Map of the Habitats Listed in Annex I of the EU Habitat Directive or Resolution 4 of the Bern Convention in the 250m buffer on Each Side of the Project Footprint[12]

[12] For detailed Habitats of Annex I of the EU Habitat Directive, please refer to Appendix 2 to this report.

Following this screening, no fish species assessed against EBRD PR6 and EIB ESS4 criteria as the *Sabanejewia aurata*, Golden Spined Loach; *Leuciscus aspius*, Aral Asp; and *Luciobarbus capito*, Bulatmai Barbel were not observed during fieldwork and their presence considered unlikely by a local ichthyologist expert. No amphibians were selected either as the only species that could potentially be assessed is *Pelobates syriacus*, the Syrian spadefoot (LC) which was not observed during surveys and for which last available data date back to 1987. Moreover, no appropriate habitats were identified in the study area (areas of loose soil and temporary pools with no fish).

Species included in annex II of the Habitat directive and/or Bern convention resolution 6 not observed in the buffer of 250m on each side of the road and unlikely to be present based on local scientists' expertise and knowledge were also scoped out (*e.g.,* the insect species *Cerambyx Longicorn, Cerambyx cerdo* (VU), *Rosalia alpina* (VU), etc.).

Several floral species Endangered or Critically endangered in the Armenian Redbook are mentioned in Bargushat mountain range or Zangezur area and sometimes identified in the herbarium in the 20th century (*cf.* Volume 2, Annex 1). However, as the species were not observed in the 250m buffer on each side of the road during fieldwork and the data is old, they were scoped out of the analysis. Nevertheless, a recommendation is included in the ESIA and BAP to conduct Pre-Construction Biodiversity Surveys within the project footprint (temporary and permanent), including all the annexes, access roads, base camps, Spoil Disposal Areas, and so forth, to double check for the presence of EN and CR species. If such species are discovered in the footprint, they should be flagged for experimental translocation following a protocol developed in association with national scientists and local relevant NGOs. If one of these species would be found in a 50m buffer around the project footprint, their station(s) would need to be delineated to prevent potential degradation or destruction by construction activities.

The outcome of this screening is a list of **11 habitats and 58 species** presented in Table 3 and 4, which were then assessed against EBRD PR6 criteria for Critical Habitat (CH) and Priority Biodiversity Feature (PBF) and against EIB ESS4 for Critical Habitat (CH).

Table 3. List of Habitats, Targets of the CHA, Brought for Further CH/PBF Analysis

EUNIS		EU Habitats Directive[13]		Bern Convention (resolution 4)
Code	**Name of habitat**	**Code**	**Name of habitat**	
C2.	Surface running waters	3240	Alpine rivers and their ligneous vegetation with *Salix elaeagnos*	Resolution 4
E1.2	Perennial calcareous grassland and basic steppes	6190	Rupicolous pannonic grasslands (*Stipo-Festucetalia pallentis*)	Resolution 4
		62A0	Eastern sub-mediteranean dry grasslands (Scorzoneratalia villosae)	
E1.4	**Mediterranean tall-grass and wormwood - Artemisia - steppes**	**6240***	**Sub-Pannonic steppic grasslands**	/
E4.	Alpine and subalpine grasslands	6170	Alpine and subalpine calcareous grasslands	/
F3.1.	**Temperate thickets and scrub**	**40A0***	**Subcontinental peri-Pannonic scrub**	/
G1.	Broadleaved deciduous woodland	9160	Sub-Atlantic and medio-European oak or oak-hornbeam forests of the *Carpinion betuli*	Resolution 4

[13] Codes with an « * » correspond to priority Habitats in the EU Habitat Directive.

EUNIS		EU Habitats Directive[13]		Bern Convention (resolution 4)
Code	Name of habitat	Code	Name of habitat	
G1.A	Meso- and eutrophic oak, hornbeam, ash, sycamore, lime, elm and related woodland	9170	Galio-Carpinetum oak-hornbeam forests	Resolution 4
G1.11.	Riverine willow woodland	92A0	*Salix alba* and *Populus alba* galleries	Resolution 4
G3.9.	Coniferous woodland dominated by Cupressaceae	5210	Arborescent matorral with *Juniperus spp*.	Resolution 4
H3.2	Basic and ultra-basic inland cliffs	8210	Calcareous rocky slopes with chasmophytic vegetation	/

IUCN Red list status: CR: Critically Endangered; EN: Endangered; VU: Vulnerable; NT: Near threatened; LC: Least Concerned; DD: Data Deficient; NE: Not Evaluated

Table 4. List of Species, Targets of the CHA, Brought for Further CH/PBF Analysis

N°	Groups	English name	Scientific name	IUCN Red list	Armenia Red Book	EU Birds or Habitats Directive	Bern Convention (resolution 6)	Presence in the study area
	Species							
1	Mammals	Marbled polecat	*Vormela peregusna*	VU	VU	Annex II, IV Habitat Directive	-	Present in Semiarid rocky areas
2	Mammals	Wild goat (Bezoar goat)	*Capra aegagrus*	NT	VU	Annex II Habitat Directive	Resolution 6	Present in Rocks and cliffs
3	Mammals	Armenian mouflon	*Ovis orientalis gmelinii*	NT	EN	Annex II Habitat Directive	-	Present
4	Mammals	Brown bear	*Ursus arctos*	LC	VU	Annex II, IV Habitat Directive	Resolution 6	Present
5	Mammals	Grey Wolf	*Canis lupus*	LC	NE	Annex II, IV Habitat Directive	Resolution 6	Present
6	Mammals	Eurasian Otter	*Lutra lutra*	NT	EN	Annex II, IV Habitat Directive	Resolution 6	Present, Near to rivers and reservoirs
7	Mammals	Leopard	*Panthera pardus saxicolor*	VU (subspecies: EN[14])	CR	-	Resolution 6	Present
8	Mammals	Eurasian Lynx	*Lynx lynx*	LC	NE	Annex II, IV Habitat Directive	Resolution 6	Present
9	Mammals	Wildcat	*Felis silvestris*	LC	VU	Annex IV Habitat Directive	-	Present
10	Bats	Mehely's horseshoe bat	*Rhinolophus mehelyi*	VU	VU	Annex II Habitat Directive	Resolution 6	Present
11	Bats	Mediterranean horseshoe bat	*Rhinolophus euryale*	NT	VU	Annex II Habitat Directive	Resolution 6	Present
12	Bats	Blasius' horseshoe bat	*Rhinolophus blasii*	LC	EN	Annex II Habitat Directive	Resolution 6	Present
13	Bats	Schreiber's Bat	*Miniopterus schreibersii*	VU	VU	Annex II Habitat Directive	Resolution 6	Present
14	Birds	Bearded Vulture	*Gypaetus barbatus*	NT	VU	Annex I Birds Directive	Resolution 6	Present in Rocks and cliffs

[14] Stein, 2020.

N°	Groups	English name	Scientific name	IUCN Red list	Armenia Red Book	EU Birds or Habitats Directive	Bern Convention (resolution 6)	Presence in the study area
15	Birds	Egyptian Vulture	*Neophron percnopterus*	EN	EN	Annex I Birds Directive	Resolution 6	Present in Rocks and cliffs
16	Birds	Black Vulture	*Aegypius monachus*	NT	EN	Annex I Birds Directive	Resolution 6	Present in Juniper woodland
17	Birds	Griffon Vulture	*Gyps fulvus*	LC	VU	Annex I Birds Directive	Resolution 6	Present in Rocks and cliffs
18	Birds	Northern Goshawk	*Accipiter gentilis*	LC	VU	Annex I Birds Directive	-	Present in Deciduous woodland
19	Birds	Levant Sparrowhawk	*Accipiter brevipes*	LC	VU	Annex I Birds Directive	Resolution 6	Present in Riparian woodlands and orchards
20	Birds	Black Stork	*Ciconia nigra*	LC	VU	Annex I Birds Directive	Resolution 6	Present in Open grasslands
21	Birds	Kingfisher	*Alcedo atthis*	LC	NE	Annex I Birds Directive	Resolution 6	Present in Rivers and reservoirs
22	Birds	Tawny Pipit	*Anthus campestris*	LC	NE	Annex I Birds Directive	Resolution 6	Present
23	Birds	Golden Eagle	*Aquila chrysaetos*	LC	VU	Annex I Birds Directive	Resolution 6	Present in Rocks and cliffs, open grasslands
24	Birds	Greater short-toed Lark	*Calandrella brachydactyla*	LC	NE	Annex I Birds Directive	Resolution 6	Present
25	Birds	Nightjar	*Caprimulgus europaeus*	LC	NE	Annex I Birds Directive	Resolution 6	Present in Juniper woodlands, bushes
26	Birds	Short-toed Snake-eagle	*Circaetus gallicus*	LC	VU	Annex I Birds Directive	Resolution 6	Present
27	Birds	Lesser Spotted Eagle	*Clanga pomarina*	LC	VU	Annex I Birds Directive	Resolution 6	Present in Deciduous woodlands, open grasslands
28	Birds	Hen Harrier	*Circus cyaneus*	LC	NE	Annex I Birds Directive	Resolution 6	Present
29	Birds	European Roller	*Coracias garrulus*	LC	VU	Annex I Birds Directive	Resolution 6	Present
30	Birds	Syrian Woodpecker	*Dendrocopos syriacus*	LC	NE	Annex I Birds Directive	Resolution 6	Widely distributed in riparian woodlands
31	Birds	Middle Spotted Woodpecker	*Leiopicus medius*	LC	NE	Annex I Birds Directive	Resolution 6	Deciduous woodlands
32	Birds	Ortolan Bunting	*Emberiza hortulana*	LC	NE	Annex I Birds Directive	Resolution 6	Widely distributed in open grasslands
33	Birds	Red-breasted Flycatcher	*Ficedula parva*	LC	NE	Annex I Birds Directive	Resolution 6	Present
34	Birds	Semi-collared Flycatcher	*Ficedula semitorquata*	LC	VU	Annex I Birds Directive	Resolution 6	Present
35	Birds	Red-backed Shrike	*Lanius collurio*	LC	NE	Annex I Birds Directive	Resolution 6	Widely distributed in variety of habitats
36	Birds	Lesser Grey Shrike	*Lanius minor*	LC	NE	Annex I Birds Directive	Resolution 6	Present
37	Birds	Woodlark	*Lullula arborea*	LC	NE	Annex I Birds Directive	Resolution 6	Present. Widely distributed in juniper

N°	Groups	English name	Scientific name	IUCN Red list	Armenia Red Book	EU Birds or Habitats Directive	Bern Convention (resolution 6)	Presence in the study area
								woodlands and bushes
38	Birds	Bluethroat	*Luscinia svecica*	LC	NE	Annex I Birds Directive	Resolution 6	Present
39	Birds	Green Warbler	*Phylloscopus nitidus*	LC	NE	-	-	Present. Widely distributed in deciduous woodlands
40	Birds	Mountain Chiffchaff	*Phylloscopus sindianus*	LC	NE	-	-	Present in woodlands
41	Birds	Calandra Lark	*Melanocorypha calandra*	LC	NE	Annex I Birds Directive	Resolution 6	Present
42	Birds	Red-billed Chough	*Pyrrhocorax pyrrhocorax*	LC	NE	Annex I Birds Directive	Resolution 6	Present in Rocks and cliffs
43	Birds	Barred Warbler	*Sylvia nisoria*	LC	NE	Annex I Birds Directive	Resolution 6	Present
44	Reptiles	Armenian steppe viper	*Vipera eriwanensis*	VU	VU	-	-	Present
45	Reptiles	Radde's viper	*Montivipera raddei*	NT	VU	-	-	Present
46	Reptiles	Mediterranean tortoise	*Testudo graeca*	VU	VU	Annex II, IV Habitat Directive	Resolution 6	Present
47	Reptiles	European Pond Turtle	*Emys orbicularis*	NT	NE	Annex II, IV Habitat Directive	Resolution 6	Presence confirmed in the literature
48	Reptiles	Caspian Turtle	Mauremys caspica	LC	NE	Annex II, IV Habitat Directive	Resolution 6	Present
49	Reptiles	Mediterranean tortoise	*Testudo graeca*	VU	VU	Annex II, IV Habitat Directive	Resolution 6	Present
50	Insects	Forster's Blue	*Polyommatus (Agrodiaetus) aserbeidschanus*	N/E	EN	-	-	Present
51	Insects	/	*Polyommatus (Agrodiaetus) huberti*	N/E	EN	-	-	Present
52	Insects	Apollo Butterfly	*Parnassius apollo*	NT	VU	Annex IV Habitats Directive	-	Present
53	Insects	Large Blue	*Maculinea arion*	NT	VU	Annex IV Habitats Directive	-	Present
54	Plants	No	*Astragalus xiphidium*	N/E	EN	-	-	Present in Steppe
55	Plants	No	*Hypericum armenum*	N/E	CR	-	-	Present in Steppe
56	Plants	No	*Iris lineolata*	N/E	EN	-	-	Present in Steppe
57	Plants	No	*Tulipa sosnowskyi*	N/E	EN	-	-	Present in Steppe, bushes
58	Plants	No	*Tulipa florenskyi*	N/E	EN	-	-	Present in Light forests

2.4 Identification of Ecologically Appropriate Areas of Analysis (EAAA)

For the target species, Ecologically Appropriate Areas of Analysis (EAAA) were designed to include landscape-level distribution, as a reference for different threshold calculations when necessary. In all cases, the distribution and connectivity of such features in the landscape and the ecological processes that support them, should also be considered in the EAAA.

Where multiple biodiversity features have largely overlapped ecological requirements and distributions, a common EAAA has been defined (e.g., large mammals).

- **Large mammals** (Armenian Mouflon, *Ovis gmelinii gmelinii* (NT) ; Bezoar Goat ; *Capra aegagrus* (VU), Grey Wolf, *Canis lupus* (LC) ; Brown Bear, *Ursus arctos* (LC) ; Lynx, *Lynx lynx* (LC) ; Leopard, *Panthera pardus saxicolor* (VU); Wildcat, *Felis silvestris* (LC) ; Marble Polecat, *Vormela peregusna* (VU) ; even though these species use different habitats and do not share the exact same ecology, all use large territories and are mostly present in well-conserved habitats far from human activities (apart from bears, wolves, and jackals). Moreover, Zangezur sanctuary and the Emerald Network site have been designated specifically to ensure the conservation of these species (along with other groups of animals and plants), so the EAAA encompasses the perimeter of Zangezur Emerald Network site. Watersheds crossed by the road between Shenatagh and Kajaran, where favourable habitats for this variety of mammals are present (vegetation, altitude, and so forth) were added.
- **Raptors** (Bearded Vulture, *Gypaetus barbatus* (NT) ; Egyptian Vulture, *Neophron percnopterus* (EN) ; Golden Eagle, *Aquila chrysaetos* (LC) ; Lesser Spotted Eagle, *Clanga pomarina* (LC) ; Black Vulture, *Aegypius monachus* (NT) ; Griffon Vulture, *Gyps fulvus* (LC) ; Northern Goshawk, *Accipiter gentilis* (LC), Short-toed Snake-eagle, *Circaetus gallicus* (LC)): for wide-ranging species such as raptors, the respective EAAA should be based on nesting or roosting sites (see wide-ranging species definition in the PR6 guidance note, 2022), or important migration stopovers and since none are known or observed, no EAAA has been defined for raptors.
- **Reptiles:**
    - **European Pond Turtle, *Emys orbicularis* (NT):** Even though this species was not observed during field surveys, there are former records of the species in the vicinity of the Shamb reservoir. As the species is quite common, there is a very likely presence in this area and upstream in favorable habitats such as reed areas where they can bask sheltered by large helophytes.
    - **Armenian steppe viper, *Vipera eriwanensis* (VU):** Distribution is very fragmented in mountain steppes between 1000 m and 3000 m so its EAAA is limited to the steppic and mountainous massif of Zangezur**.**
    - **Radde's viper, *Montivipera raddei* (NT):** Species found in rocky montane areas with sparse scrubby vegetation at elevations between 1,000m and 2,000m asl. The EAAA was delineated following these habitats in the right altitude along the project area of influence.
- **Insects**
    - **Forster's Blue, *Polyommatus (Agrodiaetus) aserbeidschanus* (EN on the Armenian Red Book):** Species living in calcareous grasslands at the elevation from 2,000 to 2,500 m above sea level.
- **Flora species:** for flora species, the respective EAAA areas were assessed by the botanist expert by species (*cf.* Appendix 3). These areas (figures) were used to do the calculations and assess if the thresholds triggering the different criteria were reached or not.
- **Species living at the scale of the valley** (*e.g.,* Eurasian Otter, bats, etc.): for species which are dependent on rivers[15] in the project area and associated watersheds

[15] There are no aquatic invertebrates of conservation concern in the area. Additionally, none of the fish species are likely to trigger CH or PBF.

crossed by the project, or species which potentially use the whole landscape in the watershed, and/or well distributed at the scale of the project area. The area considered for this EAAA consists of all the watersheds crossed by the project footprint and sheltered habitats for bats such as hibernation or roosting sites.

Table 5. Description of the Ecologically Appropriate Areas of Analysis (EAAA) for the Different Potential Biodiversity Priority Features

Biodiversity feature and/or common group concerned	Name EAAA	Area (km²)
EAAA for large mammals	EAAA large mammals	944 km²
EAAA for *Vipera eriwanensis*	EAAA *V. eriwanensis*	62 km²
EAAA for *Montivipera raddei*	EAAA *M. raddei*	156 km²
EAAA for *Emys orbicularis*	EAAA *Emys orbicularis*	2.2 km²
EAAA for *Agrodiaetus aserbeidschanus*	EAAA *A.aserbeidschanus*	6.8 km²
EAAA for Species leaving at the scale of the valley	EAAA others	1 369 km²

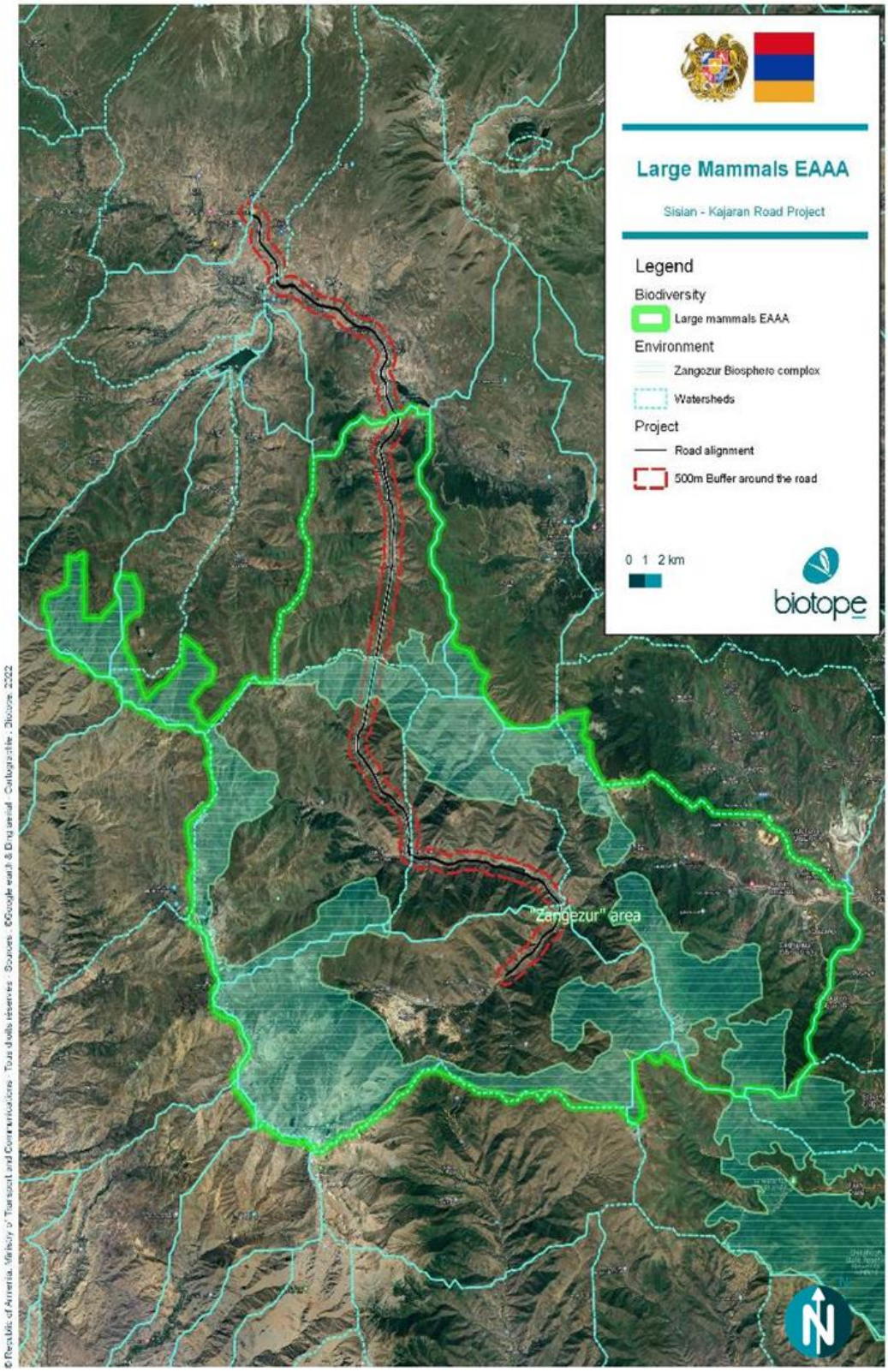

Figure 5. Map of the Large Mammals EAAA

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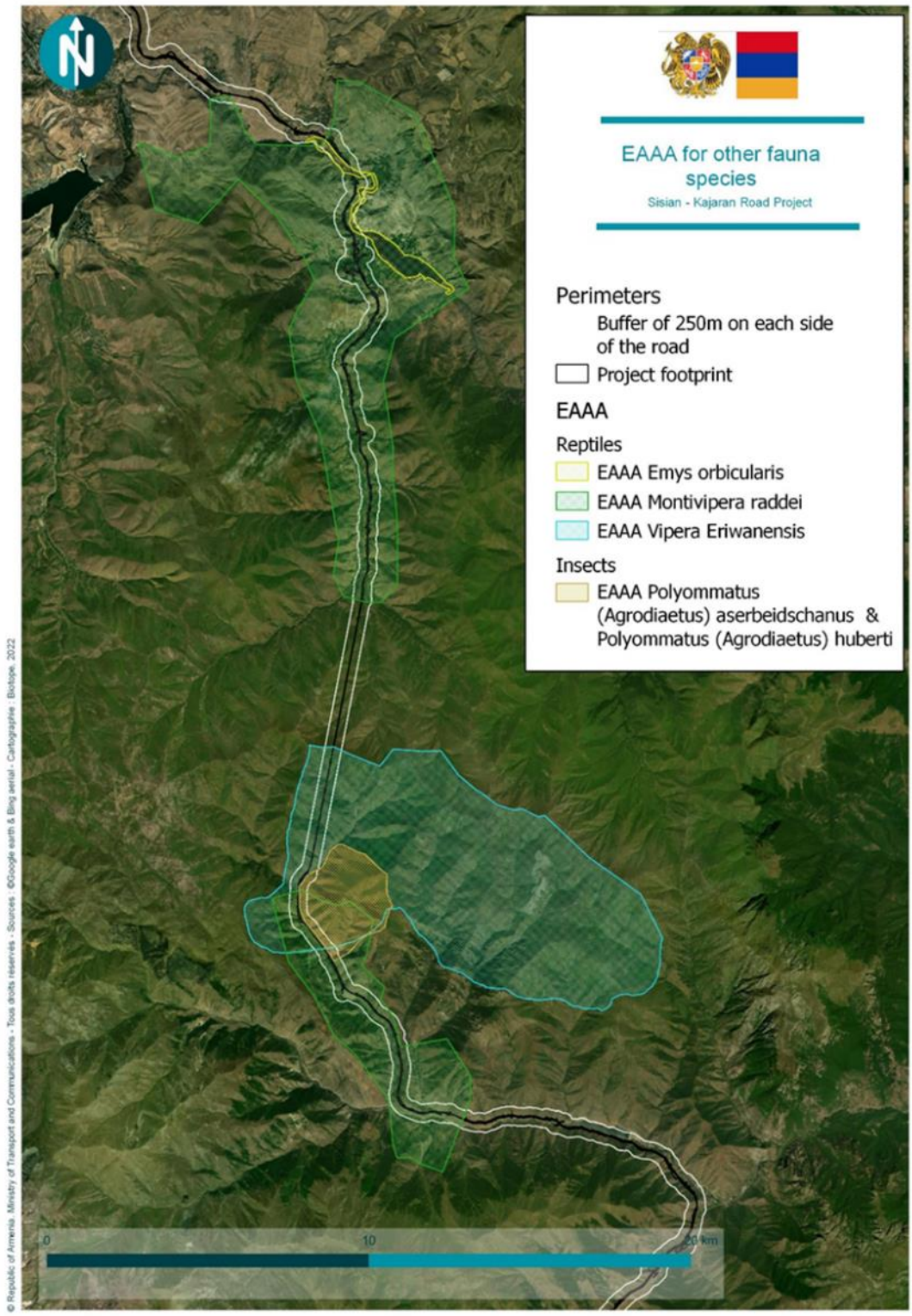


Figure 6. Map of the EAAA for Vipera eriwanensis, Montivipera raddei, and Emys orbicularis (Reptiles) and for Polyommatus (Agrodiaetus) aserbeidschanus (Butterfly)

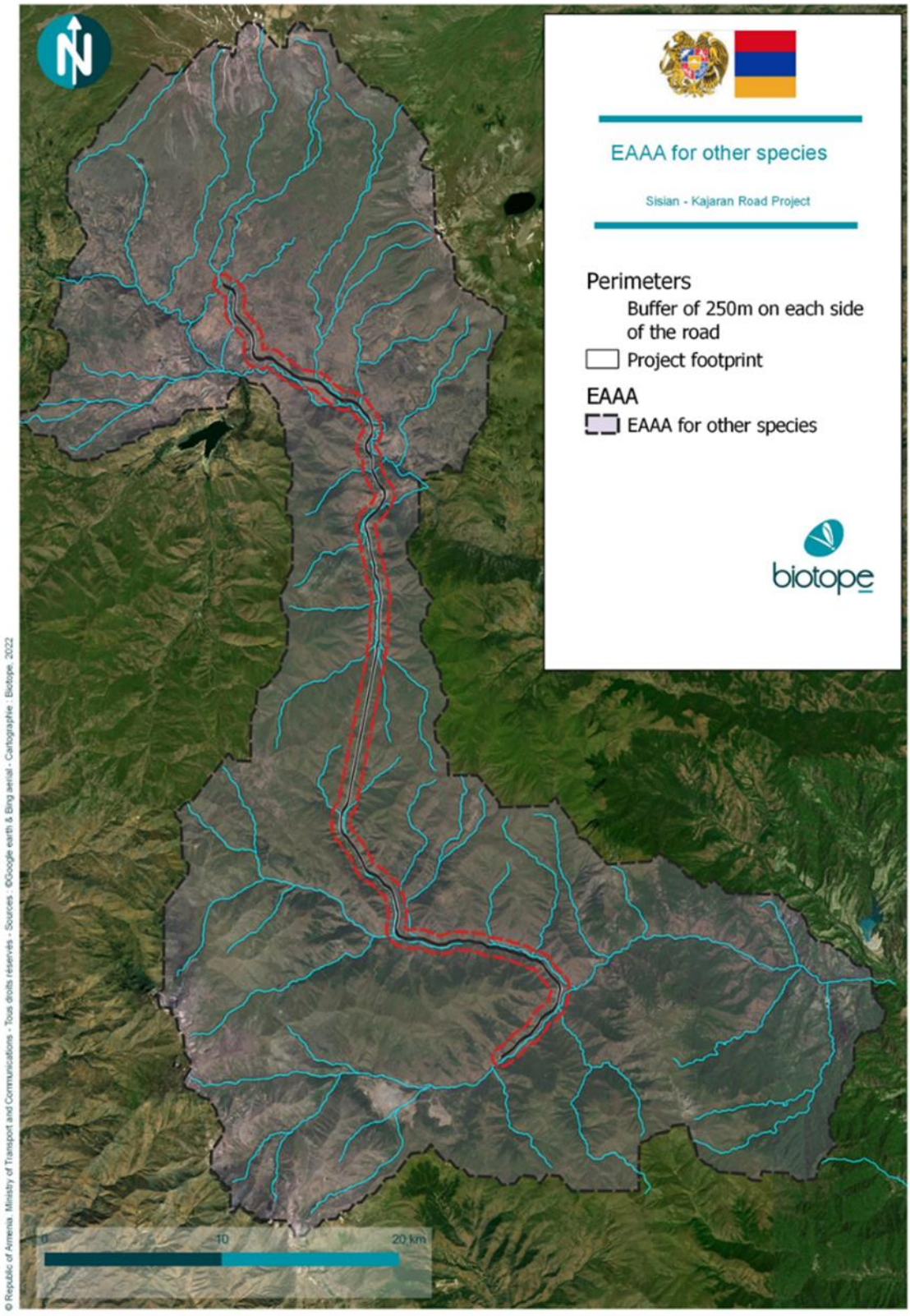


Figure 7. EAAA for Species Living at the Scale of the Valley (Otter, Bats, and Other Aquatic or Semi-Aquatic Species)

2.5 Biodiversity Priority Features and Critical Habitat Assessment

2.5.1 Habitat Assessment - EBRD PR6 Criterion i and EIB ESS4 Criterion 1

The CHA is based on criteria i (EBRD, PR6) and criteria 1 (EIB, ESS4), corresponding to Highly threatened or unique ecosystems.

Surveys revealed **11 habitats** listed in **Annex 1 of EU Habitats Directive** of which 7 listed in the Resolution 4 of the Bern Convention. Moreover, **2 of them are designated as Priority habitat types** (*6240*: Sub-Pannonic steppic grasslands and 40A0*: Subcontinental peri-Pannonic scrub*) and qualify as **critical habitat according to EIB ESS4**, and **7 others qualifying as Priority Biodiversity Features** (PBF) according to EBRD PR6 Cr 12.i.a (**Table 6**).

Table 6. Threatened Ecosystems Concerned by the Project (Cr. i.a PR6 EBRD, 1.a ESS4 EIB)

EUNIS		EU Habitats Directive[16]		Bern Convention (resolution 4)	EBRD PR6		EIB ESS4
					Priority Biodiversity Feature (PBF)	Critical Habitat (CH)	Critical Habitat (CH)
Code	Name of habitat	Code	Name of habitat				
C2.	Surface running waters	3240	Alpine rivers and their ligneous vegetation with *Salix elaeagnos*	Resolution 4	✓		
E1.2	Perennial calcareous grassland and basic steppes	6190	Rupicolous pannonic grasslands (*Stipo-Festucetalia pallentis*)	Resolution 4	✓		
		62A0	Eastern sub-mediteranean dry grasslands (Scorzoneratalia villosae)	Resolution 4	✓		
E1.4	**Mediterranean tall-grass and wormwood – Artemisia – steppes**	**6240***	**Sub-Pannonic steppic grasslands**	/			✓
E4.	Alpine and subalpine grasslands	6170	Alpine and subalpine calcareous grasslands	/			
F3.1.	**Temperate thickets and scrub**	**40A0***	**Subcontinental peri-Pannonic scrub**	/			✓
G1.	Broadleaved deciduous woodland	9160	Sub-Atlantic and medio-European oak or oak-hornbeam forests of the *Carpinion betuli*	Resolution 4	✓		
G1.A	Meso- and eutrophic oak, hornbeam, ash, sycamore, lime, elm and related woodland	9170	Galio-Carpinetum oak-hornbeam forests	Resolution 4	✓		

[16] Codes with an « * » correspond to priority Habitats in the EU Habitat Directive.

EUNIS		EU Habitats Directive[16]		Bern Convention (resolution 4)	EBRD PR6		EIB ESS4
Code	Name of habitat	Code	Name of habitat		Priority Biodiversity Feature (PBF)	Critical Habitat (CH)	Critical Habitat (CH)
G1.11.	Riverine willow woodland	92A0	*Salix alba* and *Populus alba* galleries	Resolution 4	✓		
G3.9.	Coniferous woodland dominated by Cupressaceae	5210	Arborescent matorral with *Juniperus spp*.	Resolution 4	✓		
H3.2	Basic and ultra-basic inland cliffs	8210	Calcareous rocky slopes with chasmophytic vegetation	/			

The Project thus has the potential to affect PBF triggering criteria 12.i-a (7 habitats) according to the EBRD PR6, and CH triggering criterion 1.a according to the ESS4 (2 habitats)

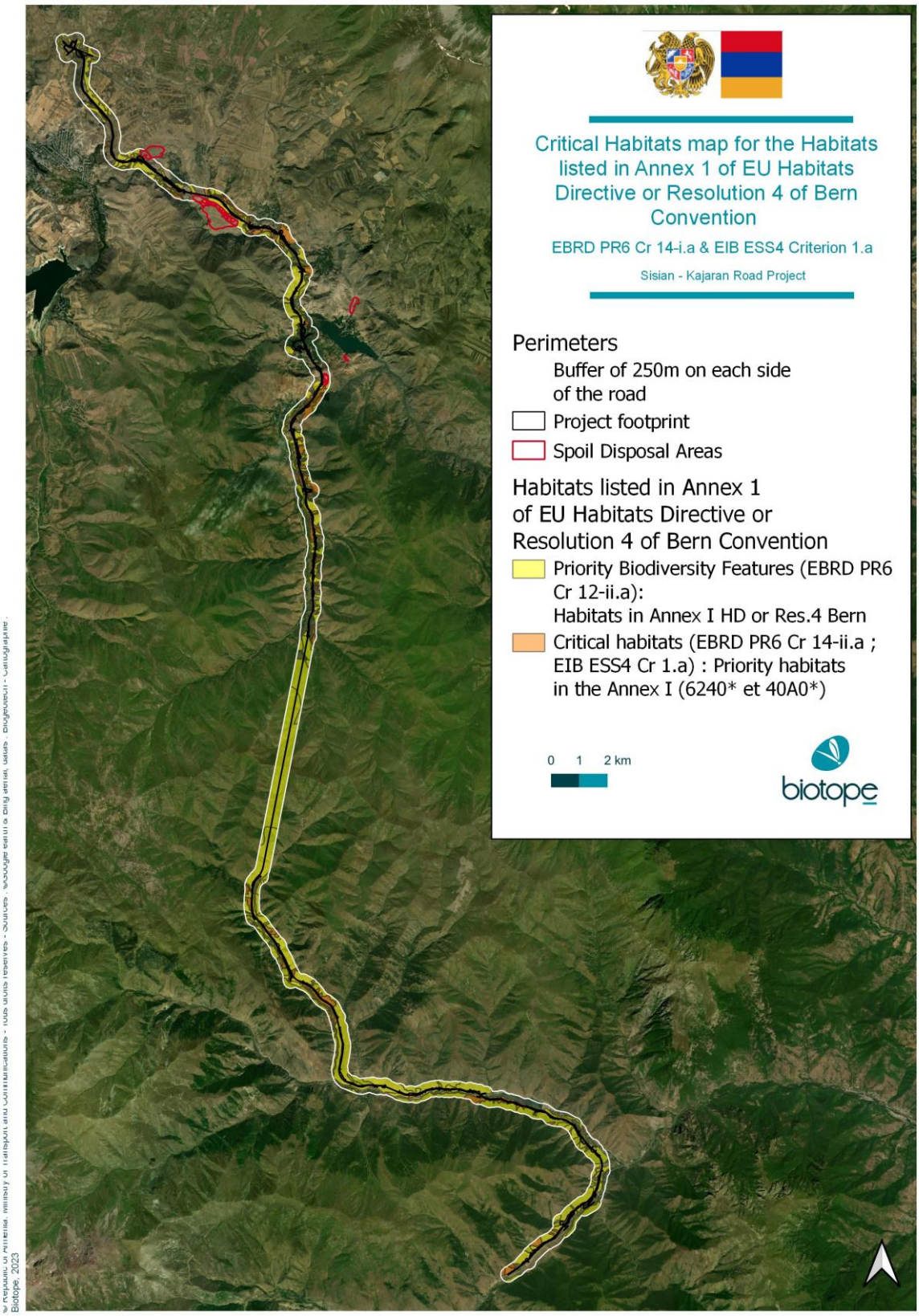


Figure 8. General Map of the Priority Biodiversity Features Triggering Criteria 12.i.a (EBRD, PR6) and Critical Habitats Triggering Criteria 1.a (EIB, ESS4) (for details, refer to Appendix 2)

2.5.2 Species Assessment

2.5.2.1 EBRD PR6 Criteria ii & iii and EIB ESS4 Criteria 2 & 3 - Critically Endangered and Endangered species and Endemic or geographically restricted species

All targeted species scoped for inclusion, and their assessment against the different criteria of the EBRD PR6 (Criteria ii, iii) and EIB ESS4 (Criteria 2, 3) are listed in **Table 7.** As the Project is situated in a biodiversity hotspot, there are many species of fauna and flora which have been considered in the CHA.

Only priority species and species of conservation concern have been brought for further analysis and impact assessment in the ESIA (Volume 2). If not stated otherwise in the table below under column '*Justification'*, for each species mentioned in the table residual impacts of the Project would not impair the long-term survival of the species, or the conservation status of the species, at the scale of their dedicated EAAA after implementation of adequate mitigation and offset measures (*cf.* the BAP).

Where available – the information about the population size within the AoI is indicated in the column '*Justification';* otherwise the exact information on population sizes is not available as there is no single country-level system of biodiversity monitoring yet that would allow for computation of Armenian populations of flora and fauna species (though various projects focused on specific biodiversity topics are being implemented by the state bodies and NGOs; the relevant information from these project was considered in the below table).

Table 7. CHA for Species

English name	Scientific name	IUCN Red list	Armenia Red Book	EU Birds or Habitats Directive	Bern Convention	Justification	EBRD PR6		EIB SS4
							Priority Biodiversity Feature (PBF)	Critical Habitat Trigger species (CH)	Critical Habitat Trigger species (CH)
Terrestrial Mammals									
Marbled polecat	***Vormela peregusna***	**VU**	**VU**	**Annex II, IV Habitat Directive**	**Resolution 6**	Listed in Annex II & IV of the Habitat Directive and Resolution 6 of the Bern Convention ***Triggers EBRD Cr 12.ii.a*** ***Triggers EIB Cr 2.d*** ***The species has not been registered during baseline surveys. The species' presence is known from literature and it is supposed to be resident for the area, although no quantitative data is available at the scale of the area of***	✓		✓

English name	Scientific name	IUCN Red list	Armenia Red Book	EU Birds or Habitats Directive	Bern Convention	Justification	EBRD PR6		EIB SS4
							Priority Biodiversity Feature (PBF)	Critical Habitat Trigger species (CH)	Critical Habitat Trigger species (CH)
						influence of the project and at the scale of the dedicated EAAA. The species has been considered in the CHA due to precautionary approach.			
Eurasian Otter	***Lutra lutra***	**NT**	**EN**	**Annex II, IV Habitat Directive**	**Resolution 6**	Listed in Annex II & IV of the Habitat Directive and Resolution 6 of the Bern Convention ***Triggers EBRD Cr 12.ii.a*** ***Triggers EIB Cr 2.d*** In the study area, presence of Otters is known in the Vorotan river and in Geghi river (Buzzard et al, 2020). Based on consultation with Gor Qaloyan, Institute of Zoology, and recent fieldworks the population of Otters in the study area is between 6-10 individuals (5 individuals on the Sisian part of the road in the area of Shamb reservoir and up to Vorotnavank in the Vorotan river, and 1-2 individuals on the Kitsk side, on the Geghi river). Otter is reproductive is the Sisian part of the road and not reproductive in the Geghi part of the road. There is also unpublished data of Gor Qaloyan: Along the Vorotan river several families occur. In all reservoirs Shamb, Angeghakot Tolos, Spandaryan one family per reservoir is found. The data on the total population size of the species in Armenia is unknown. Population is increasing, largely due to fish farming in the region (outside the Project AoI), although there are co-existence conflicts.	✓		✓

English name	Scientific name	IUCN Red list	Armenia Red Book	EU Birds or Habitats Directive	Bern Convention	Justification	EBRD PR6		EIB SS4
							Priority Biodiversity Feature (PBF)	Critical Habitat Trigger species (CH)	Critical Habitat Trigger species (CH)
Wild goat (Bezoar goat)	***Capra aegagrus***	**VU**	**VU**	**Annex II, IV Habitat Directive**	**Resolution 6**	Listed in Annex II & IV of the Habitat Directive and Resolution 6 of the Bern Convention ***Triggers EBRD Cr 12.ii.a*** ***Triggers EIB Cr 2.d*** The population in the dedicated EAAA is estimated to 100-150 individuals (WWF Armenia, pers. Communication), while outside EAAAs for Armenia it makes at least 3000-4000 individuals. The population is increasing.	✓		✓
Armenian mouflon	***Ovis gmelinii gmelinii***	**NT**	**EN**	**Annex II Habitat Directive**	**-**	EAAA for important concentrations of a nationally or regionally listed EN or CR species. ***Triggers EBRD Cr 14.ii.d*** ***Triggers EIB Cr 2.c*** Species listed in Annex II of the EU habitat directive ***Triggers EIB Cr 2.d*** Subspecies assessed as EN in the IUCN redlist (Michel & Ghoddousi, 2020) with less than 2 500 individuals in its distribution range and a population of about 15-50 individuals estimated in the dedicated EAAA, corresponding to more than **0.5% of the population and presenting more than 5 reproductive units as 66 females** with yearlings and lambs were found in 2007 (Khorozyan et al, 2009). The species is mainly found on the summits and slopes of mountain ranges, but can descend into the valleys in winter. The population is decreasing as the number of mouflons that returns to Armenia from the winter/summer migration from abroad is smaller than that of leaving Armenia.		✓	✓

English name	Scientific name	IUCN Red list	Armenia Red Book	EU Birds or Habitats Directive	Bern Convention	Justification	EBRD PR6		EIB SS4
							Priority Biodiversity Feature (PBF)	Critical Habitat Trigger species (CH)	Critical Habitat Trigger species (CH)
Brown Bear	***Ursus arctos***	**LC**	**VU**	**Annex II, IV Habitat Directive**	**Resolution 6**	Listed in Annex II & IV of the Habitat Directive and Resolution 6 of the Bern Convention ***Triggers EBRD Cr 12.ii.a*** ***Triggers EIB Cr 2.d*** Resident 5-10 individuals. at the scale of the dedicated EAAA. Potentially breeding area close to Geghavank reservoir in the Geghi valley. Reproductive (mother with two cubs was registered in the AoI). The species is definitely increasing in Armenia, although precise data on the total population size of the species in Armenia is unknown. The species thrives in mountainous and forested areas, as well as on grassland, and travels over large areas, including moving across the valley.	✓		✓
Grey Wolf	***Canis lupus***	**LC**	**NE**	**Annex II, IV Habitat Directive**	**Resolution 6**	Listed in Annex II & IV of the Habitat Directive and Resolution 6 of the Bern Convention ***Triggers EBRD Cr 12.ii.a*** ***Triggers EIB Cr 2.d*** Resident 20-35 individuals at the scale of the dedicated EAAA. Breeding is known in the valley of the project. The species regularly crosses the valley on its movements across its vast territory. The data on the total population size of the species in Armenia is unknown.	✓		✓
Wildcat	***Felis silvestris***	**LC**	**VU**	**Annex IV Habitat Directive**	**-**	Listed in Annex IV of the Habitat Directive ***Triggers EIB Cr 2.d*** Resident 2-7 individuals.at the scale of the dedicated EAAA.			✓

English name	Scientific name	IUCN Red list	Armenia Red Book	EU Birds or Habitats Directive	Bern Convention	Justification	EBRD PR6		EIB SS4
							Priority Biodiversity Feature (PBF)	Critical Habitat Trigger species (CH)	Critical Habitat Trigger species (CH)
						Wildcat occurs in deciduous forests and arid sparse forest in Ararat, Vyots Dozor, Syunik, Tavush and Lori provinces. The data on the total population size of the species in Armenia is unknown.			
Eurasian Lynx	***Lynx lynx***	**LC**	**NE**	**Annex II, IV Habitat Directive**	**Resolution 6**	Listed in Annex II & IV of the Habitat Directive and Resolution 6 of the Bern Convention ***Triggers EBRD Cr 12.ii.a*** ***Triggers EIB Cr 2.d*** Resident 5-8 individuals at the scale of the dedicated EAAA. Potentially breeding close to Geghavank reservoir in Geghi valley	✓		✓
Leopard	***Panthera pardus saxicolor***	**VU (subspecies: EN[17])**	**CR**	**-**	**Resolution 6**	Dedicated EAAA for important concentrations of a nationally or regionally listed CR species. According to Khorozyan et al, 2022, the estimated population of Persian Leopard in Armenia is 3-9 individuals, and according to WWF, 8 Leopards visit Armenia from Iran. Moreover, at least 1 and probably 2 individuals are present in the Zangezoor ASCI and cross the Geghi valley to reach the other ridge. Finally, the area is part of the large transboundary "Zangezur triangle" (Armenia / Iran / Nakhichivan), one out of only 2 sites with confirmed leopard reproduction in the entire Caucasus ecoregion (Breitenmoser et al, 2017) so it is		✓	✓

[17] Stein, 2020.

English name	Scientific name	IUCN Red list	Armenia Red Book	EU Birds or Habitats Directive	Bern Convention	Justification	EBRD PR6		EIB SS4
							Priority Biodiversity Feature (PBF)	Critical Habitat Trigger species (CH)	Critical Habitat Trigger species (CH)
						considered supporting an important concentration of this subspecies and important to the long-term survival of the species. ***Triggers EBRD Cr 14.ii.d*** ***Triggers EIB Cr 2.c***			
Bats									
Mehely's horseshoe bat	*Rhinolophus mehelyi*	VU	VU	Annex II Habitat Directive	Resolution 6	Listed in Annex II of the Habitat Directive or Resolution 6 of the Bern Convention ***Triggers EBRD Cr 12.ii.a*** ***Triggers EIB Cr 2.d*** The study area is used by the species as a foraging area. Around 20-30 bats were observed during the field surveys. **No hibernation sites and nursery colony are recorded in the AoI,** while some roosting or breeding sites exist at the scale of the dedicated EAAA outside of the AoI of the project. No estimation of the population size at the scale of the EAAA. The habitats around the AoI are suitable for the bats' long-term survival. The data on the total population size of the species in Armenia is unknown.	✓		✓
Mediterranean horseshoe bat	*Rhinolophus euryale*	NT	VU	Annex II Habitat Directive	Resolution 6	Listed in Annex II of the Habitat Directive or Resolution 6 of the Bern Convention ***Triggers EBRD Cr 12.ii.a*** ***Triggers EIB Cr 2.d*** The study area is used by the species as a foraging area. No hibernation sites and nursery colony recorded in the project AoI, while some roosting or breeding sites exist at the scale of the dedicated EAAA. No estimation of the population size at the	✓		✓

English name	Scientific name	IUCN Red list	Armenia Red Book	EU Birds or Habitats Directive	Bern Convention	Justification	EBRD PR6		EIB SS4
							Priority Biodiversity Feature (PBF)	Critical Habitat Trigger species (CH)	Critical Habitat Trigger species (CH)
						scale of the EAAA. Habitats are well distributed beyond the EAAA in the South Caucasus. The data on the total population size of the species in Armenia is unknown.			
Blasius' horseshoe bat	*Rhinolophus blasii*	LC	EN	Annex II Habitat Directive	Resolution 6	Listed in Annex II of the Habitat Directive ***Triggers EBRD Cr 12.ii.a*** ***Triggers EIB Cr 2.d*** and Nationally listed EN species regularly occurring in the EAAA (concentration not important enough to trigger CH for both PR6 or ESS4) ***Triggers EBRD Cr 12.ii.d*** The study area is used by the species as a foraging area. No hibernation sites and nursery colony recorded in the project AoI, while some roosting or breeding sites exist at the scale of the dedicated EAAA (outside of the AoI). No estimation of the population size at the scale of the EAAA. Habitats are well distributed beyond the EAAA in the South Caucasus. The data on the total population size of the species in Armenia is unknown.	✓		✓
Greater Horseshoe Bat	*Rhinolophus ferrumequinum*	NT	NE	Annex II Habitat Directive	Resolution 6	Listed in Annex II of the Habitat Directive or Resolution 6 of the Bern Convention ***Triggers EBRD Cr 12.ii.a*** ***Triggers EIB Cr 2.d*** The study area is used by the species as a foraging area. No hibernation sites and nursery colony recorded in the project AoI, while some roosting or breeding sites exist at the scale of the dedicated EAAA. No estimation of the population size at the	✓		✓

English name	Scientific name	IUCN Red list	Armenia Red Book	EU Birds or Habitats Directive	Bern Convention	Justification	EBRD PR6		EIB SS4
							Priority Biodiversity Feature (PBF)	Critical Habitat Trigger species (CH)	Critical Habitat Trigger species (CH)
						scale of the EAAA. Habitats are well distributed beyond the EAAA in the South Caucasus. The data on the total population size of the species in Armenia is unknown.			
Lesser Horseshoe Bat	*Rhinolophus hipposideros*	NT	NE	Annex II Habitat Directive	Resolution 6	Listed in Annex II of the Habitat Directive or Resolution 6 of the Bern Convention ***Triggers EBRD Cr 12.ii.a*** ***Triggers EIB Cr 2.d*** The study area is used by the species as a foraging area. No hibernation sites and nursery colony recorded in the project AoI, some roosting or breeding sites exist at the scale of the dedicated EAAA. No estimation of the population size at the scale of the EAAA. Habitats are well distributed beyond the EAAA in the South Caucasus. The data on the total population size of the species in Armenia is unknown.	✓		✓
Lesser Mouse-eared Myotis	*Myotis blythii*	LC	NE	Annex II Habitat Directive	Resolution 6	Listed in Annex II of the Habitat Directive or Resolution 6 of the Bern Convention ***Triggers EBRD Cr 12.ii.a*** ***Triggers EIB Cr 2.d*** The study area is used by the species as a foraging area. No hibernation sites and nursery colony recorded in the project AoI. Also, the area lays on the species' migration route where they can have the rest. *E.g., Myotis Blythi* found in Votnavanq church in April, but not further. The data on the total population size of the species in Armenia is unknown.	✓		✓

English name	Scientific name	IUCN Red list	Armenia Red Book	EU Birds or Habitats Directive	Bern Convention	Justification	EBRD PR6		EIB SS4
							Priority Biodiversity Feature (PBF)	Critical Habitat Trigger species (CH)	Critical Habitat Trigger species (CH)
Geoffroy's Bat	*Myotis emarginatus*	LC	NE	Annex II Habitat Directive	Resolution 6	Listed in Annex II of the Habitat Directive or Resolution 6 of the Bern Convention ***Triggers EBRD Cr 12.ii.a*** ***Triggers EIB Cr 2.d*** The study area is used by the species as a foraging area. No hibernation sites and nursery colony recorded in the project area. but for sure, some roosting or breeding sites exist at the scale of the dedicated EAAA. No estimation of the population size at the scale of the EAAA is available. The data on the total population size of the species in Armenia is unknown.	✓		✓
Schreiber's Bat	*Miniopterus schreibersii*	VU	VU	Annex II Habitat Directive	Resolution 6	Listed in Annex II of the Habitat Directive or Resolution 6 of the Bern Convention ***Triggers EBRD Cr 12.ii.a*** ***Triggers EIB Cr 2.d*** The study area is used by the species as a foraging area. No hibernation sites and nursery colony recorded in the AoI. Also, the dedicated EAAA is on the migration route where they can rest. The data on the total population size of the species in Armenia is unknown.	✓		✓
Birds[18]									

[18] No nests were observed for the birds listed in this table unless specified otherwise herein.

English name	Scientific name	IUCN Red list	Armenia Red Book	EU Birds or Habitats Directive	Bern Convention	Justification	EBRD PR6		EIB SS4
							Priority Biodiversity Feature (PBF)	Critical Habitat Trigger species (CH)	Critical Habitat Trigger species (CH)
Bearded Vulture	*Gypaetus barbatus*	NT	VU	Annex I Birds Directive	Resolution 6	Listed in Annex I of the Birds Directive and Resolution 6 of the Bern Convention ***Triggers EBRD Cr 12.ii.a*** ***Doesn't trigger CH according to EIB ESS4*** There are no active nests of the species in the AoI. Nevertheless 1 adult individual is regularly using the area as part of its foraging range, and 1 subadult individual visits the area for foraging. Foraging areas are slopes where you have some dead sheep and roosting sites are only on cliffs. The total breeding population of the species in Armenia is 11-12 pairs.	✓		
Egyptian Vulture	*Neophron percnopterus*	EN	EN	Annex I Birds Directive	Resolution 6	Listed in Annex I of the Birds Directive ***Triggers EBRD Cr 12.ii.a*** EAAA supports <0,5% of the population (global pop. Estimate: 12 400- 36 000 ; local pop estimate 1-2 : conservative approach for the ratio : 2/12400=0.02% ; ii.b) ***Triggers EBRD Cr 12.ii.b*** Nationally Listed EN species regularly occurring in the EAAA ***Triggers EBRD Cr 12.ii.d*** ***Doesn't trigger CH according to EIB ESS4*** There are no active nests of the species in the project area. Nevertheless 1-2 adult individuals regularly use the area as part of their foraging range. Foraging areas are slopes where you have some dead sheep or others dead mammals, and roosting sites are only on cliffs	✓		

English name	Scientific name	IUCN Red list	Armenia Red Book	EU Birds or Habitats Directive	Bern Convention	Justification	EBRD PR6		EIB SS4
							Priority Biodiversity Feature (PBF)	Critical Habitat Trigger species (CH)	Critical Habitat Trigger species (CH)
						The total breeding population of the species in Armenia is 52-60 pairs.			
Black Vulture	*Aegypius monachus*	NT	EN	Annex I Birds Directive	Resolution 6	Listed in Annex I of the Birds Directive ***Triggers EBRD Cr 12.ii.a*** and Nationally Listed EN species regularly occurring in the EAAA ***Triggers EBRD Cr 12.ii.d*** ***Doesn't trigger CH according to EIB ESS4*** There are no active nests of the species in the project area. Nevertheless 1-3 subadult individuals forage in the area. Foraging areas are slopes where you have some dead sheep and roosting sites are mainly on trees or cliffs. The total breeding population of the species in Armenia is 12-14 pairs.	✓		
Northern Goshawk	*Accipiter gentilis*	LC	VU	Annex I Birds Directive	-	Listed in Annex I of the Birds Directive (Cr. ***Triggers EBRD Cr 12.ii.a*** ***Doesn't trigger CH according to EIB ESS4*** Presence of one breeding pair is rather certain (near the project AoI), while the presence of a second pair is highly possible. The species nests in forests and hunts mainly on ridges of the mountain. The total breeding population of the species in Armenia is 38-62 pairs.			
Levant Sparrowhawk	*Accipiter brevipes*	LC	VU	Annex I Birds Directive	Resolution 6	Listed in Annex I of the Birds Directive and Resolution 6 of the Bern Convention ***Triggers EBRD Cr 12.ii.a*** ***Doesn't trigger CH according to EIB ESS4***	✓		

English name	Scientific name	IUCN Red list	Armenia Red Book	EU Birds or Habitats Directive	Bern Convention	Justification	EBRD PR6		EIB SS4
							Priority Biodiversity Feature (PBF)	Critical Habitat Trigger species (CH)	Critical Habitat Trigger species (CH)
						The species is not breeding in the project area but 1-5 individuals can occur during seasonal migration.			
Golden Eagle	*Aquila chrysaetos*	LC	VU	Annex I Birds Directive	Resolution 6	Listed in Annex I of the Birds Directive and Resolution 6 of the Bern Convention ***Triggers EBRD Cr 12.ii.a*** ***Doesn't trigger CH according to EIB ESS4*** There are no active nests of the species in the project area. Nevertheless 2 adult individuals regularly forage in the area as part of their foraging range, and 1 subadult individual forages in the area. Foraging areas are mainly the slopes and the ridge of the mountains The total breeding population of the species in Armenia is 34-38 pairs.	✓		
Lesser Spotted Eagle	*Clanga pomarina*	LC	VU	Annex I Birds Directive	Resolution 6	Listed in Annex I of the Birds Directive and Resolution 6 of the Bern Convention ***Triggers EBRD Cr 12.ii.a*** ***Doesn't trigger CH according to EIB ESS4*** There are no active nests of the species in the AoI. Nevertheless, the eagle may sometimes, occur in breeding and migration seasons. During migration it just passes the area, probably sometimes stopping to overnight, but during breeding season can use the area as part of its foraging range. Foraging areas are mainly situated in the different grasslands of the valley. The total breeding population of the species in Armenia is 48-52 pairs.	✓		

English name	Scientific name	IUCN Red list	Armenia Red Book	EU Birds or Habitats Directive	Bern Convention	Justification	EBRD PR6		EIB SS4
							Priority Biodiversity Feature (PBF)	Critical Habitat Trigger species (CH)	Critical Habitat Trigger species (CH)
Griffon Vulture	*Gyps fulvus*	LC	VU	Annex I Birds Directive	Resolution 6	Listed in Annex I of the Birds Directive and Resolution 6 of the Bern Convention ***Triggers EBRD Cr 12.ii.a*** ***Doesn't trigger CH according to EIB ESS4*** There are no active nests of the species in the study area. Nevertheless, it sometimes occurs in breeding and migration seasons. During migration it just passes the area, probably sometimes stopping to overnight, but during breeding season it can use the area as part of its foraging range. Foraging areas are slopes where you have some dead sheep and roosting sites are only on cliffs The total breeding population of the species in Armenia is 48-54 pairs.	✓		
Short-toed Snake-eagle	*Circaetus gallicus*	LC	VU	Annex I Birds Directive	Resolution 6	Listed in Annex I of the Birds Directive and Resolution 6 of the Bern Convention ***Triggers EBRD Cr 12.ii.a*** ***Doesn't trigger CH according to EIB ESS4*** The species is not breeding in the project AoI and EAAAs, but occurs here during seasonal migration in a number of 1-5 individuals. This species potentially hunts reptiles in all the grassy and rocky areas of the valley. Population size is not known for Armenia.	✓		
Hen Harrier	*Circus cyaneus*	LC	NE	Annex I Birds Directive	Resolution 6	Listed in Annex I of the Birds Directive and Resolution 6 of the Bern Convention ***Triggers EBRD Cr 12.ii.a*** ***Doesn't trigger CH according to EIB ESS4*** The species can use the dedicated EAAA as a part of its wintering range. Their number is within a	✓		

English name	Scientific name	IUCN Red list	Armenia Red Book	EU Birds or Habitats Directive	Bern Convention	Justification	EBRD PR6		EIB SS4
							Priority Biodiversity Feature (PBF)	Critical Habitat Trigger species (CH)	Critical Habitat Trigger species (CH)
						range of 1-5 individuals. This species thrives in agricultural areas and meadows.			
Caucasian Black Grouse	*Tetrao mlokosiewiczi*	NT	VU	-	-	The Caucasian Black grouse qualifies as a significant biodiversity feature identified by a broad set of stakeholders or governments as it is an endemic from Caucasus and breeding in the mountainous area close to Kitsk ***Triggers EBRD Cr. 12.iii***	✓		
Caspian Snowcock	*Tetraogallus caspius*	LC	VU	-	-	The Caspian Snowcock qualifies as a significant biodiversity feature identified by a broad set of stakeholders or governments as it is an endemic from Caucasus and breeding in the area over the Bargushat tunnel. ***Triggers EBRD Cr. 12.iii***	✓		
Nightjar	*Caprimulgus europaeus*	LC	NE	Annex I Birds Directive	Resolution 6	Listed in Annex I of the Birds Directive and Resolution 6 of the Bern Convention ***Triggers EBRD Cr 12.ii.a*** ***Doesn't trigger CH according to EIB ESS4*** The species breeds within the EAAA, although the quantity remain unknown. This species thrives in semi-forested areas and bushy areas on slopes. Population size is not known for Armenia.	✓		
European Roller	*Coracias garrulus*	LC	VU	Annex I Birds Directive	Resolution 6	Listed in Annex I of the Birds Directive and Resolution 6 of the Bern Convention ***Triggers EBRD Cr 12.ii.a*** ***Doesn't trigger CH according to EIB ESS4*** The species is not breeding in the project AoI and EAAAs but occurs here during seasonal migration. This species is mainly found at the bottom of	✓		

English name	Scientific name	IUCN Red list	Armenia Red Book	EU Birds or Habitats Directive	Bern Convention	Justification	EBRD PR6		EIB SS4
							Priority Biodiversity Feature (PBF)	Critical Habitat Trigger species (CH)	Critical Habitat Trigger species (CH)
						valleys, not far from watercourses, hunting insects in meadows for example, although the quantity remain unknown. Population size is not known for Armenia.			
Kingfisher	*Alcedo atthis*	LC	NE	Annex I Birds Directive	Resolution 6	Listed in Annex I of the Birds Directive and Resolution 6 of the Bern Convention ***Triggers EBRD Cr 12.ii.a*** ***Doesn't trigger CH according to EIB ESS4*** The species breeds within the EAAA along the small and large rivers, although the quantity remain unknown. Population size is not known for Armenia.	✓		
Tawny Pipit	*Anthus campestris*	LC	NE	Annex I Birds Directive	Resolution 6	Listed in Annex I of the Birds Directive and Resolution 6 of the Bern Convention ***Triggers EBRD Cr 12.ii.a*** ***Doesn't trigger CH according to EIB ESS4*** The species is not breeding in the project AoI but can occur here during seasonal migration, mainly on crops or in grassland areas.	✓		
Syrian Woodpecker	*Dendrocopos syriacus*	LC	NE	Annex I Birds Directive	Resolution 6	Listed in Annex I of the Birds Directive and Resolution 6 of the Bern Convention ***Triggers EBRD Cr 12.ii.a*** ***Doesn't trigger CH according to EIB ESS4*** The species breeds within the EAAA, mainly on small pieces of woods. Population size is not known for Armenia.	✓		
Middle Spotted Woodpecker	*Leiopicus medius*	LC	NE	Annex I Birds Directive	Resolution 6	Listed in Annex I of the Birds Directive and Resolution 6 of the Bern Convention ***Triggers EBRD Cr 12.ii.a***	✓		

English name	Scientific name	IUCN Red list	Armenia Red Book	EU Birds or Habitats Directive	Bern Convention	Justification	EBRD PR6		EIB SS4
							Priority Biodiversity Feature (PBF)	Critical Habitat Trigger species (CH)	Critical Habitat Trigger species (CH)
						Doesn't trigger CH according to EIB ESS4 The species breeds within the EAAA in small pieces of woods although the quantity remain unknown. Population size is not known for Armenia.			
Ortolan Bunting	*Emberiza hortulana*	LC	NE	Annex I Birds Directive	Resolution 6	Listed in Annex I of the Birds Directive and Resolution 6 of the Bern Convention ***Triggers EBRD Cr 12.ii.a*** ***Doesn't trigger CH according to EIB ESS4*** The species breeds within the EAAA, mainly on slopes with bushy areas although the quantity remain unknown. Population size is not known for Armenia.	✓		
Red-breasted Flycatcher	*Ficedula parva*	LC	NE	Annex I Birds Directive	Resolution 6	Listed in Annex I of the Birds Directive and Resolution 6 of the Bern Convention ***Triggers EBRD Cr 12.ii.a*** ***Doesn't trigger CH according to EIB ESS4*** The species definitely uses the project area as a stopover site during migration. Population size is not known for Armenia.	✓		
Semi-collared Flycatcher	*Ficedula semitorquata*	LC	VU	Annex I Birds Directive	Resolution 6	Listed in Annex I of the Birds Directive and Resolution 6 of the Bern Convention ***Triggers EBRD Cr 12.ii.a*** ***Doesn't trigger CH according to EIB ESS4*** The species definitely uses the project area as a stopover site during migration. The total breeding population of the species in Armenia is 950-1150 pairs.	✓		

English name	Scientific name	IUCN Red list	Armenia Red Book	EU Birds or Habitats Directive	Bern Convention	Justification	EBRD PR6		EIB SS4
							Priority Biodiversity Feature (PBF)	Critical Habitat Trigger species (CH)	Critical Habitat Trigger species (CH)
Red-backed Shrike	*Lanius collurio*	LC	NE	Annex I Birds Directive	Resolution 6	Listed in Annex I of the Birds Directive and Resolution 6 of the Bern Convention ***Triggers EBRD Cr 12.ii.a*** ***Doesn't trigger CH according to EIB ESS4*** The species breeds within the EAAA mainly in agricultural areas and in some slopes with bushy areas although the quantity remain unknown. Population size is not known for Armenia.	✓		
Lesser Grey Shrike	*Lanius minor*	LC	NE	Annex I Birds Directive	Resolution 6	Listed in Annex I of the Birds Directive and Resolution 6 of the Bern Convention ***Triggers EBRD Cr 12.ii.a*** ***Doesn't trigger CH according to EIB ESS4*** Most probably the species breeds within the EAAA mainly on isolated trees in the agricultural area although the quantity remain unknown. Population size is not known for Armenia.	✓		
Calandra Lark	*Melanocoryph a calandra*	LC	NE	Annex I Birds Directive	Resolution 6	Listed in Annex I of the Birds Directive and Resolution 6 of the Bern Convention ***Triggers EBRD Cr 12.ii.a*** ***Doesn't trigger CH according to EIB ESS4*** The species most probably migrates through the project area, sometimes stopping here to rest.	✓		
Red-billed Chough	*Pyrrhocorax pyrrhocorax*	LC	NE	Annex I Birds Directive	Resolution 6	Listed in Annex I of the Birds Directive and Resolution 6 of the Bern Convention ***Triggers EBRD Cr 12.ii.a*** ***Doesn't trigger CH according to EIB ESS4*** The species breeds within the EAAA, only on cliffs area although the quantity remain unknown.	✓		

English name	Scientific name	IUCN Red list	Armenia Red Book	EU Birds or Habitats Directive	Bern Convention	Justification	EBRD PR6		EIB SS4
							Priority Biodiversity Feature (PBF)	Critical Habitat Trigger species (CH)	Critical Habitat Trigger species (CH)
						Population size is not known for Armenia.			
Barred Warbler	*Sylvia nisoria*	LC	NE	Annex I Birds Directive	Resolution 6	Listed in Annex I of the Birds Directive and Resolution 6 of the Bern Convention ***Triggers EBRD Cr 12.ii.a*** ***Doesn't trigger CH according to EIB ESS4*** The species most probably migrates through the project area, sometimes stopping here to rest.	✓		
Insects									
Forster's Blue	***Polyommatus (Agrodiaetus) aserbeidschanus***	**N/E**	**EN**	**-**	**-**	Nationally listed EN species occurring in the EAAA and the EAAA holds >1% of global population of the species. ***Triggers EBRD Cr 14.ii.d*** ***Triggers EIB Cr 2.c*** The species is resident, highly dependent on the habitat and the very specific, restricted-ranged, habitat-specialist host plant. The larvae feed on Astragalus species, thus in Armenia they are found on Astragalus prilipkoanus. The flight period of the adult is from late July till mid-August The study area and the dedicated EAAA is one the two known distribution spots for the species in Armenia.		✓	✓
/	*Polyommatus (Agrodiaetus) huberti*	N/E	EN	-	-	Nationally listed EN species regularly occurring in the EAAA but no specific concentrations that would trigger CH ***Triggers EBRD Cr 12.ii.d*** ***Doesn't trigger CH according to EIB ESS4*** The species is resident, highly dependent on the habitat (dry slopes and dry grassland) and the very	✓		

English name	Scientific name	IUCN Red list	Armenia Red Book	EU Birds or Habitats Directive	Bern Convention	Justification	EBRD PR6		EIB SS4
							Priority Biodiversity Feature (PBF)	Critical Habitat Trigger species (CH)	Critical Habitat Trigger species (CH)
						specific, restricted-ranged, habitat-specialist host plant. The larvae feed on *Astragalus* species The area is one of c. 15 known distribution spots for the species in Armenia.			
Apollo Butterfly	***Parnassius apollo***	**NT**	**VU**	**Annex IV Habitats Directive**	**-**	Listed in Annex IV of the Habitat Directive ***Triggers EIB Cr 2.d*** The species is resident, highly dependent on the habitat and the very specific, restricted-ranged, habitat-specialist host plant. The caterpillar feeds on Crassulaceae like Sedum species The species is widely distributed in subalpine areas of Armenia.			✓
Large Blue	***Maculinea arion***	**NT**	**VU**	**Annex IV Habitats Directive**	**-**	Listed in Annex IV of the Habitat Directive ***Triggers EIB Cr 2.d*** Resident in the specialist that is depending not only on the specific EAAA, habitat group of the host plant (inhabits nutrient-poor, dry and sunny grasslands), but also on the specific ant species. The eggs are laid on Thymus species and Origanum species where the young caterpillars live. Later, the caterpillar lives in ant nests (*Myrmica sabuleti*), where they also hibernate. The species is widely distributed in Armenia.			✓
Reptiles									
Armenian steppe viper	*Vipera eriwanensis*	VU	VU	-	-	VU on the IUCN Redlist (12 ii.c) ***Triggers EBRD Cr 12.ii.c*** Regularly occurring range-restricted species (**EOO of less than 20 000km²**; Tuniyev et al, 2009) in the	✓		

English name	Scientific name	IUCN Red list	Armenia Red Book	EU Birds or Habitats Directive	Bern Convention	Justification	EBRD PR6		EIB SS4
							Priority Biodiversity Feature (PBF)	Critical Habitat Trigger species (CH)	Critical Habitat Trigger species (CH)
						EAAA but unlikely to be present as an important population concentration. As there are no population data on this species, the approach used is comparing the extent of the EAAA compared to the EOO of this species. The Armenian Steppe Viper presents an **EOO of less than 20 000km²** (Tuniyev et al, 2009 which is <50 000km²). Its distribution is very fragmented and there is continuing decline in the extent and quality of its mountain steppe habitat due to overgrazing and agricultural conversion. The snake's EAAA is limited to the steppic and mountainous massif of Zangezur (see figure 3) and accounts for 62.4km², corresponding to 0.31% of the EOO (<10%), so even if more than 10 reproductive units of the species are present in the EAAA, it does not cover more than 10% of its EOO, so does not qualify as CH. ***Triggers EBRD Cr 12.ii.c*** ***Doesn't trigger CH according to EIB ESS4*** The species finds all the life-cycle components within the EAAA: brumation (hibernation), breeding, and foraging. The total population of the species in Armenia is between 8,000 and 20,000. This population is very important, being the southernmost population of the species in the country.			
Radde's viper	*Montivipera raddei*	NT	VU	-	-	Regularly occurring range-restricted species (**EOO About 30 000 km²**; Nilson et al, 2009) in the EAAA but unlikely present as an important population concentration.	✓		

English name	Scientific name	IUCN Red list	Armenia Red Book	EU Birds or Habitats Directive	Bern Convention	Justification	EBRD PR6		EIB SS4
							Priority Biodiversity Feature (PBF)	Critical Habitat Trigger species (CH)	Critical Habitat Trigger species (CH)
						As there are no population data on this species, the approach used is by comparing the extent of the EAAA compared to the EOO of this species. The Radde's Viper has an EOO of about 30 000km² (<50 000km²) so is considered a range-restricted species. However, as the EAAA corresponds to less than 10% of the EOO (about 80 km², so approx. 0.27% of the EOO), it does not qualify as CH. ***Triggers EBRD Cr 12.ii.c*** ***Doesn't trigger CH according to EIB ESS4*** The main threat for the species is habitat loss due to various human activities, e.g., overgrazing degrades vegetation. Road construction activities are most threatening, as result of habitat degradation and fragmentation. Also, road construction results in population declines of insects and rodents used by reptiles as prey, thus indirectly influencing the species. The species is widely distributed in Armenia.			
Mediterranean tortoise	***Testudo graeca***	**VU**	**VU**	**Annex II, IV Habitat Directive**	**Resolution 6**	**Listed in Annex IV of the Habitat Directive** **The species have been observed in 4 locations in the EAAA** ***Triggers EBRD Cr 14.ii.a*** ***Triggers EIB Cr 2.d*** The species is distributed in 4 different EAAAs. The species is widely distributed in Armenia.	✓		✓
European Pond Turtle	***Emys orbicularis***	**NT**	**NE**	**Annex II, IV Habitat Directive**	**Resolution 6**	**Listed in Annex IV of the Habitat Directive and even though it was not observed in the field, its presence is likely in the area of the Shamb**	✓		✓

English name	Scientific name	IUCN Red list	Armenia Red Book	EU Birds or Habitats Directive	Bern Convention	Justification	EBRD PR6		EIB SS4
							Priority Biodiversity Feature (PBF)	Critical Habitat Trigger species (CH)	Critical Habitat Trigger species (CH)
						reservoir and it is considered as a CH trigger species ***Triggers EBRD Cr 14.ii.a*** ***Triggers EIB Cr 2.d*** The species is not observed during surveys and its probability of occurrence in the project area is low. One location on the study area is known from the literature (Shamb reservoir). Total population size for the species in Armenia is unknown.			
Caspian Turtle	*Mauremys caspica*	*LC*	*NE*	*Annex II, IV Habitat Directive*	*Resolution 6*	*Listed in Annex IV of the Habitat Directive but not observed during surveys and its probability of occurrence is very low, so it is not considered as PBF or CH trigger.* The species is widely distributed in Armenia.			
Flora									
I	***Astragalus xiphidium***	**N/E**	**EN B**	**-**	**-**	**EAAA for regularly occurring nationally or regionally listed EN or CR species** **As there are no population data on this species, the approach used is by comparing the extent of the EAAA (7.7km²) compared to the EOO in Armenia of this species (=20km²) as it is listed endangered in the Armenian redbook. As the EAAA corresponds to 38% of the Armenian EOO (7.7/20= 38% which is >1%), so it triggers CH for both standards.** ***Triggers EBRD Cr 14.ii.d*** ***Triggers EIB Cr 2.c*** **EAAA for regularly occurring range-restricted species**		✓	✓

English name	Scientific name	IUCN Red list	Armenia Red Book	EU Birds or Habitats Directive	Bern Convention	Justification	EBRD PR6		EIB SS4
							Priority Biodiversity Feature (PBF)	Critical Habitat Trigger species (CH)	Critical Habitat Trigger species (CH)
						The EAAA represents more than 10 reproductive units and as there are no population data on this species, so the approach used is by comparing the extent of the EAAA (7.7km²) to the global EOO of the species (less than 500km²). As the EAAA represents 1.5 % of the global EOO (7.7/500= 1.5% which is < 10% of the global EOO), it doesn't trigger CH for this criterion. ***Triggers EBRD Cr 12.iii (PBF, but as it already qualifies as CH for the Cr. ii.d, it is considered as CH)*** ***Doesn't trigger CH according to EIB Cr 3.a***			
/	***Hypericum armenum***	**N/E**	**CR**	**-**	**-**	**EAAA for important concentrations of a nationally or regionally listed EN or CR species** **In Armenia this species occurs only in 2 locations, one being the Geghi river gorge floristic region and the national EOO is estimated to 8km², so it is considered an important concentration of a nationally listed CR species in the Armenian Redbook (as the EAAA corresponds to 1 out of 2 locations in the Armenian EOO, so it is > 1% of the population)** ***Triggers EBRD Cr 14.ii.d*** ***Triggers EIB Cr 2.c*** **EAAA regularly holds ≥ 10% of global population AND ≥ 10 reproductive units of the species.** **As there are no population data on this species, the approach used is comparing the extent of**		✓	✓

English name	Scientific name	IUCN Red list	Armenia Red Book	EU Birds or Habitats Directive	Bern Convention	Justification	EBRD PR6		EIB SS4
							Priority Biodiversity Feature (PBF)	Critical Habitat Trigger species (CH)	Critical Habitat Trigger species (CH)
						the EAAA (4km²) compared to the global EOO of the species (= less than 10km²). (4/10= 40% which is >10%), so it triggers CH for both standards. *Triggers EBRD Cr 14.iii.a* *Triggers EIB Cr 3.a*			
/	*Iris lineolata*	N/E	EN B	-	-	EAAA for regularly occurring nationally or regionally listed EN or CR species As there are no population data on this species, the approach used is comparing the extent of the EAAA (7.7km²) compared to the EOO in Armenia of this species (=750km²) as it is listed endangered in the Armenian Redbook. As the EAAA corresponds to 1.02% of the Armenian EOO (7.7/750= 1.02% which is >1%), it triggers CH for both standards. *Triggers EBRD Cr 14.ii.d* *Triggers EIB Cr 2.c* EAAA for regularly occurring range-restricted species The EAAA represents more than 10 reproductive units and as there are no population data on this species, the approach used is by comparing the extent of the EAAA (7.7km²) to the global EOO of the species (less than 5 000km²). As the EAAA represents 0.1% of the global EOO (7.7/5 000= 0.2% which is < 10% of the global EOO), it doesn't trigger CH for this criterion. *Triggers EBRD Cr 12.iii*		✓	✓

English name	Scientific name	IUCN Red list	Armenia Red Book	EU Birds or Habitats Directive	Bern Convention	Justification	EBRD PR6		EIB SS4
							Priority Biodiversity Feature (PBF)	Critical Habitat Trigger species (CH)	Critical Habitat Trigger species (CH)
						Doesn't trigger CH according to EIB Cr 3.a			
/	***Tulipa sosnowskyi***	N/E	EN	-	-	**EAAA for regularly occurring nationally or regionally listed EN or CR species** **As there are no population data on this species, the approach used is by comparing the extent of the EAAA (29.7km²) compared to the EOO in Armenia of this species (=1 350km²) as it is listed endangered on the Armenian Redbook. As the EAAA corresponds to 2.2% of the Armenian EOO (29.7/1 350 = 2.2% which is >1%), so it triggers CH for both standards.** ***Triggers EBRD Cr 14.ii.d*** ***Triggers EIB Cr 2.c*** **EAAA for regularly occurring range-restricted species.** **The EAAA represents more than 10 reproductive units and as there are no population data on this species, so the approach used is by comparing the extent of the EAAA (29.7km²) to the global EOO of the species (less than 5 000km²). As the EAAA represents 0.6 % of the global EOO (29.7/ 5 000= 0.6% which is < 10% of the global EOO), it doesn't trigger CH for this criterion.** ***Triggers EBRD Cr 12.iii (PBF, but as it already qualifies as CH for the Cr. Ii.d, it is considered as CH)*** ***Doesn't trigger CH according to EIB Cr 3.a***		✓	✓

English name	Scientific name	IUCN Red list	Armenia Red Book	EU Birds or Habitats Directive	Bern Convention	Justification	EBRD PR6		EIB SS4
							Priority Biodiversity Feature (PBF)	Critical Habitat Trigger species (CH)	Critical Habitat Trigger species (CH)
/	*Tulipa florenskyi*	N/E	EN B	-	-	**EAAA for regularly occurring nationally or regionally listed EN or CR species** **As there are no population data on this species, the approach used is by comparing the extent of the EAAA (40km²) compared to the EOO in Armenia of this species (= 350km²) as it is listed endangered on the Armenian Redbook. As the EAAA corresponds to 11.4% of the Armenian EOO (40/350 = 11.4% which is >1%), so it triggers CH for both standards.** ***Triggers EBRD Cr 14.ii.d*** ***Triggers EIB Cr 2.c*** **The EAAA represents more than 10 reproductive units and the approach used is by comparing the extent of the EAAA (40km²) to the global EOO of the species (less than 500km²). As the EAAA represents 8 % of the global EOO (40/ 500= 8% which is < 10% of the global EOO), it doesn't trigger CH for this criterion.** The species is on the verge of extinction caused by changes in habitat conditions, especially global climate change. The total population of the species in Armenia can be estimated as 1,000-10,000 (the most precise estimation), and the population can be considered as stable. The main threat is the transformation of habitat under the climate change; however, the species appears to shift its vertical distribution up, following the shifts of landscapes, under the influence of climate change factors. The distribution		✓	✓

English name	Scientific name	IUCN Red list	Armenia Red Book	EU Birds or Habitats Directive	Bern Convention	Justification	EBRD PR6		EIB SS4
							Priority Biodiversity Feature (PBF)	Critical Habitat Trigger species (CH)	Critical Habitat Trigger species (CH)
						range of the species within the project area is not crucial for the long-term survival of the species. ***Triggers EBRD Cr 12.iii (PBF, but as it already qualifies as CH for the Cr. ii.d, it is considered as CH)*** ***Doesn't trigger CH according to EIB Cr 3.a***			

The results of the assessment against EBRD PR6 Criterion ii & iii and EIB ESS4 Criterion 2 & 3 are summarized below.

2.5.2.2 EBRD PR6 Criterion iv and EIB ESS4 Criterion 4 – Habitat required for the survival of migratory species and/or congregatory species

None of the potential migratory species can possibly reach the threshold (significant proportion, large groups, or percentage of the global population during period of environmental stress) for PR6 Criterion iv and ESS4 Criterion 4, and the species designated in the EU bird Directive are already assessed as PBF by criteria 12.ii.a.

Moreover, the Zangezur IBA was designated for breeding, so it is not recognized as important for the conservation of migratory and/or congregatory bird species and does not sustain on a cyclical or otherwise regular basis more than 1 percent of a global population of a migratory species at any point of a species lifecycle, so no species triggers these criteria.

2.5.2.3 Other criteria

The other criteria do not have pre-determined conditions, so that assessment is based on expert judgement (*cf.* EBRD PR6):

For PBF:

- EBRD PR6 Criterion 12.iii *"Significant biodiversity features identified by a broad set of stakeholders or governments"*: it is good practice to include such species in the Project's Biodiversity Action Plan (BAP) to ensure that appropriate mitigation measures are developed and applied. There are several species recognized by the conservation and research community that would be potentially impacted by the project, but they have already been identified as CH or PBF so are already included (*e.g.* Armenian Mouflon, Bezoar Goat, Lynx, Persian Leopard, Eurasian Otter, Brown Bear, Grey Wolf, etc.).

  Moreover, the following lekking bird species could qualify as PBF according to this criterion: the Caucasian Black Grouse (*Tetrao mlokosiewiczi* (NT) observed in the mountaneous area close to Kitsk with several potential lekking spots in this area, and the Caspian Snowcock, *Tetraogallus caspius* (LC) that breeds in the mountains above Shenatagh village with quite a high density – 3 calling males in about 3 square km qualify. The Northern Goshawk (*Accipiter gentilis*, LC) is as well identified as PBF as it is nationally important and identified as Vulnerable on the Armenian Red book.

  The Lesser Marbled Fritillary (*Brenthis ino*), which was found in a dense population in almost pristine meadows above Shenatagh village (a few observations of sensitive butterfly species are located in the study outside the project footprint some 100-150 m from the proposed road footprint) can qualify as well as PBF.

- EBRD PR6 Criterion 12.iv *"ecological structure and functions needed to maintain the viability of priority biodiversity features"* previously described: no specific ecological structure or functions identified to maintain the viability of priority biodiversity features.

For CH:

- EBRD PR6 Cr v & EIB ESS4 Cr 6 *"areas associated with key evolutionary processes"*: the mountains of the Caucasus, due to their geographical and altitudinal isolation, play a role in key evolutionary processes, particularly for species movements, migration, and gene flow which allows endemic and restricted-range species maintenance through time. This is the case with the ridges of the Zangezur mountain range which connect different sub-populations within the range along with other transboundary surrounding ranges (Meghri, etc. *cf.* maps below). If the project was not in the Bargushat tunnel, the continuity of the ridges necessary to species maintenance and evolution through time would be broken and isolate the range on the eastern side from the other mountain range network. Avoidance of this area through the Bargushat tunnel is then a crucial conceptual design measure, along with the reduction measures

aiming at restoring ecological corridors between these different ridges when the road project crosses such corridors, through the set-up of wildlife crossings (*cf.* the Volume 2 of the ESIA and the BAP).

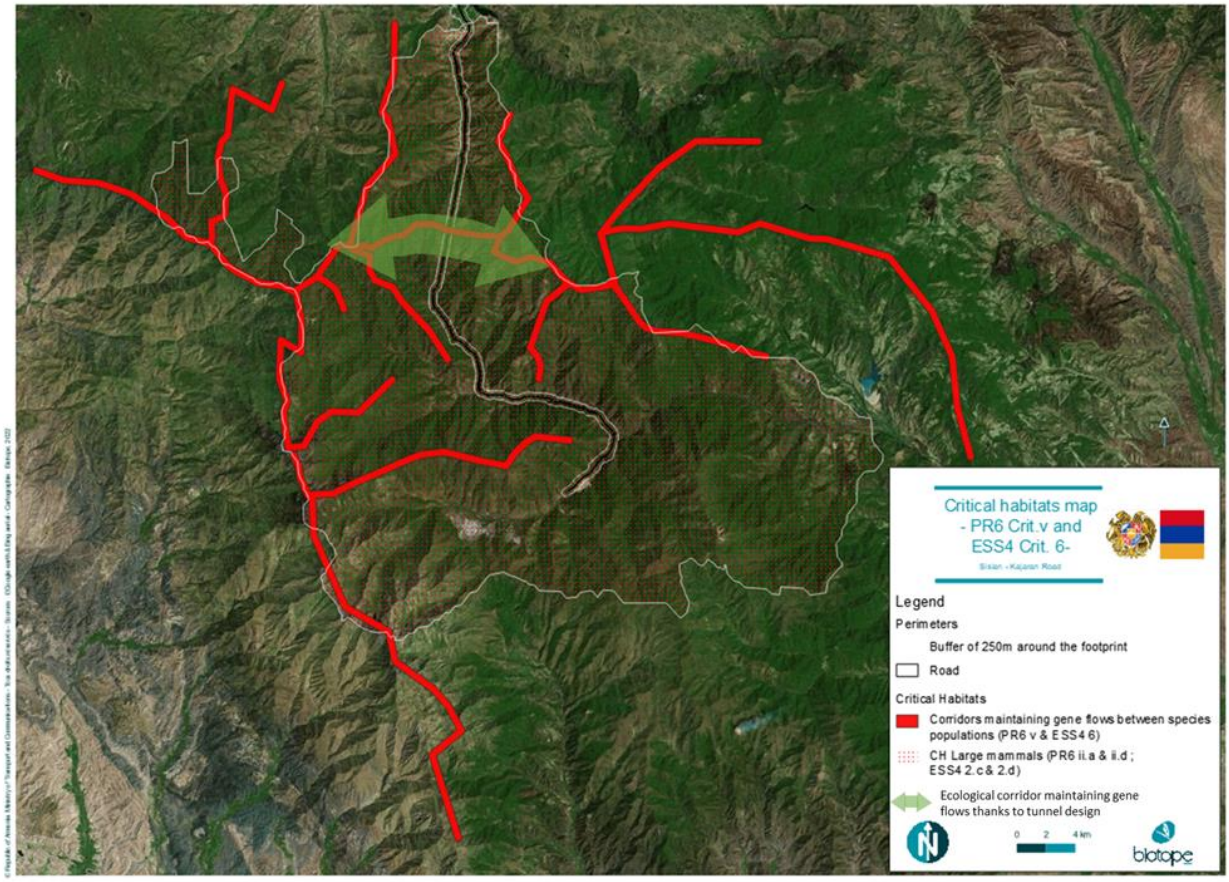


Figure 9. Critical Habitats in the Framework of EBRD PR6 Criterion v and EIB ESS4 Criterion 6

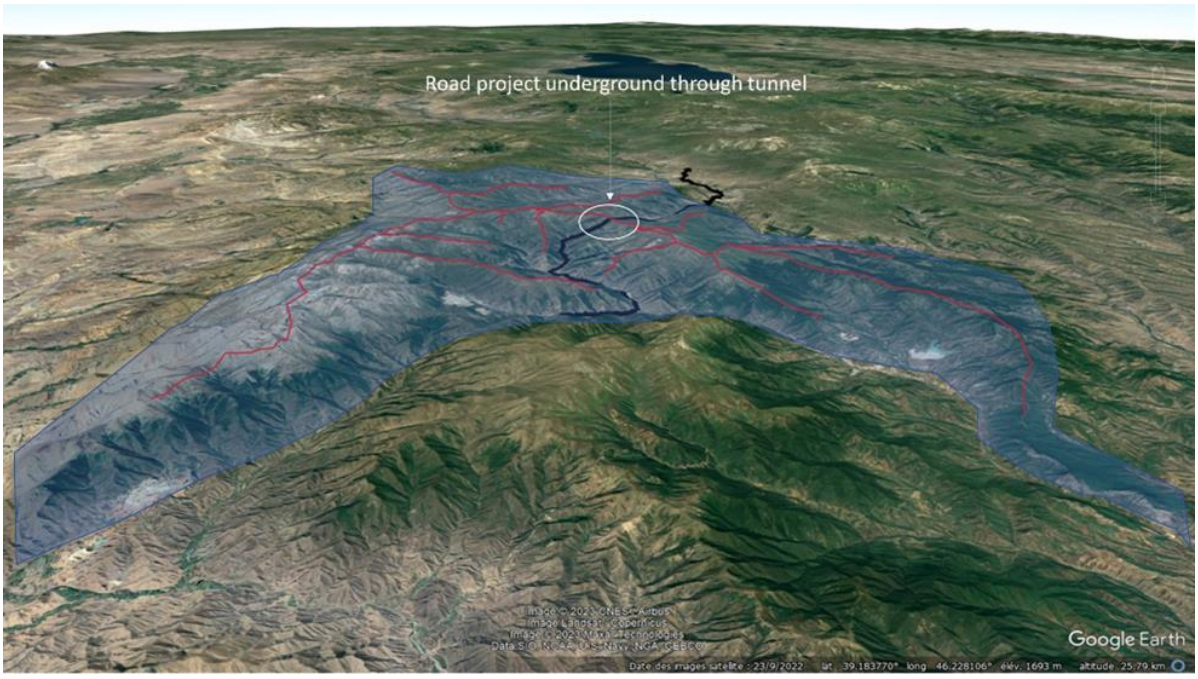


Figure 10. Illustration of the corridors contributing to gene flows within the Zangezur range and with other transboundary mountain ranges

2.5.2.4 Species which do not fall into mandatory CHA assessment in line with criteria, however added due to their local importance

The following species were not assessed as they were not identified during fieldwork, and not evaluated on the IUCN red list nor on the Armenian Redbook, but still constitute species that when evaluated against IUCN criteria, could be EN or CR status (*cf.* Karagyan et al, 2019).

Pseudochazara daghestana zangezura Nekrutenko, 1989 (Lepidoptera: Satyridae*)*

The subspecies is endemic to the Daralagyaz and Zangezur ranges in Nakhchivan and Armenia. In Armenia known by several observations from Gnishik (one spot) and Kajaran (two isolated spots); habitats are under threat of overgrazing and infrastructure development. According to IUCN Criteria it is categorized as **EN**. Two known spots are within existing protected areas – "Zangezur" State Sanctuary and "Gnishik" Protected Landscape; one of the spots from neighbouring Kajaran is not in a protected area, and its inclusion into the neighbouring Sanctuary is of crucial importance for species conservation.

The species does not occur in most of the project area, but theoretically could occur in the area over the tunnel.

Polyommatus (Sublysandra) cinyraea Nekrutenko et Effendi, 1979 (Lepidoptera: Lycaenidae) This species is endemic to the Daralagyaz and Zangezur ranges in Nakhchivan and Armenia, where it is known by a single observation from Kajaran surroundings in the upper stream of the Kajaran river at an altitude 2600-2800 m. During 1998-2018 several microhabitats were located and studied. The population density is relatively low; and categorized as **CR**. The species habitat is near the border of "Zangezur" State Sanctuary, and its inclusion into the Sanctuary is of crucial importance for species conservation (Aghababyan, Khanamirian, 2018).

The species does not occur in the project area, but theoretically could occur in the area above the Bargushat tunnel.

In general, there is a lack of biodiversity data on insects – including butterflies – status of threat in Armenia, and several species informed as DD or not evaluated by IUCN are present in Zangezur and Meghri range (Khanamiryan et al, 2011). Moreover, it seems that this area is very rich in butterflies due to its relative isolation, separated from the rest of the country by high and steep mountain ranges, which are natural barriers for species dispersal. The species have been considered in the CHA report in line with precautionary approach.

3 CONCLUSION

The assessment against EBRD PR6, reveals **7 habitats[19] and 47 fauna species identified as Priority Biodiversity Features** (PBF), and **2 habitats, 5 fauna species and 5 flora species triggering Critical Habitat** (CH) (*cf.* **Table 8**).

For the EIB ESS4, there are **2 habitats, 22 fauna species and 5 flora species triggering Critical Habitat (*cf.* Table 9**). EIB ESS4 considers species listed in Annex II of the Habitat directive as CH triggers, while EBRD PR6 does not. This is the key difference between the standards that brings about different results when analysing the species.

The presence of these habitats confirms the importance of this natural area within the East Lesser Caucasus, already identified by the CEPF as critical for several threatened and/or endemic species. With fauna species such as the European otter, *Lutra lutra,* (LC) and the

[19] According to the Natura 2000 codes

bat species listed in the resolution 6 of the Bern convention (*cf.* List in **Table 11**) living at the scale of the landscape of the different watersheds crossed by the project, **the entire project area therefore constitutes a critical habitat** on the basis of the "species living at the scale of the valley" EAAA (*cf.* **Figure 7**). **It should be noted, however, that considering the proportion of the project footprint regarding in the EAAA (3.86/1369 = 0.28% of the EAAA), the magnitude of the impact on this critical habitat is low at the scale of the EAAA and minor after implementation of adequate mitigation (including avoidance measures) and additional conservation measures as per BAP. Furthermore, there are no viable alternatives in the area of the lesser biodiversity value at the scale of Bargushat and Zangezur mountain ranges as they support the same biodiversity features, and there is already an existing road in the valleys crossed by the Project.**

Indeed, after the implementation of key mitigation measures such as (*cf*. figure below and details in Volume 2 and in the BAP):

- The avoidance of the Zangezur protected area and tentative Emerald site through the Bargushat Tunnel, avoiding disrupting the ecological continuity on the ridges within the Zangezur mountain range which connect different large mammals sub-populations within the range, along with other transboundary surrounding ranges contributing to gene flows, and thus facilitates maintenance of endemic and restricted-range species,
- The selection of Spoil Disposal Areas devoid of critical habitats listed as priority habitat in Annex I of the EU Habitat Directive and avoiding large mammal corridors on the transversal valleys of the Geghi valley,
- Reduction measures aiming at restoring ecological corridors crossed by the project present in the EAAA through the establishment of wildlife crossings in close cooperation with the head of the Zangezur Biosphere Complex SNCO and following international good practice in wildlife crossing design (cf. the BAP),
- Measures to reduce collision risks with wildlife during operation through fencing combined with jump-outs or exit ramps in association with the wildlife crossings,

and other mitigation proposed, the residual impacts are on the loss of priority habitats in annex I of EU Habitats Directive:

⇨ Loss of 27.33 ha of critical habitats Sub-Pannonic steppic grasslands (6240, 6.61ha) and Subcontinental peri-Pannonic scrub (40A0*, 20.72ha) marked as "priority habitat type" in Annex I of EU Habitats Directive, under the permanent project footprint.*

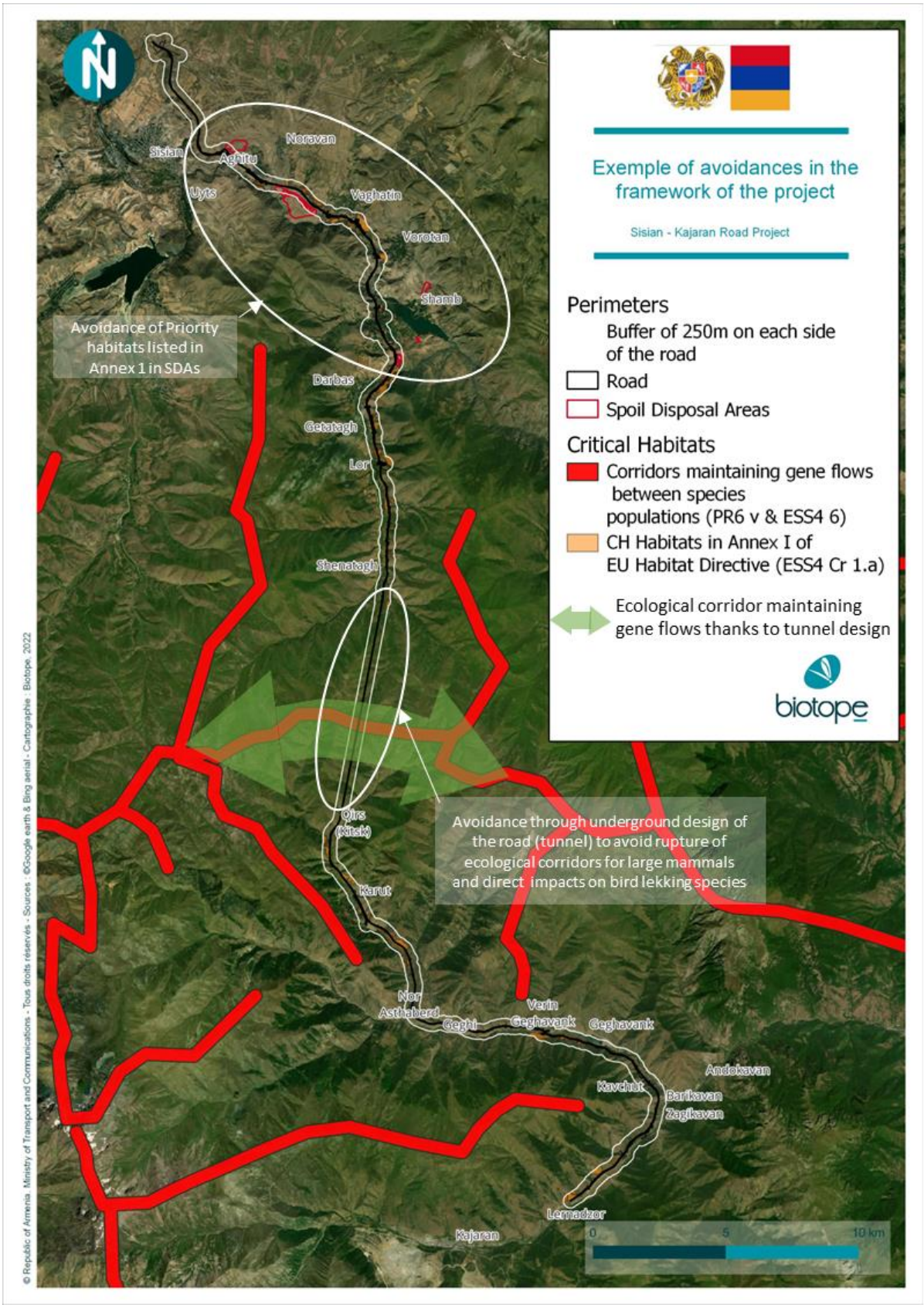


Figure 11. Illustration of Avoidance Measures following Mitigation Hierarchy Application for the Project according to International Standards

Maps of critical habitats according to EBRD PR6 Criterion 12 i.a and EIB ESS4 Criterion 1.a (for habitats) are presented in **Appendix 1**. Moreover, a synthesis map presenting the different CH along the road footprint is presented in **Figure 12**.

Table 8. Summary Table of Priority Biodiversity Features and Critical Habitats Identified in the Study Area as per EBRD PR6[20]

N°	Criterion	Features (Habitats/ecosystems/species)
	Priority Biodiversity Features as per EBRD PR6 (§12)	
i	12.i.a EAAA is habitat type listed in Resolution 4 of the Bern Convention	Habitats (x7) 3240. Alpine rivers and their ligneous vegetation with Salix elaeagnos 6190. Rupicolous pannonic grasslands (*Stipo-Festucetalia pallentis*) 62A0. Eastern sub-mediteranean dry grasslands (*Scorzoneratalia villosae*) 9160. Sub-Atlantic and medio-European oak or oak-hornbeam forests of the Carpinion betuli 9170. Galio-Carpinetum oak-hornbeam forests 92A0. *Salix alba* and *Populus alba* galleries 5210. Arborescent matorral with *Juniperus spp*.
ii		Terrestrial mammal (*6) *Capra aegagrus* (VU) *Ursus arctos* (LC) *Canis lupus* (LC) *Vormela peregusna* (VU) *Lutra lutra* (NT) *Lynx lynx* (LC)
ii	12.ii.a EAAA for species and their habitats listed in the Resolution 6 of the Bern Convention[21]	Birds (x23) *Gypaetus barbatus* (NT) *Neophron percnopterus* (EN) *Aegypius monachus* (NT) *Accipiter brevipes* (LC) *Aquila chrysaetos* (LC) *Clanga pomarina* (LC) *Gyps fulvus* (LC) *Circaetus gallicus* (LC) *Circus cyaneus* (LC) *Caprimulgus europaeus* (LC) *Coracias garrulus* (LC) *Alcedo atthis* (LC) *Anthus campestris* (LC) *Dendrocopos syriacus* (LC) *Leiopicus medius* (LC) *Emberiza hortulana* (LC) *Ficedula parva* (LC) *Ficedula semitorquata* (LC) *Lanius collurio* (LC) *Lanius minor* (LC) *Melanocorypha calandra* (LC)

[20] In case a species would trigger several criteria in the PBF and CH, the species is listed in this table only as the highest conservation concern, which is CH. If the species triggers different criteria inside the same category (PBF or CH), the criteria that is the most discriminant is presented (*e.g.,* population proportions, reproductive units). For a full description of the different criteria triggers by a certain species, please refer to the table source file.

[21] Considering that Armenian MoE is still working on the transposition of the EU Habitat and Bird Directives in the Armenian Laws and by-laws in the framework of the Comprehensive and Enhanced Partnership Agreement (CEPA) with EU, the habitats and species were not assessed against the Annex I of the EU Bird Directive and Annex I, II and IV of the Habitat Directive regarding the EBRD PR6.

N°	Criterion	Features (Habitats/ecosystems/species)
		Pyrrhocorax pyrrhocorax (LC) *Sylvia nisoria* (LC) Bats (x8) *Rhinolophus mehelyi* (VU) *Rhinolophus euryale* (NT) *Rhinolophus ferrumequinum* (NT) *Rhinolophus hipposideros* (NT) *Rhinolophus blasii* (LC) *Miniopterus schreibersii* (VU) *Myotis blythii* (LC) *Myotis emarginatus* (LC) Reptiles (x2) *Testudo graeca* (VU) *Emys orbicularis* (NT)
	12.ii.b EAAA supports < 0.5% of global population OR < 5 reproductive units of a CR or EN species[22]	Birds (x1, already triggering ii.a and ii.d) *Neophron percnopterus* (EN)
	12.ii.c EAAA supports VU species	*2 Species of bats and 1 species of terrestrial mammals already triggering criteria 12.ii.a* Insects (*1) *Parnassius apollo* (VU) Reptiles (*1) *Vipera eriwanensis* (VU)
	12.ii.d EAAA for regularly occurring nationally or regionally listed EN or CR species	Bats (*1, already trigeering cr.12 ii.a) *Rhinolophus blasii* (EN on the Armenian Red book) Birds (*2) *Neophron percnopterus* (EN) already triggering cr.12 ii.a and ii.b *Aegypius monachus* (EN) already triggering cr.12 ii.a Insects (*1) *Polyommatus (Agrodiaetus) huberti* (EN on the Armenian Red book)
	12.ii.e EAAA for regularly occurring range-restricted species	Reptiles (*2) *Vipera eriwanensis* (VU) already qualifying as 12.ii.d *Montivipera raddei* (NT) Insects (*1) *Polyommatus aserbeidschanus* (NE) already qualifying for Cr 14 ii.d
	12.iii Significant biodiversity features identified by a broad set of stakeholders or governments	Insects (*1) *Brenthis ino* (LC) Birds (*3) *Tetrao mlokosiewiczi* (NT) *Tetraogallus caspius* (LC) *Accipiter gentilis* (LC)
	Critical Habitats as per EBRD PR6 (§14)	
	14.ii.d EAAA for important concentrations of a nationally or regionally listed EN or CR species	Terrestrial mammals (*2) *Ovis gmelinii gmelinii* (NT) *Panthera pardus saxicolor* (CR on the Armenian Red book) Insect (*1) *Polyommatus (Agrodiaetus) aserbeidschanus* (EN on the Armenian Redbook) Flora (*5) *Hypericum armenum* (CR on the Armenian Redbook)

[22] On the global IUCN Redlist.

N°	Criterion	Features (Habitats/ecosystems/species)
		Astragalus xiphidium (EN on the Armenian Redbook) *Iris lineolata* (EN on the Armenian Redbook) *Tulipa sosnowskyi* (EN on the Armenian Redbook) *Tulipa florenskyi* (EN on the Armenian Redbook)
iii	14.iii.a EAAA regularly holds ≥ 10% of global population AND ≥ 10 reproductive units of the species***	Flora (*1) *Hypericum armenum* (CR on the Armenian Redbook) already triggering 14 ii.d

Table 9. Summary Table of Critical Habitats Identified in the Study Area as per EIB ESS4

N°	Criterion	Features (Habitats/ecosystems/species)
	Critical Habitats as per EIB ESS4	
1	1.a Priority Habitats listed in Annex I of the Habitats Directive and habitats considered to be their equivalent in countries outside the EU	Habitats (x2) 6240*: Sub-Pannonic steppic grasslands 40A0*: Subcontinental peri-Pannonic scrub
2	2.c Nationally or regionally-important concentration of a species listed as endangered or critically endangered on a regional/national IUCN Red List, or equivalent on national/regional listing.	Terrestrial mammals (*2) *Ovis gmelinii gmelinii* EN on the Armenian redbook) also triggering 2.d *Panthera pardus saxicolor* (VU) Insect (*1) *Polyommatus (Agrodiaetus) aserbeidschanus* (EN on the Armenian Redbook) Flora (*5) *Hypericum armenum* (CR on the Armenian Redbook) *Astragalus xiphidium* (EN on the Armenian Redbook) *Iris lineolata* (EN on the Armenian Redbook) *Tulipa sosnowskyi* (EN on the Armenian Redbook) *Tulipa florenskyi* (EN on the Armenian Redbook)
	2.d A population of species listed in Annex II and IV of the Habitats Directive	Terrestrial mammals (x8) *Ovis gmelinii gmelinii* (NT) *Capra aegagrus* (VU) *Ursus arctos* (LC) *Canis lupus* (LC) *Vormela peregusna* (VU) *Lutra lutra* (NT) *Felis silvestris* (LC) *Lynx lynx* (LC) Bats (x8) *Rhinolophus mehelyi* (VU) *Rhinolophus euryale* (NT) *Rhinolophus ferrumequinum* (NT) *Rhinolophus hipposideros* (NT) *Rhinolophus blasii* (LC) *Miniopterus schreibersii* (VU) *Myotis blythii* (LC) *Myotis emarginatus* (LC) Reptiles (*2) *Testudo graeca* (VU) *Emys orbicularis* (NT) Insects (*2) *Parnassius apollo* (NT) *Maculinea arion* (NT)
3	3.a EAAA regularly holds ≥ 10% of global population AND ≥ 10 reproductive units of the species***	Flora (*1) *Hypericum armenum* (CR on the Armenian Redbook) already triggering 14 ii.d

Table 10. Synthesis of the Numbers of PBF and CH identified in the EAAA by Groups

Group	EBRD PR6		EIB ESS4
	Biodiversity Priority Features	Critical Habitat	Critical Habitat
Habitats	7 habitats	/	2 habitats
Plants	/	5 species	5 species
Terrestrial Mammals	6 species	2 species	9 species
Bats	8 species	/	**8 species**
Birds	26 species	/	/
Reptiles	4 species	2 species	2 species
Amphibians	/	/	/
Insects	3 species	1 species	3 species

Table 11. Conclusion Table of Habitats and Species Triggering CH Taking into Account the More Stringent of the Three Lenders Standards (EBRD/EIB/ADB)

N°	Groups	Critical Habitats triggers
1	Habitats (*2)	6240*: Sub-Pannonic steppic grasslands 40A0*: Subcontinental peri-Pannonic scrub
2	Plants (*5)	*Hypericum armenum* (CR on the Armenian Redbook) *Astragalus xiphidium* (EN on the Armenian Redbook) *Iris lineolata* (EN on the Armenian Redbook) *Tulipa sosnowskyi* (EN on the Armenian Redbook) *Tulipa florenskyi* (EN on the Armenian Redbook)
3	Terrestrial Mammals (*9)	Armenian Mouflon, *Ovis gmelinii gmelinii* (NT) Bezoar Goat, *Capra aegagrus* (VU) Brown Bear, *Ursus arctos* (LC) Grey Wolf, *Canis lupus* (LC) Marble Polecat, *Vormela peregusna* (VU) Eurasian Otter, *Lutra lutra* (NT) Widlcat, *Felis silvestris* (LC) Lynx, *Lynx lynx* (LC) Caucasian Leopard, *Panthera pardus saxicolor* (VU)
4	Bats (*8)	*Rhinolophus mehelyi* (VU) *Rhinolophus euryale* (NT) *Rhinolophus ferrumequinum* (NT) *Rhinolophus hipposideros* (NT) *Rhinolophus blasii* (LC) *Miniopterus schreibersii* (VU) *Myotis blythii* (LC) *Myotis emarginatus* (LC)
5	Reptiles (*2)	*Testudo graeca* (VU) *Emys orbicularis* (NT)
6	Insects (*3)	*Polyommatus (Agrodiaetus) aserbeidschanus* (EN on the Armenian Redbook) *Parnassius apollo* (NT) *Maculinea arion* (NT)

The Biodiversity Action Plan details how the Project must apply the mitigation hierarchy to address significant direct and indirect impacts and evaluate how the Project will achieve at least no net loss for priority biodiversity features, and a net gain for Critical Habitats, including the loss-gain analysis. The BAP is presented as a standalone document (see the BAP).

Finally, as the project is in the vicinity of an Emerald Network site, an Appropriate Assessment following European Commission guidance is required (see Article 6(3) of the Habitats Directive 92/43/EEC), to ensure no significant impact on the integrity of the site. Such Appropriate Assessment has been prepared for the Project (see Annex 3 Appropriate Assessment, to ESIA Volume 2. Biodiversity).

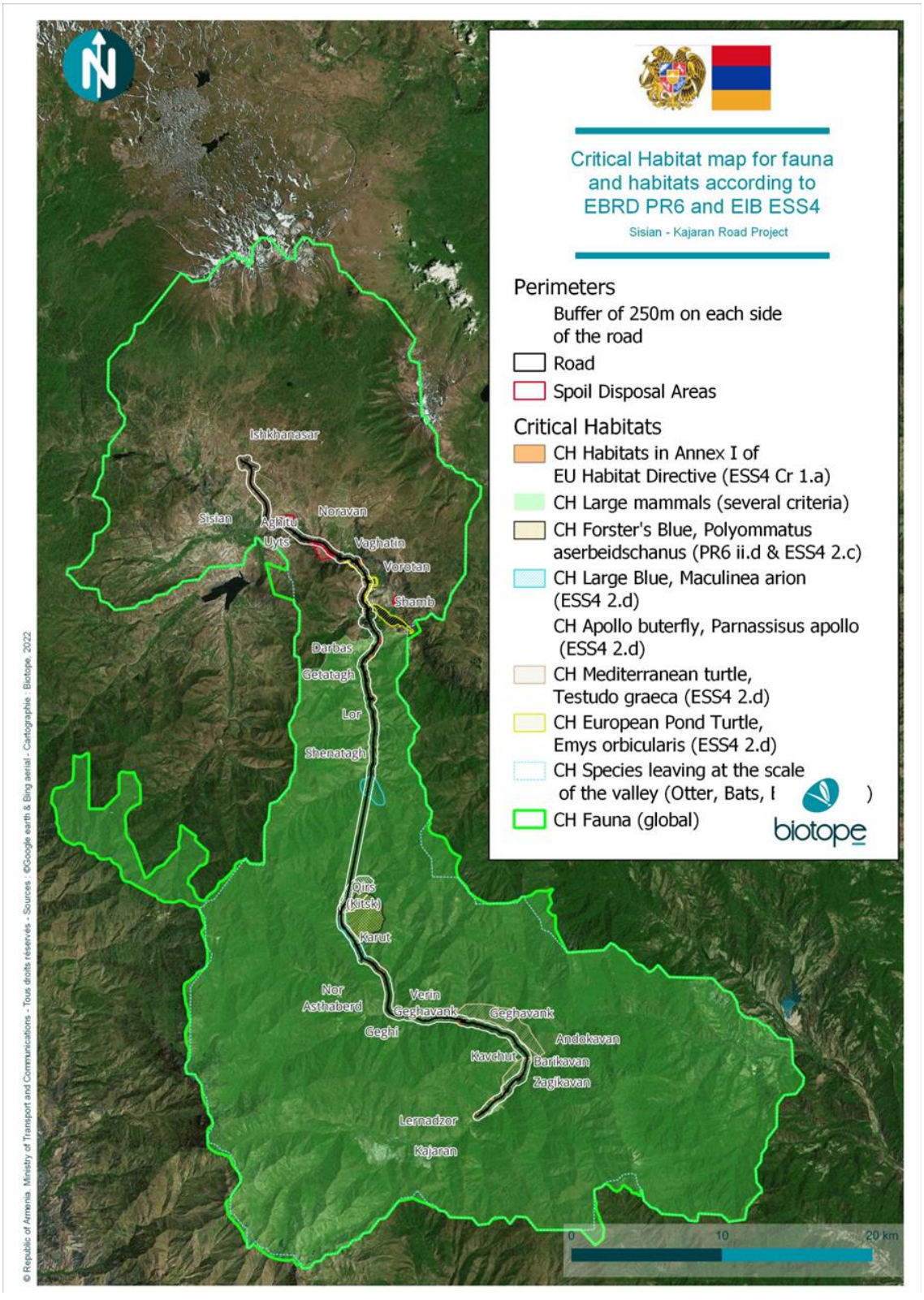
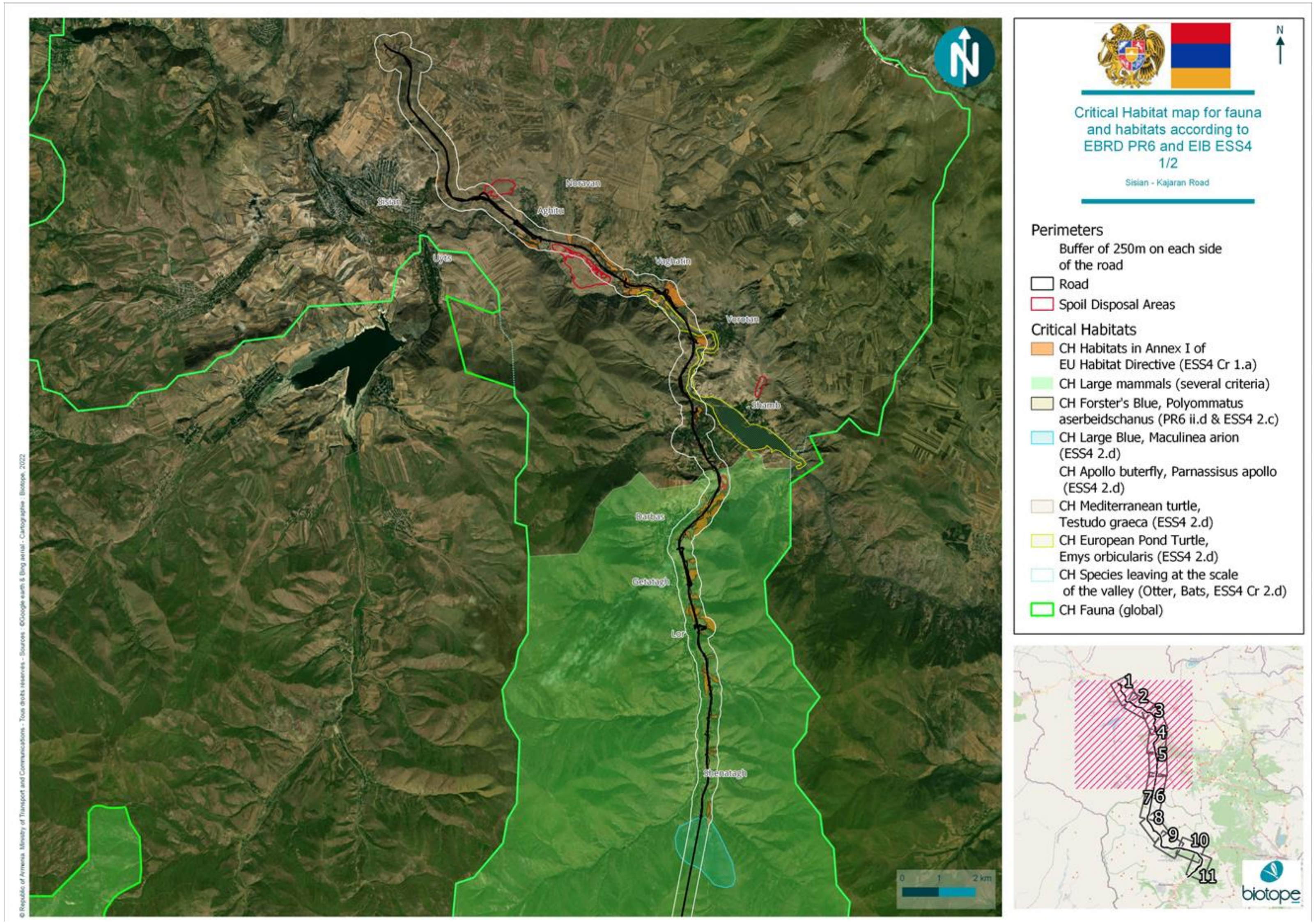


Figure 12. Critical Habitat Map for Fauna and Habitats (according to EBRD and EIB Criteria) – Including the Following Two Zoomed-in Maps



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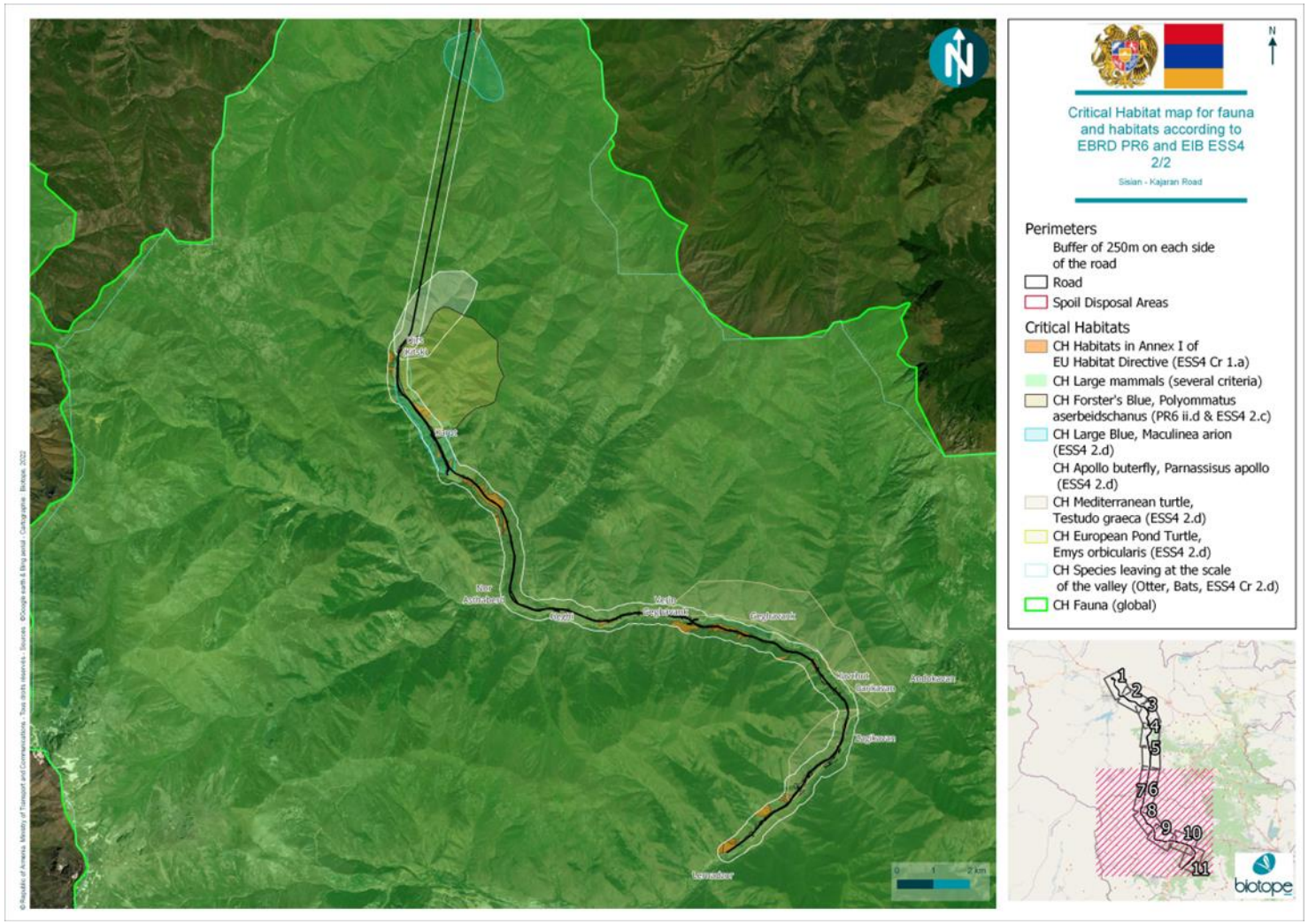

Critical Habitat map for fauna and habitats according to EBRD PR6 and EIB ESS4
2/2
Sisian - Kajaran Road
Perimeters
Buffer of 250m on each side of the road
Road
Spoil Disposal Areas
Critical Habitats
CH Habitats in Annex I of EU Habitat Directive (ESS4 Cr 1.a)
CH Large mammals (several criteria)
CH Forster's Blue, Polyommatus aserbeidschanus (PR6 ii.d & ESS4 2.c)
CH Large Blue, Maculinea arion (ESS4 2.d)
CH Apollo buterfly, Parnassisus apollo (ESS4 2.d)
CH Mediterranean turtle, Testudo graeca (ESS4 2.d)
CH European Pond Turtle, Emys orbicularis (ESS4 2.d)
CH Species leaving at the scale of the valley (Otter, Bats, ESS4 Cr 2.d)
CH Fauna (global)
biotope

Appendix 1. Critical habitat assessment criteria

Criteria for the identification of potential Critical Habitat are defined in Paragraph 14 of EBRD PR6 and Paragraph 16 of EIB Standard 4. They are listed in the table below and the differences between the 2 standards are highlighted in blue, with the more stringent in **bold blue**.

Table 12. Comparative Table of EBRD PR6 and EIB Standard 4 regarding Critical Habitat identification[23]

Feature	EBRD, PR6	EIB, Standard 4
Highly threatened or unique ecosystems	*Criterion i* EAAA is habitat type listed in Annex 1 of EU Habitats Directive marked as "priority habitat type" EAAA ≥5% of global extent of an ecosystem type with IUCN status of CR or EN EAAA is ecosystem determined to be of high priority for conservation by national systematic conservation planning	*Criterion 1* a) Priority Habitats listed in Annex I of the Habitats Directive and habitats considered to be their equivalent in countries outside the EU; b) ≥5% of the global extent of an ecosystem type meeting the criteria for IUCN's Red List of Ecosystems[24] with a status of critically endangered or endangered; c) Examples of ecosystems outside the EU and not yet assessed by IUCN, but determined to be of high priority for conservation on the basis of regional or national-level systematic conservation planning or informed specialist input.
Critically Endangered and Endangered species	*Criterion ii* a) EAAA for species and their habitats listed in Annex IV of the Habitats Directive (See EU restrictions) b) EAAA supports ≥ 0.5% of the global population AND ≥ 5 reproductive units of a CR or EN species c) EAAA supports globally significant population of VU species necessary to prevent a change of IUCN Red List status to EN or CR, and satisfies threshold (b) d) EAAA for important concentrations of a nationally or regionally listed EN or CR species	*Criterion 2* a) A population of an IUCN Red-listed endangered or critically endangered species that is ≥ 0.5% of the global population and/or ≥ 5 established reproductive units of an endangered or critically endangered species; b) Significant concentration of an IUCN Red-listed vulnerable species or of multiple IUCN Red-listed vulnerable species, especially where the loss of the area would result in the change of the IUCN Red List status to endangered or critically endangered c) Nationally or regionally-important concentration of a species listed as endangered or critically endangered on a regional/national IUCN Red List, or equivalent on national/regional listing. d) A population of species **listed in Annex II** and IV of the Habitats Directive.
Endemic or geographically restricted species	*Criterion iii*	*Criterion 3*

[23] As less stringent, ADB requirements for CHA have not been considered separately
[24] https://www.iucn.org/resources/conservation-tools/iucn-red-list-ecosystems.

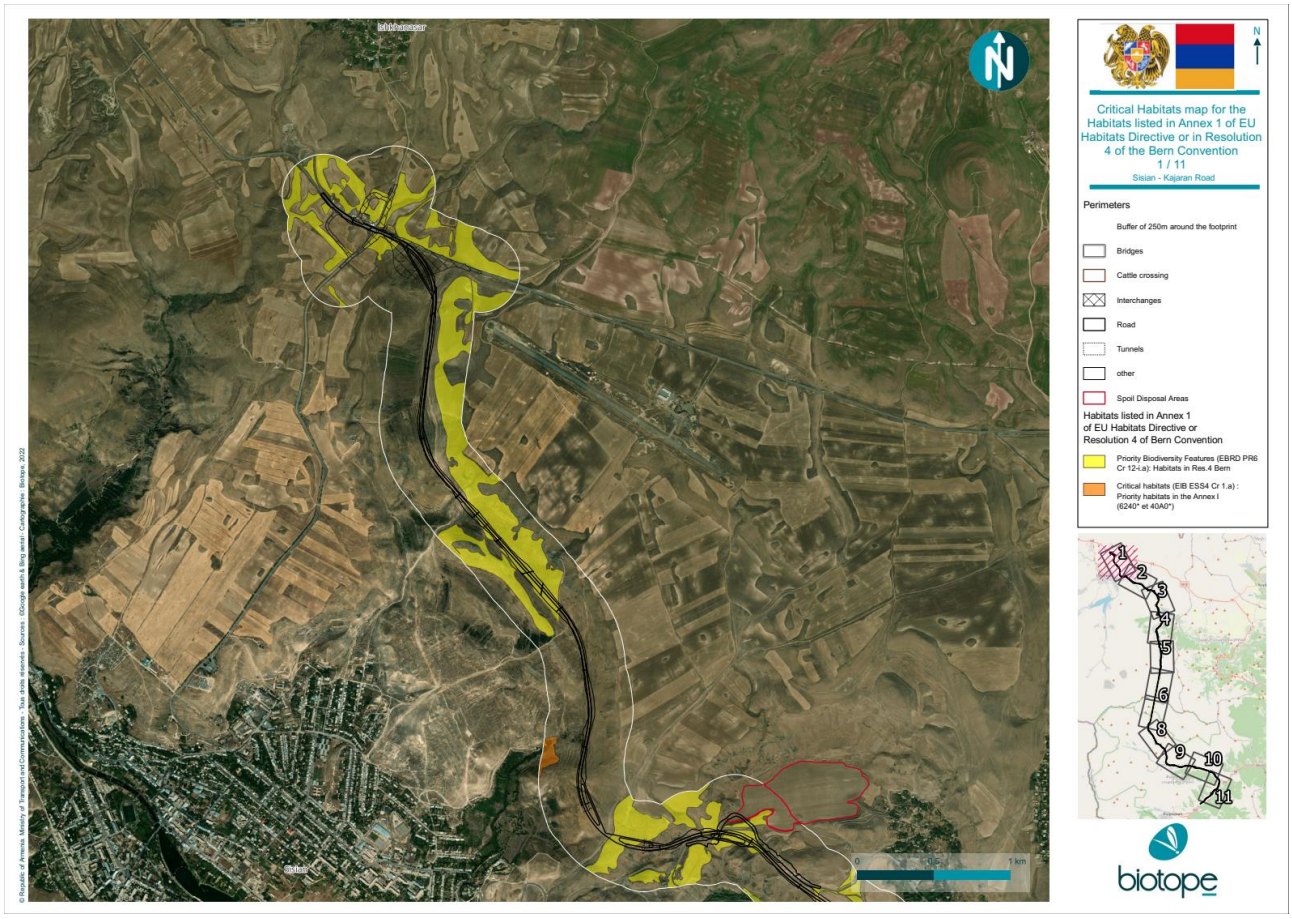
Feature	EBRD, PR6	EIB, Standard 4
	EAAA regularly holds ≥ 10% of global population AND ≥ 10 reproductive units range-restricted species[25]	a) They regularly hold ≥10% of the global population size and support ≥10 reproductive units of an endemic or restricted-range species. b) **They are considered by relevant specialists to support unique or rare assemblages of species that occur there habitually, predictably or repeatably. The constituent species may not meet other critical habitat thresholds mentioned here in their own right, but may present assemblages that are considered important to maintain high biodiversity in the area.**
Globally significant migratory or congregatory species	*Criterion iv* EAAA sustains, on a cyclical or otherwise regular basis, ≥ 1 % of the global population at any point of the species' lifecycle EAAA predictably supports ≥10 percent of global population during periods of environmental stress	*Criterion 4* a) Areas sustain ≥ 1%of the global population of a migratory or congregatory species at any point of the species' lifecycle on a cyclical or otherwise regular basis. b) **Areas are needed to support migratory or congregatory species during periods of environmental stress.**
Biodiversity and/or an ecosystem of significant social, economic or cultural importance to local communities and indigenous groups;	NA (Ecosystem services are not explicitly included in Table 1 but should be prioritized, in coordination with the social baseline analysis, according to the importance to, and dependence on, the ecosystem services by relevant stakeholders)	*Criterion 5* Areas of semi-natural and natural habitat used by indigenous peoples and local communities to obtain essential or priority benefits will be considered critical from an ecosystem service perspective.
Areas associated with key evolutionary processes	*Criterion v* Areas associated with key evolutionary processes	*Criterion 6* This may include, but is not limited to, exceptional representations of: a) Landscapes with high spatial heterogeneity and therefore high levels of species diversity; b) Environmental gradients, also known as ecotones, that produce transitional habitat which is associated with the process of speciation and high species and genetic diversity; c) Edaphic interfaces that juxtapose soil types (*e.g.* serpentine outcrops, limestone and gypsum deposits), which have led to the formation of unique plant communities;

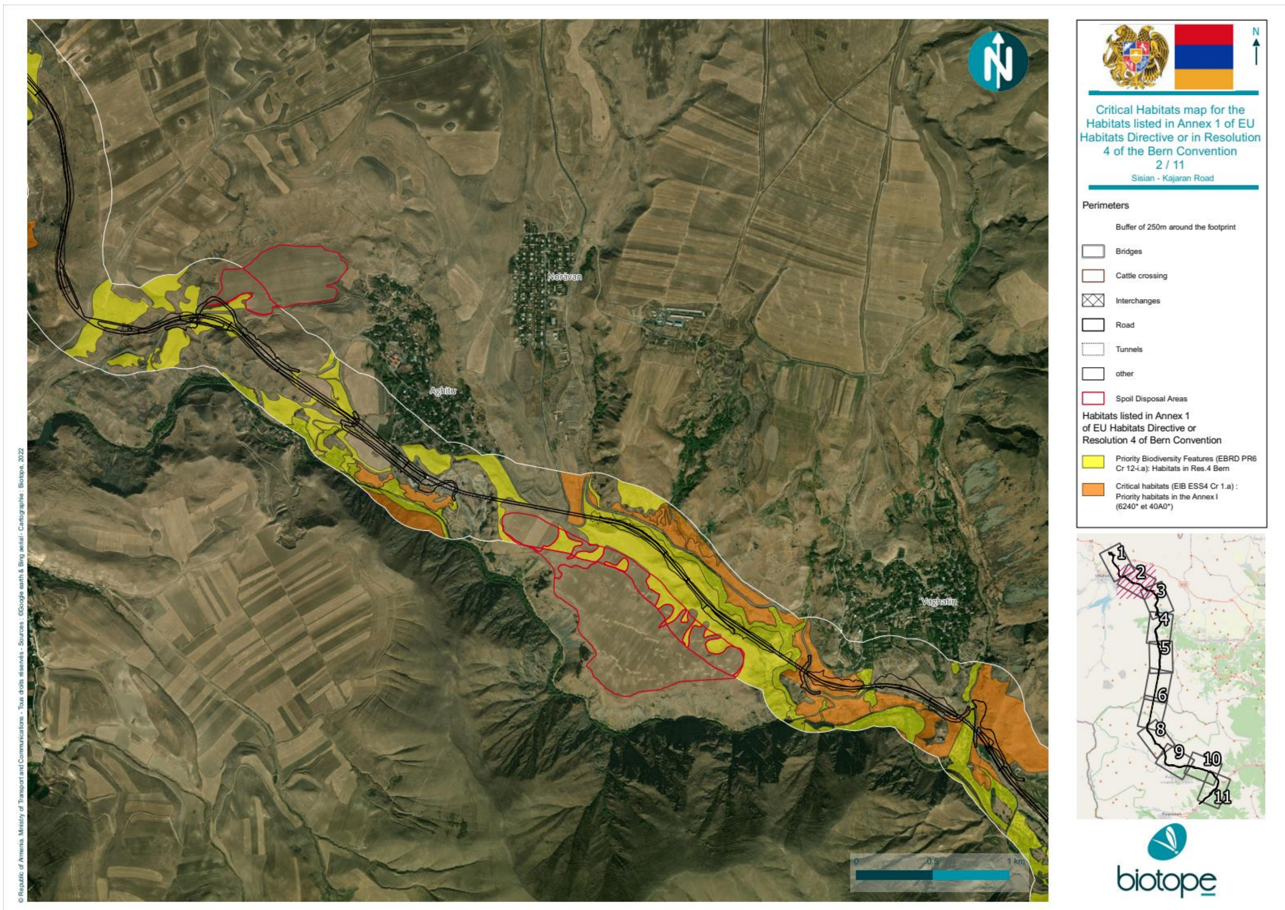
[25] The IUCN Key Biodiversity Areas standard cites the following definition for reproductive unit: "the minimum number and combination of mature individuals necessary to trigger a successful reproductive event at a site. Examples of five reproductive units include five pairs, five reproducing females in one harem, and five reproductive individuals of a plant species."

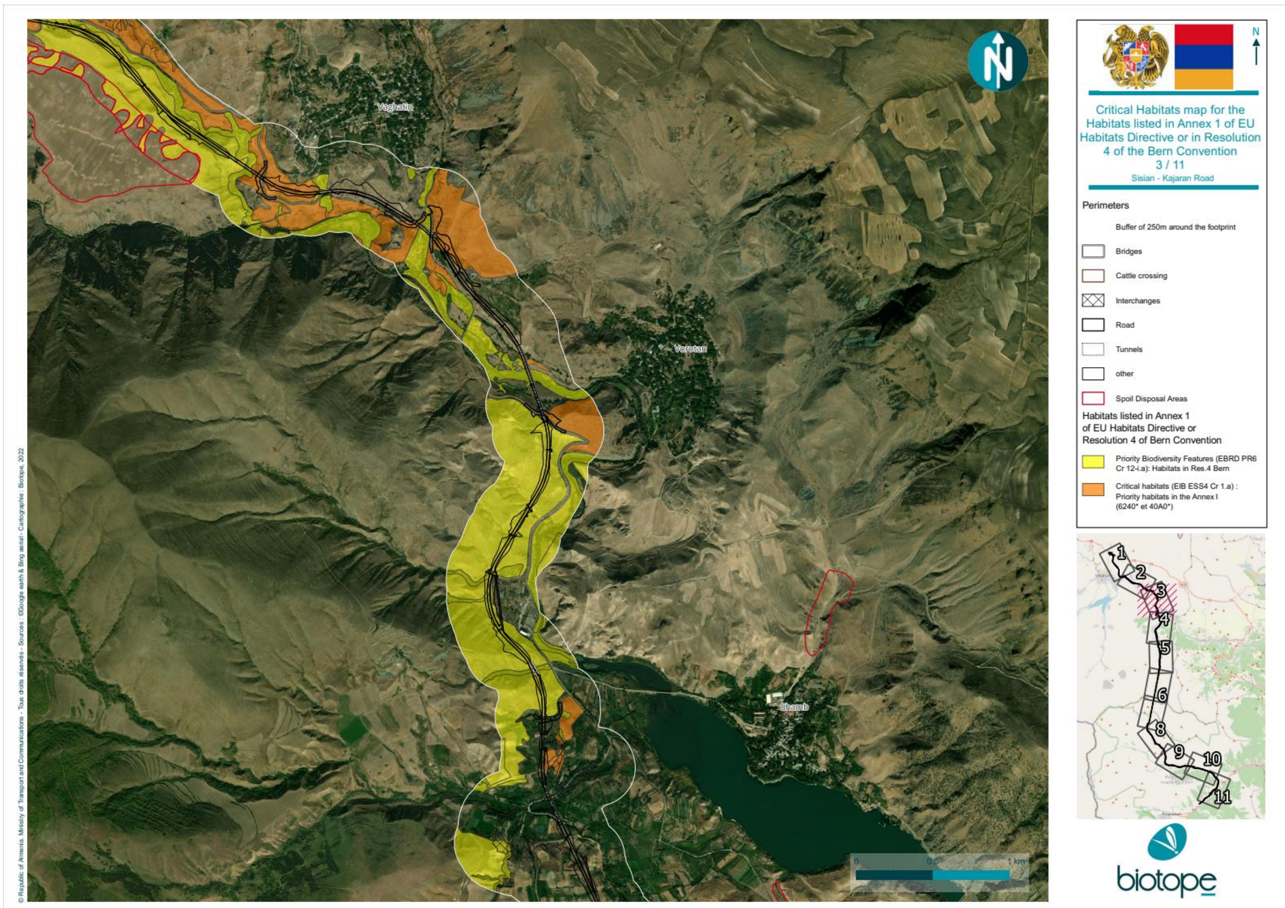
Feature	EBRD, PR6	EIB, Standard 4
		d) Connectivity between habitats (*e.g.* biological corridors) with importance for species migration and gene flow, which is especially important in fragmented habitats and for the conservation of metapopulations. This also includes biological corridors across altitudinal and climatic gradients and from "crest to coast." e) Sites of demonstrated importance to climate change adaptation for either species or ecosystems

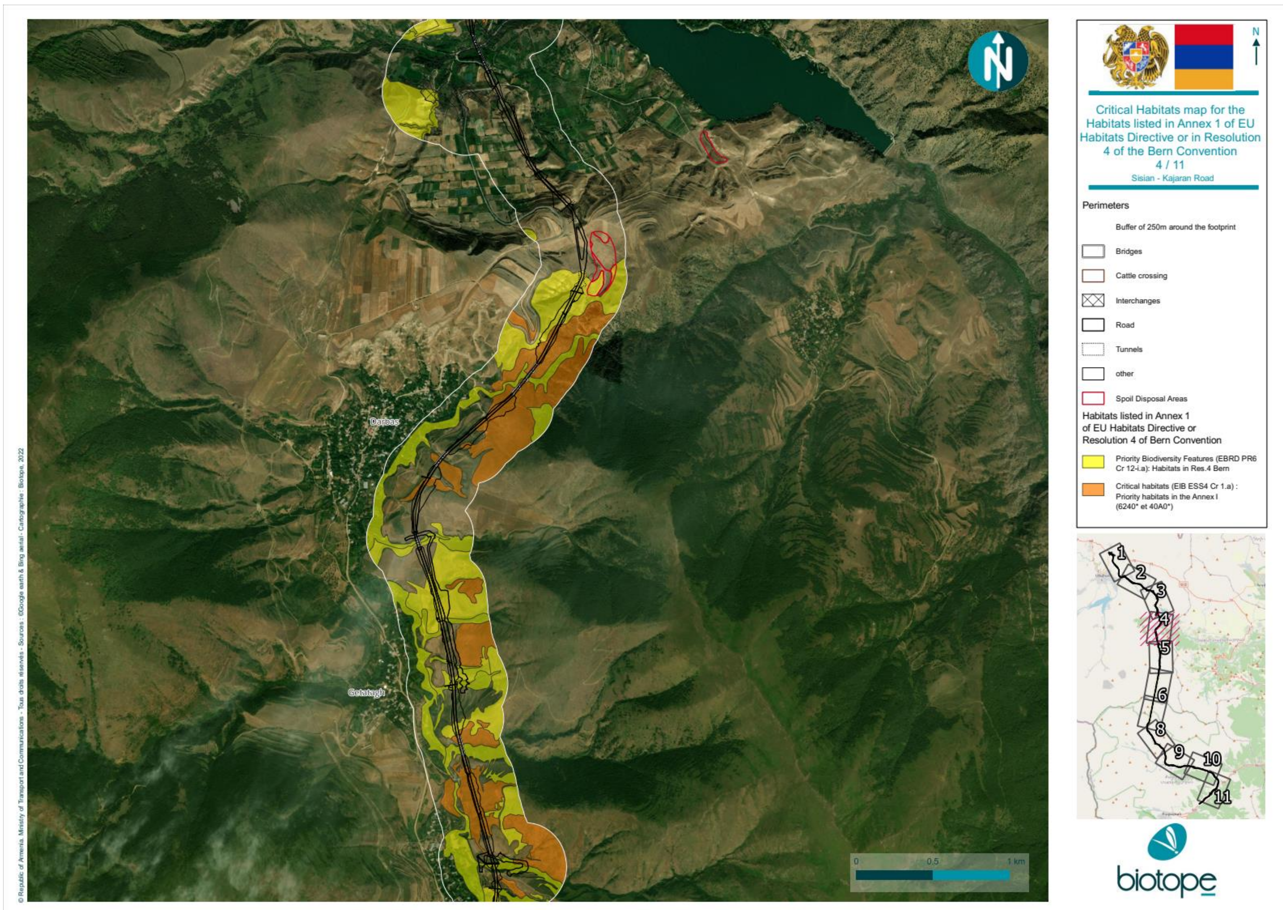
EBRD PR6 and EIB ESS4 also make provision for Legally Protected and Internationally Recognised Areas as Critical Habitat (PR6 paragraph 19-20 and Standard 4 paragraph 20), including UNESCO Natural World Heritage Sites, UNESCO Man and the Biosphere Reserves, Key Biodiversity Areas, Important Bird Areas, Important Plant Area, Alliance for Zero Extinction Sites and wetlands designated under the Convention on Wetlands of International Importance ('the Ramsar Convention'). Other areas of high biodiversity value (such as areas of primary/old growth forest, or areas required for the reintroduction of threatened species or other locally) may also qualify, as determined on a case-by-case basis by specialists. An appropriate assessment has been prepared in parallel (*cf.* Volume 2, Annex 3).

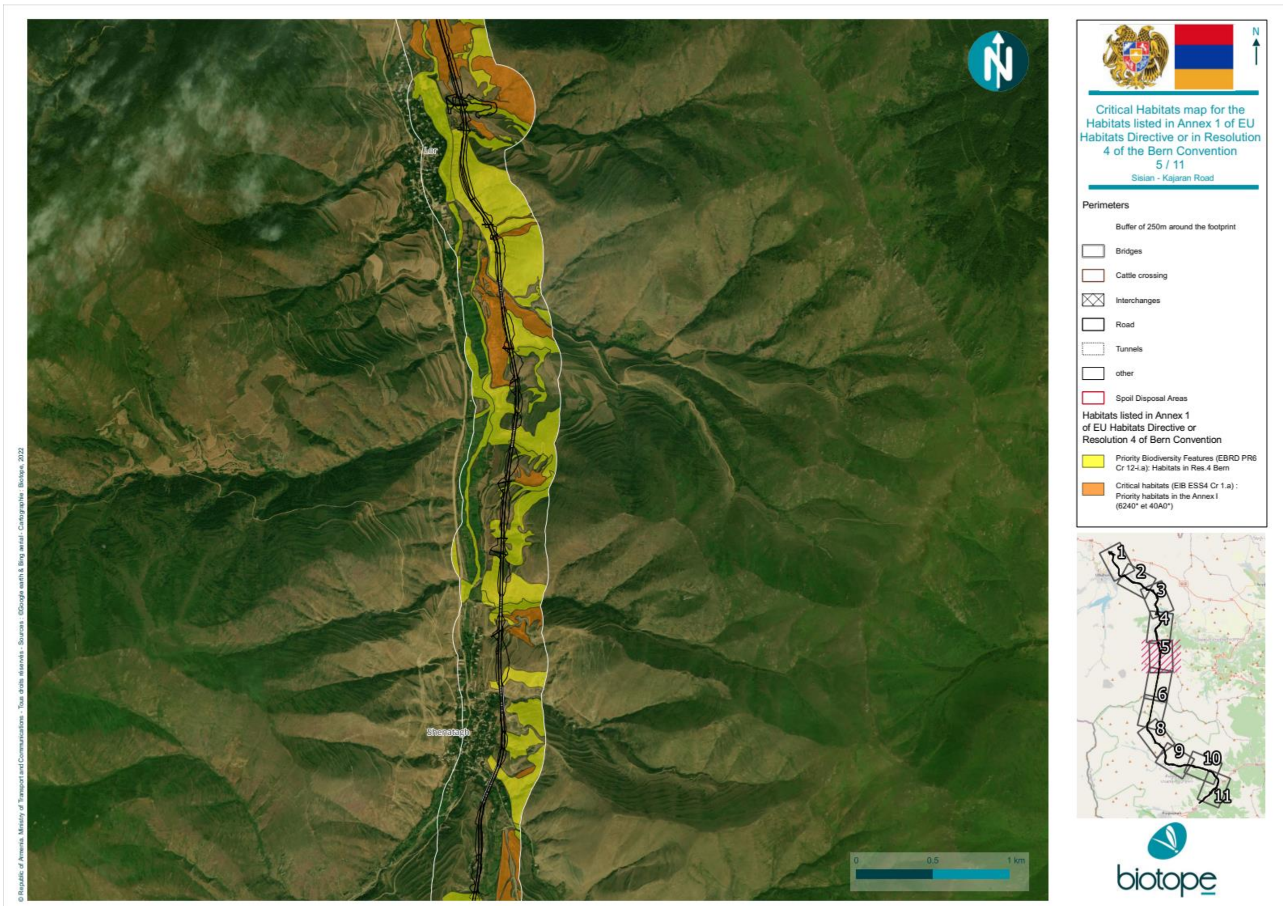
Appendix 2. Map of the Priority Biodiversity Features Triggering Criteria 12.I.A (EBRD PR6) and Critical Habitats and Criteria 1.A (EIB ESS4)

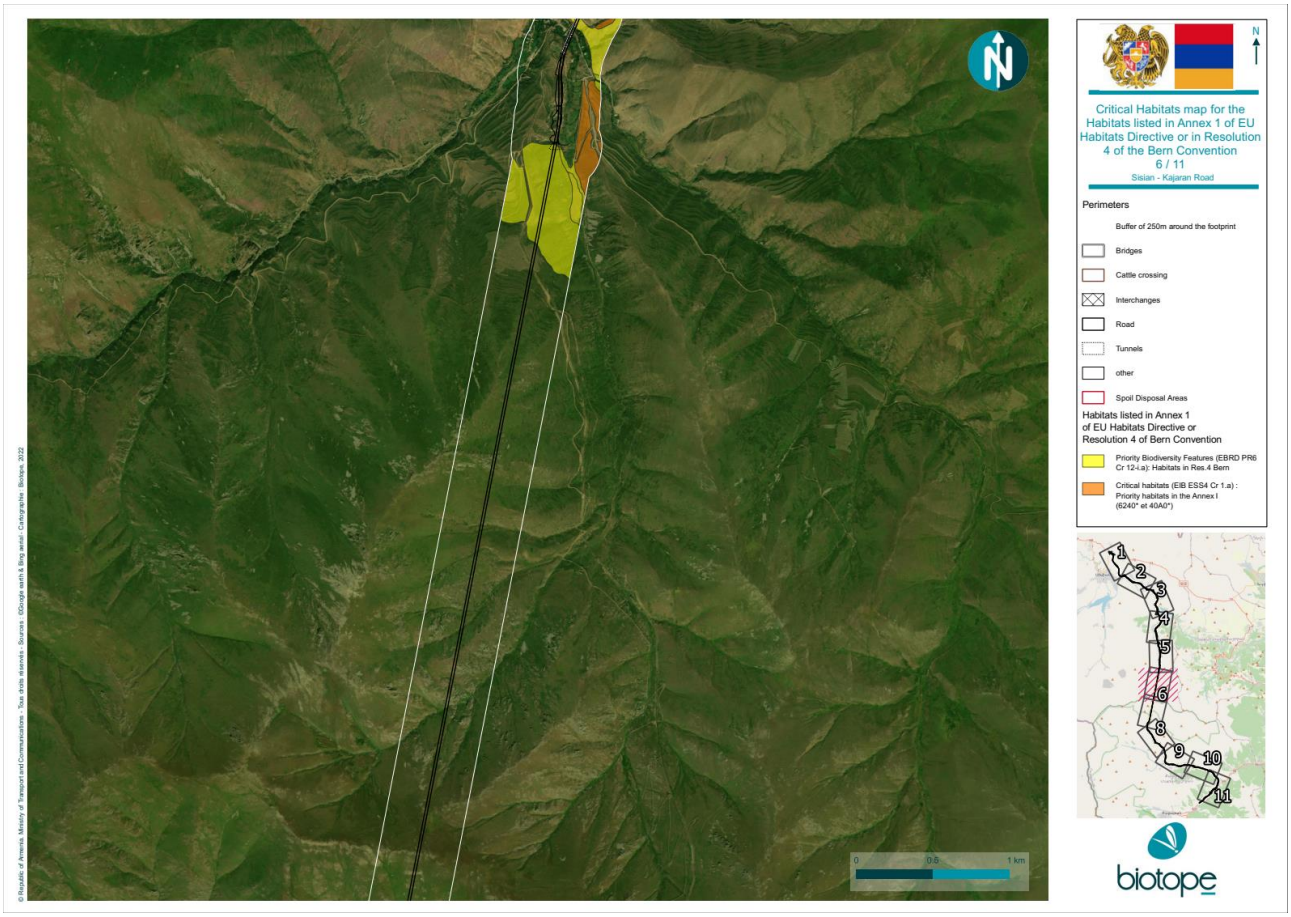


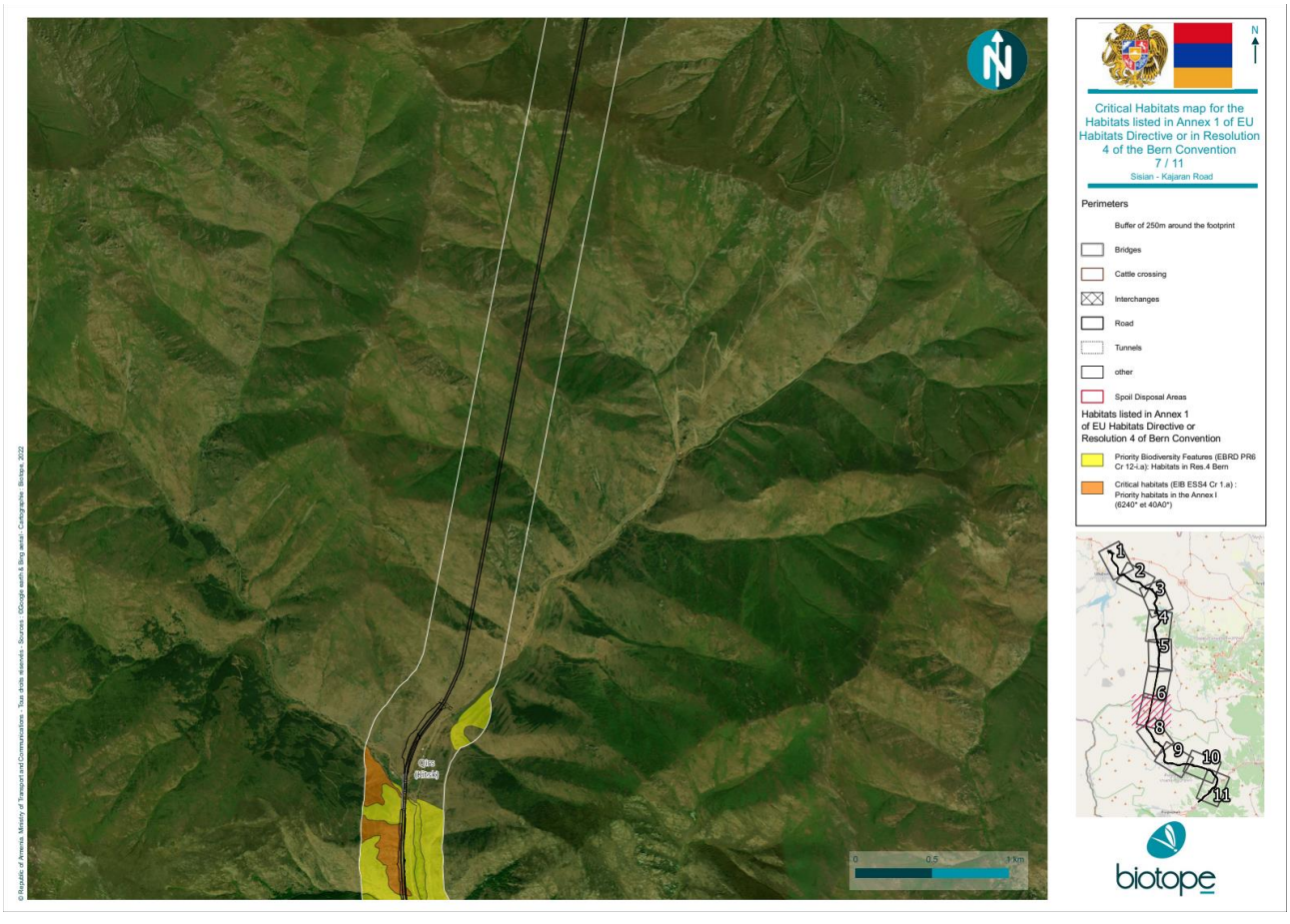

Critical Habitats map for the Habitats listed in Annex 1 of EU Habitats Directive or in Resolution 4 of the Bern Convention
2 / 11
Sisian - Kajaran Road
Perimeters
Buffer of 250m around the footprint
Bridges
Cattle crossing
Interchanges
Road
Tunnels
other
Spoil Disposal Areas
Habitats listed in Annex 1 of EU Habitats Directive or Resolution 4 of Bern Convention
Priority Biodiversity Features (EBRD PR6 Cr 12-i.a): Habitats in Res.4 Bern
Critical habitats (EIB ESS4 Cr 1.a) : Priority habitats in the Annex I (6240* et 40A0*)
biotope


Critical Habitats map for the Habitats listed in Annex 1 of EU Habitats Directive or in Resolution 4 of the Bern Convention
3 / 11
Sisian - Kajaran Road
Perimeters
Buffer of 250m around the footprint
Bridges
Cattle crossing
Interchanges
Road
Tunnels
other
Spoil Disposal Areas
Habitats listed in Annex 1 of EU Habitats Directive or Resolution 4 of Bern Convention
Priority Biodiversity Features (EBRD PR6 Cr 12-i.a): Habitats in Res.4 Bern
Critical habitats (EIB ESS4 Cr 1.a) : Priority habitats in the Annex I (6240* et 40A0*)
biotope


Critical Habitats map for the Habitats listed in Annex 1 of EU Habitats Directive or in Resolution 4 of the Bern Convention
4 / 11
Sisian - Kajaran Road
Perimeters
Buffer of 250m around the footprint
Bridges
Cattle crossing
Interchanges
Road
Tunnels
other
Spoil Disposal Areas
Habitats listed in Annex 1 of EU Habitats Directive or Resolution 4 of Bern Convention
Priority Biodiversity Features (EBRD PR6 Cr 12-i.a): Habitats in Res.4 Bern
Critical habitats (EIB ESS4 Cr 1.a) : Priority habitats in the Annex I (6240* et 40A0*)
0 0.5 1 km
biotope


Critical Habitats map for the Habitats listed in Annex 1 of EU Habitats Directive or in Resolution 4 of the Bern Convention
5 / 11
Sisian - Kajaran Road
Perimeters
Buffer of 250m around the footprint
Bridges
Cattle crossing
Interchanges
Road
Tunnels
other
Spoil Disposal Areas
Habitats listed in Annex 1 of EU Habitats Directive or Resolution 4 of Bern Convention
Priority Biodiversity Features (EBRD PR6 Cr 12-i.a): Habitats in Res.4 Bern
Critical habitats (EIB ESS4 Cr 1.a) : Priority habitats in the Annex I (6240* et 40A0*)
0 0.5 1 km
biotope


Critical Habitats map for the Habitats listed in Annex 1 of EU Habitats Directive or in Resolution 4 of the Bern Convention
6 / 11
Sisian - Kajaran Road
Perimeters
Buffer of 250m around the footprint
Bridges
Cattle crossing
Interchanges
Road
Tunnels
other
Spoil Disposal Areas
Habitats listed in Annex 1 of EU Habitats Directive or Resolution 4 of Bern Convention
Priority Biodiversity Features (EBRD PR6 Cr 12-i.a): Habitats in Res.4 Bern
Critical habitats (EIB ESS4 Cr 1.a) : Priority habitats in the Annex I (6240* et 40A0*)
biotope


Critical Habitats map for the Habitats listed in Annex 1 of EU Habitats Directive or in Resolution 4 of the Bern Convention
7 / 11
Sisian - Kajaran Road
Perimeters
Buffer of 250m around the footprint
Bridges
Cattle crossing
Interchanges
Road
Tunnels
other
Spoil Disposal Areas
Habitats listed in Annex 1 of EU Habitats Directive or Resolution 4 of Bern Convention
Priority Biodiversity Features (EBRD PR6 Cr 12-i.a): Habitats in Res.4 Bern
Critical habitats (EIB ESS4 Cr 1.a) : Priority habitats in the Annex I (6240* et 40A0*)
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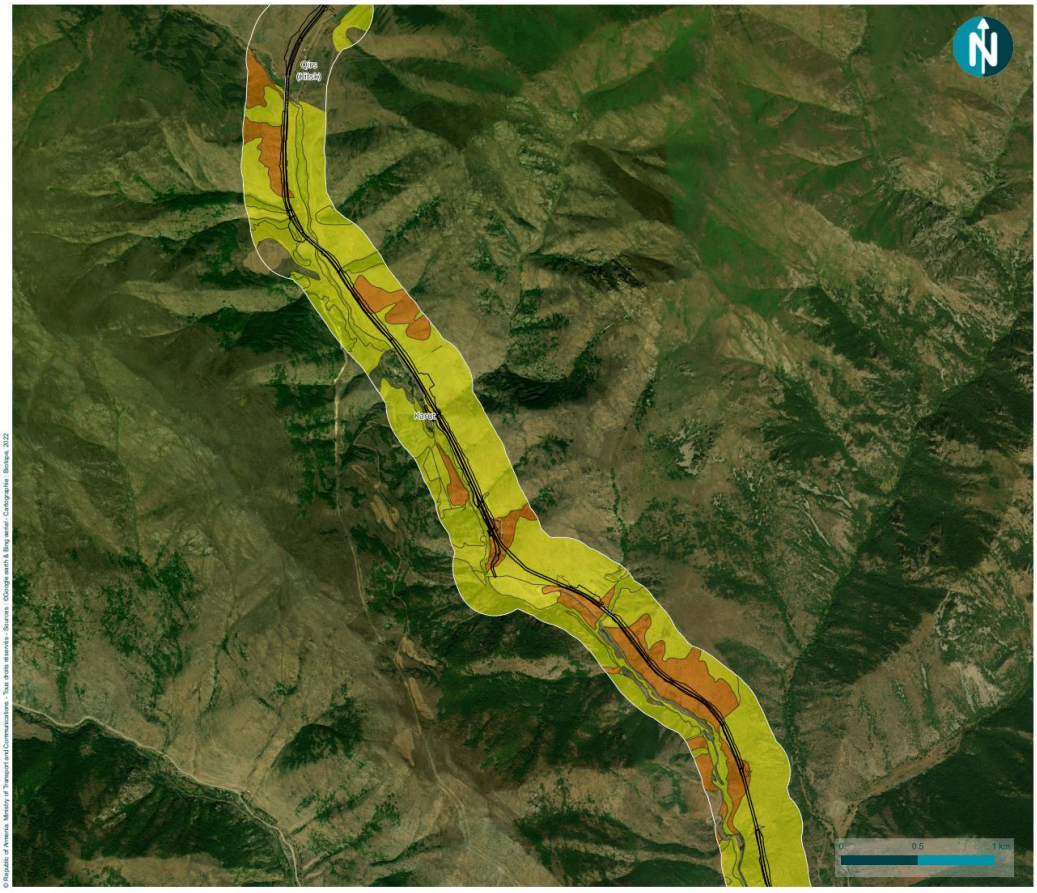

Critical Habitats map for the Habitats listed in Annex 1 of EU Habitats Directive or in Resolution 4 of the Bern Convention
8 / 11
Sisian - Kajaran Road

Perimeters
- Buffer of 250m around the footprint
- Bridges
- Cattle crossing
- Interchanges
- Road
- Tunnels
- other
- Spoil Disposal Areas

Habitats listed in Annex 1 of EU Habitats Directive or Resolution 4 of Bern Convention
- Priority Biodiversity Features (EBRD PR6 Cr 12-i.a): Habitats in Res.4 Bern
- Critical habitats (EIB ESS4 Cr 1.a) : Priority habitats in the Annex I (6240* et 40A0*)

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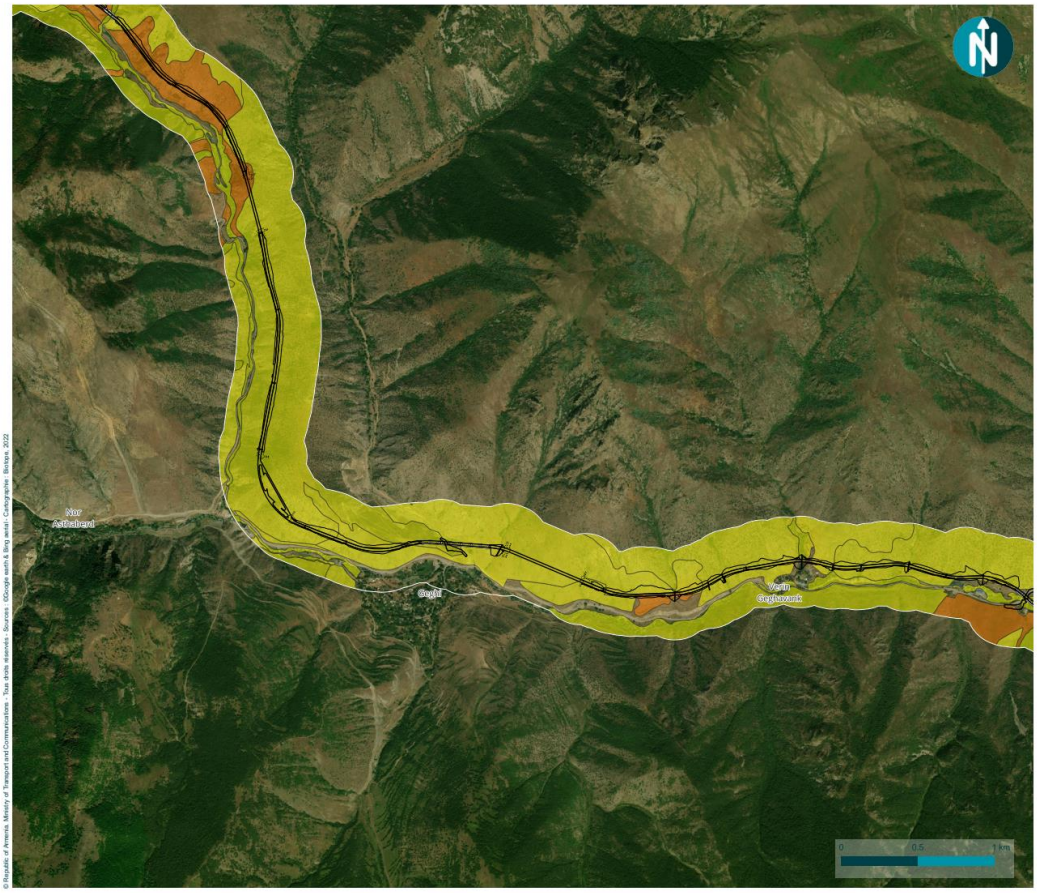

Critical Habitats map for the Habitats listed in Annex 1 of EU Habitats Directive or in Resolution 4 of the Bern Convention
9 / 11
Sisian - Kajaran Road

Perimeters
- Buffer of 250m around the footprint
- Bridges
- Cattle crossing
- Interchanges
- Road
- Tunnels
- other
- Spoil Disposal Areas

Habitats listed in Annex 1 of EU Habitats Directive or Resolution 4 of Bern Convention
- Priority Biodiversity Features (EBRD PR6 Cr 12-i.a): Habitats in Res.4 Bern
- Critical habitats (EIB ESS4 Cr 1.a) : Priority habitats in the Annex I (6240* et 40A0*)

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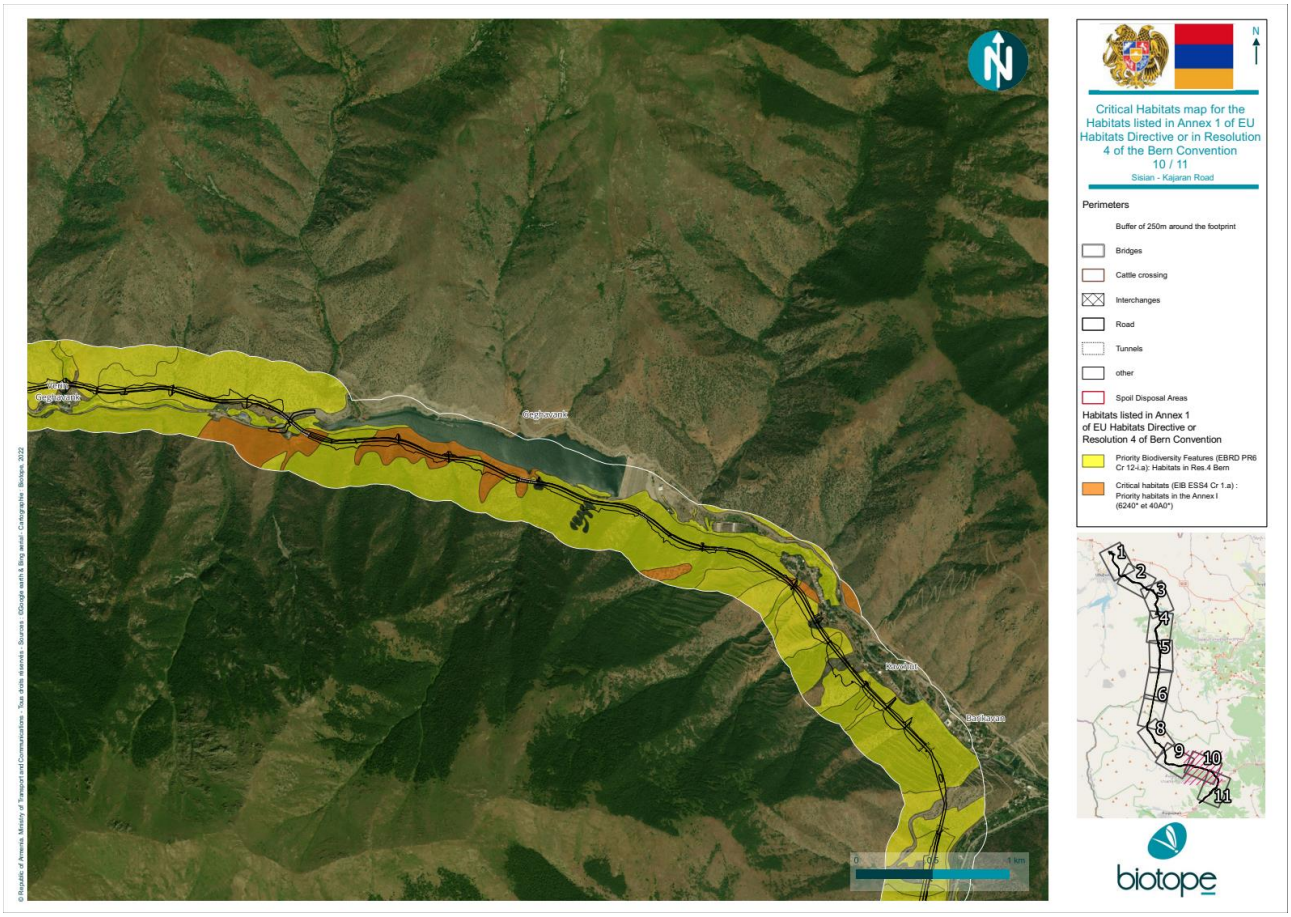

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Appendix 3. EAAA for the different flora species assessed

Scientific name	IUCN Red list	Armenia Red Book	EU Habitats Directive	Bern Convention (Resolution 6)	Global EOO (km²)	EOO in Armenia (km²)	EAAA (km²)	T P E
Hypericum armenum	N/E	CR	-	-	Less than 10km²	8	4	
Astragalus xiphidium	N/E	EN	-	-	Less than 500km²	20	7.7	7.
Iris lineolata	N/E	EN	-	-	Less than 5 000km²	750	7.7	
Tulipa sosnowskyi	N/E	EN	-	-	Less than 5 000km²	1 350	29.7	29
Tulipa florenskyi	N/E	EN	-	-	Less than 500km²	350	40	