

Kvesheti – Kobi Road Upgrade

Critical Habitat Assessment (CHA) and Appropriate Assessment (AA) Screening



Executive Summary

This document provides a Critical Habitat Assessment (CHA) and Appropriate Assessment (AA) Screening for the proposed Kvesheti to Kobi Road Upgrade Project. It has been developed in compliance with the requirements of IFC Performance Standard 6 and EBRD Performance Requirement 6. The Project is part of a program launched by the Government of Georgia (GoG) and the Roads Department to upgrade the major roads of the country.

The proposed scheme involves the construction of a new section of road of around 22.7km in length to both bypass Kvesheti and avoid the Jvari pass (the “Project”). The new section of road would run through the Tereg valley to Tskere and then on to Kobi via a 9km tunnel at a height of around 1960m. It would also require construction of 7 new bridges (resulting in some 1.8km of bridges in this section in total). The new alignment would be divided into two construction packages.

The Project passes through a number of habitats that could support notable species and its northern end is also located on the fringes of an area of internationally recognised conservation importance, and passes under an area of national park. The Project therefore has the potential to impact upon areas that could be considered either “Critical Habitat” and/or “Priority Biodiversity Features”. As a result of the designations, an AA Screening is also required to assess the scheme’s impact on sites of European conservation importance.

The CHA has been used to identify the potential for the Project to impact upon the specific species and habitats that could trigger Critical Habitat and/or Priority Biodiversity Features. Where any such impacts have been identified the Project is then required to develop and implement a series of bespoke Biodiversity Action Plans (BAPs) to help ensure that it achieves “no net loss” (or in the case of CH “net gain”) with regards to the conservation value of these habitats and species in line with the requirements of both the European Bank for Reconstruction and Development (EBRD) Environmental and Social Policy and the Asian Development Bank (ADB) Safeguard Policy.

Based on the AA Screening, the Project is considered unlikely to have a significant effect on the Kazbegi Emerald Site or the Khevi SPA and as such no further analysis is proposed on this specific issue. The CHA screening has identified requirements for BAPs or specific avoidance for the following habitats and species:

- Birch Krummholz and Low Grass Marsh habitats
- Endemic Plant Species
- Notable Birds: Black Grouse; Egyptian Vulture; Corncrake
- Migratory Raptors
- Notable Mammals: Caucasian Chamois, Otter; Bats

The specific BAPs are provided as a stand-alone document which accompanies this CHA. Additional surveys will be conducted in the Spring of 2019 to understand if any additional mitigation measures are required.

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Abbreviations

AA	Appropriate Assessment
ADB	Asian Development Bank
AIS	Alien Invasive Species
AoI	Area of Influence
BAP	Biodiversity Action Plan
BMMP	Biodiversity Management and Monitoring Plan
C&C	Cut and Cover
CEMP	Construction Environmental Management Plan
CHA	Critical Habitat Assessment
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CNF	Caucasus Nature Fund
D&B	Drill and Blast
DMU	Discrete Management Unit
EBA	Endemic Bird Area
EBRD	European Bank for Reconstruction and Development
EIA	Environmental Impact Assessment
EPC	Engineer, Procure, Construct (Contract Type)
EPE	European Principles for the Environment
ESIA	Environmental and Social Impact Assessment
ESAP	Environmental and Social Action Plan
ESMP	Environmental and Social Management Plan
ESP	Environmental and Social Policy
EU	European Union
FFI	Fauna and Flora International
GoG	Government of Georgia
GRL	Georgian Red List
HGV	Heavy goods vehicle
IBA	Important Bird Area
IFC	International Finance Corporation
ISU	Ilia State University
IUCN	International Union for the Conservation of Nature
KBA	Key Biodiversity Area

Kvesheti – Kobi Road Upgrade Critical Habitat Assessment (CHA)

Km Kilometre

Masl metres above sea level

NACRES Georgian Centre for Biodiversity Conservation and Research

NATM New Austrian Tunnelling Method

NGO Non-Governmental Organisation

PBF Priority Biodiversity Feature

PR6 EBRD's Performance Requirement 6

PS6 IFC's Performance Standard 6

RD Georgian Roads Department

RDB Red Data Book

SEA Strategic Environmental Assessment

SPA: Special Protection Area (designated under the EU Birds Directive)

spp. Several species within the same genus

ssp. Sub-species

TBM Tunnel Boring Machine

UN United Nations

WWF World Wildlife Fund

1. INTRODUCTION

1.1 Document Purpose

This document provides a Critical Habitat Assessment (CHA) and Appropriate Assessment (AA) Screening for the proposed Kvesheti to Kobi Road Upgrade Project (see Project summary in Section 3). The proposed project Area of Influence includes a number of habitats that could support notable species and the northern end of the Project is considered particularly sensitive as it is located within the fringes of an area of internationally recognised conservation importance and passes (at a depth of 200m) under an element of the Kazbegi National Park. Further details of these are provided in Sections 4 and 6 of this report respectively. The Project therefore has the potential to impact upon areas that could be considered either “Critical Habitat” and/or “Priority Biodiversity Features” as defined by IFC Performance Standard 6 and EBRD Performance Requirement 6. A **Critical Habitat Assessment** (CHA) of the scheme is therefore required as detailed in Sections 5 and 6 of this Document.

As the Project passes under a fragment of the Kazbegi National Park and Candidate Emerald site, and also overlaps with the Khevi SPA, and in line with the requirements of the EU Habitats Directive, an **Appropriate Assessment** (AA) Screening is also required of the potential for the scheme to impact on sites of European conservation importance. This is provided in Section 4 of this document.

1.2 Document Objectives

This CHA and AA have been used to identify the potential for the Project to impact upon the specific species and habitats that could trigger Critical Habitat, Priority Biodiversity Features and/or Designated or Internationally Recognised Sites within the Project Area of Influence (Aol). Where any such impacts have been identified the Project is then required to develop and implement a series of bespoke **Biodiversity Action Plans (BAPs)** to help ensure that it achieves “no net loss” (or in the case of CH “net gain”) with regards to the conservation value of these habitats and species. The BAPs will include a set of actions that together can help ensure the conservation or enhancement of the affected habitats and species by building on the key mitigation and compensation measures developed as part of the Project ESIA process. In so doing the BAPs will help the Project comply with both national legislation/policy requirements and international environmental requirements, including those of both the European Bank for Reconstruction and Development (EBRD) Environmental and Social Policy and the Asian Development Bank (ADB) Safeguard Policy.

It should be noted that BAPs are intended to focus on those species and habitats that need special management, rather than dealing with all of the biodiversity affected by the Project. The latter is covered through the specific Biodiversity Management elements of the Project Environmental and Social Management Plan (ESMP), and the associated Contractor-specific Biodiversity Management Plans, as explained in the Project ESIA.

1.3 Associated Documents

The document is part of a series of documents that have evaluated, and set out mitigation proposals for, the potential environmental and social impacts of the proposed project. As such the document builds on, and should be read alongside, the following Project Documents:

- **Regulatory Environmental Impact Assessment (EIA).** This document addresses potential environmental and social impacts of the project in the context of Georgian Law. It has been developed and enhanced to create the **Project Environmental Impact Assessment (EIA)** which further described baseline conditions within the projects Area of Influence (Aol) outlines potential impacts of the scheme and details key mitigation to be included in design, construction and operation.
- **Project Framework Environmental and Social Management Plan (ESMP):** this document (included as an Annex to the ESIA) focuses on the proposed project mitigation and includes specific project requirements to be implemented by the EPC Contractor during final project design and construction. As an operational document it will inform the EPC Contractors own Environmental and Social Management Plans which will be developed prior to construction commencing.
- **Project Biodiversity Action Plan (BAP).** Where the assessments reported in this CHA document have identified the potential for impacts on Critical Habitat, Priority Biodiversity Features or Designated or Internationally Recognised Sites, specific action plans have been developed to ensure “no net loss” to global biodiversity of the features/species identified, and in the case of CH, net gain of those features or species as described earlier.
- **Stakeholder Engagement Plan (SEP):** This provides additional details of the consultation work undertaken to date (including consultations with ecological NGOs) as well as planned future consultation work. It is provided as an Annex to the ESIA.

1.4 Stakeholder Input to this Document

Stakeholder consultation is an important element of both the CHA/AA and any subsequent BAP, both for information collection and to gather opinions on how to implement and coordinate actions. A number of national and international stakeholders (including biodiversity specialists and NGOs) have been consulted as part of the development of this document and the international ESIA. In addition to various public meetings, these have included specific meetings with national conservation organisations including the following:

- Georgian Centre for Biodiversity Conservation and Research (NACRES).
- Caucasus Nature Fund (CNF).
- Ilia State University.
- Agency for Protected Areas.
- Sabuko
- Georgian Eco-Tourism Association (GEA)
- CENN
- WWF

Additional information on other consultations is provided in the Project Stakeholder Engagement Plan. Further stakeholder consultation is also proposed as part of the BAP development to further develop proposed conservation actions and help establish long-term partnerships with the organisations who will implement the actions. The BAP report will also be further circulated to key stakeholders for comment during the disclosure period.

2 LEGAL AND CONSTITUTIONAL BASIS FOR THE CH/AA

2.1 International Legislation and Policy

Georgia has ratified a number of international laws and conventions concerning biodiversity and considered of direct relevance to this Project. These conventions require the country to proactively manage the conservation of its ecological resources, an obligation further reinforced through its national regulations and the EU obligations as outlined below.

Relevant signed conventions include the following:

- Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES 1973)
- Convention on Wetlands of International Importance Especially as Waterfowl Habitat (1971)
- Convention on the Conservation of Migratory Species of Wild Animals (1979) or Bonn Convention
- The Council of Europe's Convention on the Conservation of European Wildlife and Natural Habitats (1979), or Bern Convention,
- Agreement on the Conservation of Bats in Europe (EUROBATS) (2001)
- Agreement on the Conservation of African-Eurasian Migratory Waterbirds (2001)
- UN (Rio) Convention on Biological Diversity (1992)
- Paris Convention on the Protection of the World Cultural and Natural Heritage (1972)
- International Plant Protection Convention
- Espoo Convention requirements regarding "Cross-border context of environmental impact assessment". To be harmonized under the EU Association Agreement
- European Landscape Convention Ratified by Georgia in 2010. Requires the country to provide for preservation of landscapes, as part of cultural and natural heritage and introduce landscape planning.

2.2 EU – Related Obligations

Under the 2014 Georgia - European Union Association Agreement, Georgia is committed to harmonising its national legislation with EU requirements, including those concerning EIA (and SEA) and conservation of species and habitats/sustainable use of biological resources.

Key commitments that are currently being implemented include:

- harmonization of national conservation legislation with EU Council Directive 92/43/EEC on the conservation of natural habitats and wild fauna and flora and Council Directive 2009/147/EEC on the conservation of birds.
- identification of respective habitats associated with the Directives and their inclusion in the "Emerald Network",
- identification of important bird habitats and carrying out adequate measures for their conservations.

The Draft "**Law on Biological Diversity**" is being developed to help meet these commitments as outlined further below.

One area that is currently underdeveloped is the application of **Strategic Environmental Assessment (SEA)**, which can be an important tool for ensuring biodiversity aspects are considered in the development process. The **National Biodiversity Strategy and Action Plan** provides for establishment of SEAs for national plans, programmes and legislation

development but this has also yet to be enacted and biodiversity aspects are still often poorly integrated into strategic development.

These obligations also require the country to proactively manage the conservation of its ecological resources. In particular both the Birds and the Habitats Directive place specific obligations on the country with regards to the designation of protected areas where they support Globally or Regionally important populations of a number of notable species. Further information on this is provided in the following sections.

2.4 National Legislation

Georgia has enacted a considerable amount of national legislation relating to biodiversity and nature conservation, and this is increasingly aligned with EU requirements. The following legislation is considered to be of particular relevance to the Project from a biodiversity perspective:

Law of Georgia	Relevance
Protection of the Environment 1998 (framework law)	The law covers a range of issues including: protection of environment from harmful impact; improvement of the quality of environment; sustainable development and sustainable use of natural resources; maintenance of biological diversity and ecological balance; protection of unique landscapes and ecosystems; taking certain measures towards solution of global environmental problems; definition of the rights and obligations of citizens in the sphere of environmental protection; environmental education.
Biological Diversity	The law will: <ul style="list-style-type: none"> • establish a legal background for creation of Emerald sites and Special Protected Areas for bird species, determine grounds for identification of such territories, their inclusion in the European network, their conservation and monitoring. • Enhance legal protection at the national level of critically endangered species and those species, which are strictly protected under international treaties and EU directives. • Provide a legal framework for accessibility of genetic resources and relative traditional knowledge and equitable sharing of benefits arising from their utilization. • provide for significant changes aimed at regulation of biological resource use, including hunting and fishery.
Protected Areas (1996)	The law defines the aspects of foundation, development and functioning of protected areas; establishes the system of bodies responsible for management on different levels and defines the activities permitted on the areas of various categories.
Wildlife Law (1996)	The law defines protection and use of wild fauna. It also envisages protection of the natural habitat, migration routes, and breeding grounds, ensures sustainable development of wild fauna, and establishes a legal foundation for its in-situ and ex-situ conservation
Red List and Red Book (2003), Red list updated 2014.	The Law defines the Georgian “red list” and “red book” of critically endangered species of wild animals and plants. The Law also defines the structure of the “red list,” the procedures to determine species for inclusion into the list, and the procedures for elaboration, adoption and renewal (revision) of the draft list. It also regulates the issues related to the “red book” of critically endangered species which includes information on the status, habitat, home range, quantity, reproduction areas and conditions, protection measures and risk factors for species listed in the Red List.
Forest Code of Georgia (1999)	The law is intended to protect the forest resources of Georgia (the forest “fund”), preserve their uniqueness and intact nature, protect relict, endemic and other notable plants. It regulates legal relations with regards

	to maintenance, protection, restoration, and use of Georgian forests, defines the notion of the state forest fund and regulates the right of ownership. Initially the entire forest fund is declared as the state property, although permitted denationalization is allowed for.
Law of Georgia on Licenses and Permits (2005).	The law regulates several licenses and permits directly related to biodiversity: including those associated with general forest use, wood processing, hunting farms, fishing, license use of fir cones, galanthus bulbs and cyclamen tubers (specific CITES requirement) license for hunting, and Permit for export, import, re-export and introduction-via-sea of the species listed in CITES, their parts and derivatives.

2.8 The Georgian Red List and Red Book

The **Red List of Georgia** was adopted in 2006 based on work conducted by the Commission of Georgian Scientific Academy working in Endangered Species and updated in 2014. It now includes some 56 plant and 139 animal species, including 33 mammals, 35 birds, 11 reptiles, 2 amphibians, and 11 fish (including all sturgeon). Of these, 20 plant and 43 animal species are categorized as critically endangered (CR) or endangered (EN)¹, and four mammals may be extinct.

The “**Red Book**” of critically endangered species includes information on the status, habitat, home range, quantity, reproduction areas and conditions, protection measures and risk factors for species listed in the Red List. In terms of plants, some 275 species of vascular plants are considered endemic to Georgia, of which approximately 60% (152 species) are considered endangered, although there is insufficient information from them all to be included in the Red List². Further details on Red List species within the project Aol are included within Section E.2 “Description of the Environment: Biodiversity”.

2.9 International Financial Institution Safeguards

The Project is required to meet the international standards of the EBRD and ADB. The international environmental and social safeguard policies of these organisations are outlined below. Guidance from the IFC Performance Standards has also been applied during the CHA process, and is described here first.

International Finance Corporation (IFC) Performance Standards and Guidance

The IFC PS6 (IFC, 2012a) and Guidance Note 6 (IFC, 2012b) has been used on the Project as best practice and international standard. In accordance with IFC PS6, habitats are divided into modified, natural and critical habitats. Critical habitats can be either modified or natural habitats but are considered to support the highest biodiversity value. These are defined further later but include habitat of significant importance to critically endangered and/or endangered species (IUCN Red List); habitat of significant importance to endemic and/or restricted-range species; habitat supporting globally significant concentrations of migratory species and/or congregatory species; highly threatened and/or unique ecosystems; and/or areas associated with key evolutionary processes. A BAP is required for all projects located in critical habitat (IFC, 2012a) and is recommended for projects that have the potential to significantly impact natural habitat (IFC, 2012b).

¹ 44 vertebrate species are also included in the IUCN Red List as CR, EN or VU – see later

² <https://www.cbd.int/doc/world/ge/ge-nr-05-en.pdf>

European Bank for Reconstruction and Development (EBRD) Performance Requirements

Under the EBRD Environmental and Social Policy (ESP) (EBRD, 2014), the Bank has adopted a comprehensive set of specific Performance Requirements (“PRs”) that projects are expected to meet. Furthermore, EBRD is committed to promoting EU environmental standards as well as the European Principles for the Environment (EPE), which are reflected in the PRs. PR6 “Biodiversity Conservation and Sustainable Management of Living Natural Resource” is the relevant requirement for this BAP. PR6 applies to projects in all types of habitats, irrespective of whether they have been disturbed or degraded previously, or whether or not they are protected or subject to management plans.

The objectives of PR6 are: to protect and conserve biodiversity to avoid, minimise and mitigate impacts on biodiversity and offset significant residual impacts, where appropriate, with the aim of achieving no net loss or a net gain of biodiversity to promote the sustainable management and use of natural resources to ensure that Indigenous Peoples and local communities participate appropriately in decision-making to provide for fair and equitable sharing of the benefits from project development and arising out of the utilisation of genetic resources to strengthen companies’ license to operate, reputation and competitive advantage through best practice management of biodiversity as a business risk and opportunity to foster the development of pro-biodiversity business that offers alternative livelihoods in place of unsustainable exploitation of the natural environment.

Asian Development Bank (ADB) Safeguards

The ADB Safeguards Policy Statement (SPS) sets out policy principles and outlines the delivery process for ADBs safeguard policy in relation to environmental safeguards. The ADB has adopted a set of specific safeguard requirements that borrowers/clients are required to meet in addressing environmental and social impacts and risks. ADB staff will ensure that borrowers/clients comply with these requirements during project preparation and implementation. The safeguard policies are operational policies that seek to avoid, minimise or mitigate the adverse environmental and social impacts of projects including protecting the rights of those likely to be affected or marginalised by the development process. ADBs safeguard policy framework in the SPS consists of three operational policies on the environment, indigenous people and involuntary resettlement. ADB has developed Operational Procedures to be followed in relation to the SPS policies and these are included in the ADB Operations Manual.

Requirements for assessing and addressing biodiversity effects of projects are addressed under ‘Biodiversity Conservation and Sustainable Natural Resource Management’. This requires the environmental assessment process to focus on the major threats to biodiversity and for the borrower/client to identify measures to avoid, minimize, or mitigate potentially adverse impacts and risks and, as a last resort, propose compensatory measures, such as biodiversity offsets, to achieve no net loss or a net gain of the affected biodiversity.

Obligations on the borrower/client differ depending on whether the habitat is classified as modified, natural or critical. For areas of critical habitat the requirements state that no project activity will be implemented in areas of critical habitat unless: There are no measurable adverse impacts, or likelihood of such, on the critical habitat which could impair its high biodiversity value or the ability to function; The project is not anticipated to lead to a reduction in the population of any recognized endangered or critically endangered species or

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a loss in area of the habitat concerned such that the persistence of a viable and representative host ecosystem be compromised; For any lesser impacts, mitigation measures will be designed to achieve at least no net loss of biodiversity. They may include a combination of actions, such as post-project restoration of habitats, offset of losses through the creation or effective conservation of ecologically comparable areas that are managed for biodiversity while respecting the ongoing use of such biodiversity by Indigenous Peoples or traditional communities, and compensation to direct users of biodiversity. When the project involves activities in a critical habitat, ADB requires the borrower/client to retain qualified and experienced external experts to assist in conducting the assessment.



3 PROJECT DESCRIPTION AND HABITATS AFFECTED

3.1 Overview

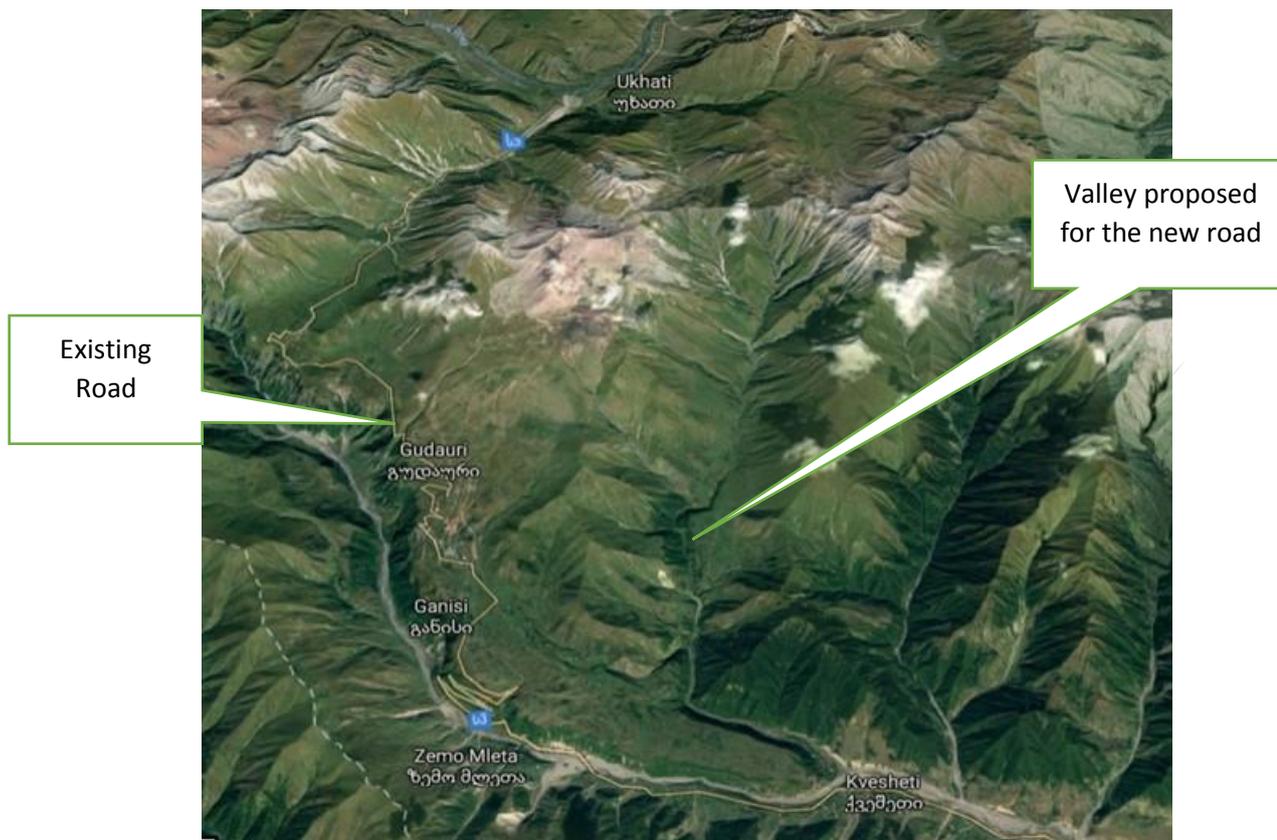
Georgia’s location means that it has an increasingly important role as a major transit country, and almost 2/3 of goods in Georgia are transported by road. Many of the roads are however poorly equipped to cope with the increasing volume of traffic and the Government of Georgia (GoG) has launched a program to upgrade the major roads of the country. The program is managed by the Roads Department of the Ministry of Regional Development and Infrastructure (Roads Department or RD) and is supported by international organisations including the World Bank, Japanese International Cooperation Agency (JICA), European Investment Bank (EIB), EBRD and ADB.



As a part of the program, the Jinvali-Larsi section of the Mtskheta-Stefantsminda-Larsi Road (The “Russian Military Road”) is due to be upgraded. This is a major road running north of Tbilisi to the border with the Russian Federation. The road starts from Mtskheta, follows the E-60 highway before heading north bypassing Jinvali reservoir from the west, crossing Gudauri winter resort via the Jvari Pass (located at 2,400 meters above sea level masl) and ending at the border to Russian Federation. A number of portions of the road are currently being rehabilitated or are in the process of feasibility study or detailed design.

Between Kvesheti and Kobi the road currently runs for some 35km through the Dusheti and Kazbegi municipalities and includes a specific stretch that runs along the TetriAragvi river and through the Gudauri area of recreational and conservation interest. In this area the road crosses a number of “braided” rivers. Crossings include a 152 m long bridge over the TetriAragvi at KvemoMleta, two 60m and 42m bridges over tributary streams of the Térek near Kobi and several other smaller crossings. The road also crosses the Jvari Pass at a height of some 2395 m although this area is prone to avalanches and rockfalls and is often closed to traffic during the winter.

The existing road is shown in the graphic below.



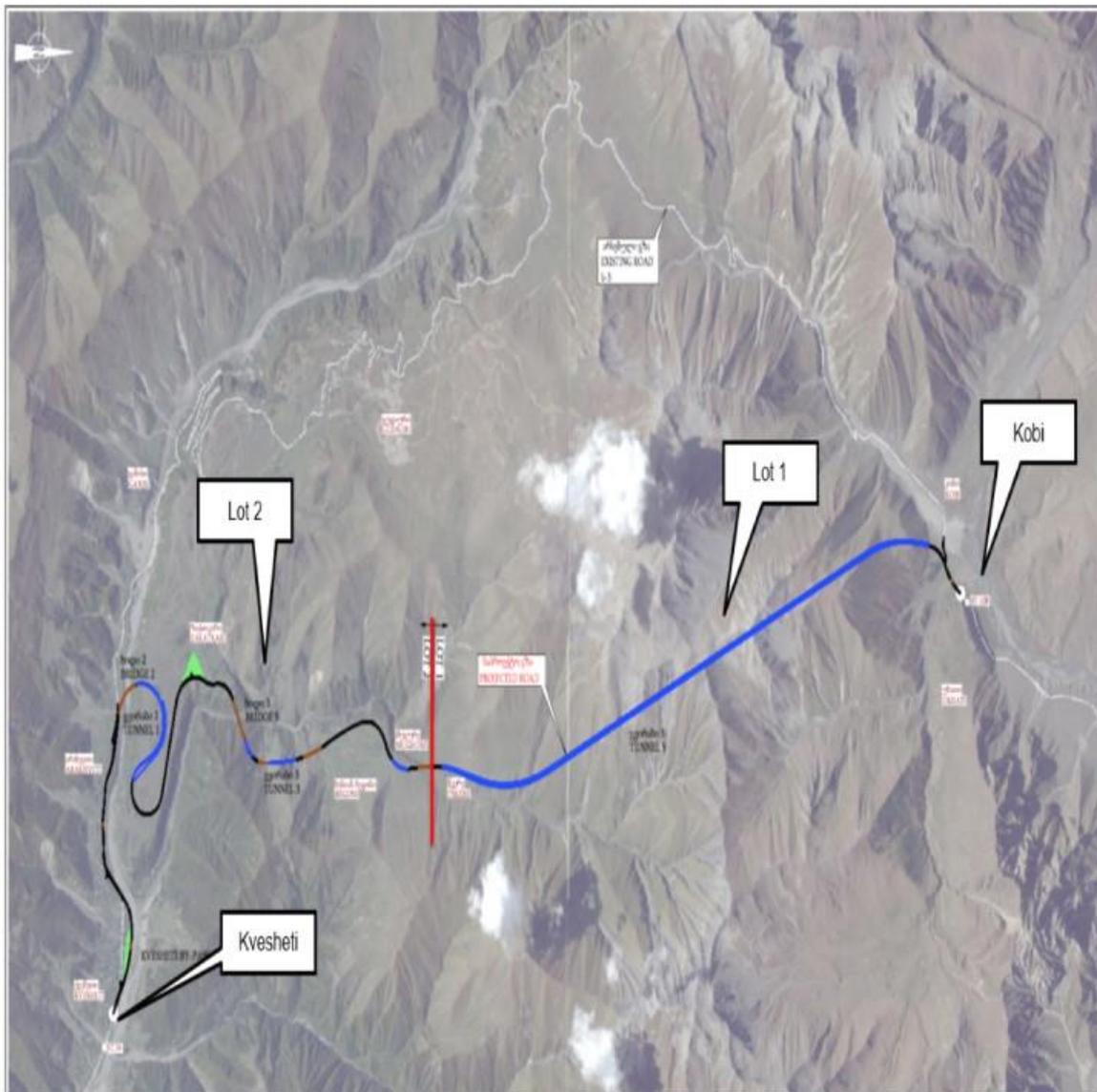
Given the winter constraints, and poor safety records of the road, the Georgian Roads Department is now considering the construction of a new section of road of around 22.7km in length to both bypass Kvesheti and avoid the Jvari pass (the “Project”). The new section of road would run through the Tereg valley to Tskere and then on to Kobi via a 9km tunnel at a height of around 1960m. It would also require construction of 7 new bridges (resulting in some 1.8km of bridges in this section in total). The new alignment would be divided into two construction packages, or ‘Lots’ as shown in the following diagram.

3.2 Lot 1 (Tskere-Kobi) Chainage KM 12.7 – KM 22.7.

This has includes the long tunnel with two cut and cover sections and a junction connecting to the existing road near Kobi. It includes:

- 178m long section of road from Tskere to the south portal of Tunnel 5;
- Tunnel 5 – a 9km long bidirectional, 2 lane tunnel (max. gradient 2.35%);
- Two cut and cover (C&C) sections of Tunnel 5 (200m –south portal and 8m in north portal) to protect from avalanches and move entrance portal farther from the Tskere;
- A 9 km emergency gallery parallel to Tunnel 5 and 17 with connections to the main tunnel (6.4 meters wide);
- Technical buildings next to the north and south portals, to include facilities building, pumping station and ventilation room;
- 0.8km long section of road connecting the north portal of the tunnel with existing road. The alignment has been adapted to the current road with a maximum gradient of 4.2 % to keep on using the existing bridge (bridge length 42m, height 6m); and
- 214m long local road diversion.

Map showing Lot 1 and Lot 2 Sections of the Proposed Scheme



3.3 Lot 2 (Kvesheti – Tskere Chainage KM 0.0 – KM 12.7 (12.7 km).

This has 2.5 km of tunnels and 1.5 km of bridges, and includes:

- Kvesheti bypass road (length 3.2 km),
- Bridge 1 (length 27.8m, height 14m, 2 lane)
- Bridge 2 over the Aragvi river (length 435.28m, height 62m, 3 lanes)
- Tunnel 1 (length 1540.64m, 2 lanes) with gallery (1092m) (New Austrian tunneling method- NATM)
- Bridge 3 - Arch bridge over the River Khadistskali (length 426m, height 164m, 3 lane)
- Tunnel 2 (length 193m, C&C, 3 lane)
- Bridge 4 over the left tributary of River Khadistskali river (length 147m, height 26m, 3 lane)
- Tunnel 3 (length 388m)

- Bridge 5 (length 322m, height 55m, 3 lane)
- Tunnel 4 (length 299m, C&C, 3 lane)
- Bridge 6 (length 218m, height 48m, 3 lane)
- Five grade junctions are planned (KM0.3, KM1.7, KM3.1, KM7.7, KM10,5) and 3 service roads.

A number of spoil disposal sites and access roads are proposed for the project. Whilst the locations for these have yet to be finalized by the preferred contractor they will not be in areas designated as Emerald Sites or IUCN Category II equivalent sites, nor affect recognised priority habitats (ie they will avoid areas of sub-alpine birch krummholz or areas of low grass marshes). They will also require approval of the regulators and project lenders and any areas of natural habitat lost will be compensated for as described in the EIA to achieve no net loss. The potential sites have also been taken into account to the extent practical as part of this AA and CHA, and the requirement for avoidance of priority habitats has been confirmed.

3.4 Alternatives Considered

A number of alternative options have been considered for the scheme, including the following all of which are described further in the ESIA:

“No Project”. This would see further deterioration of the existing road, the retention of the traffic problems, the impacts on the local communities and the retention of safety concerns. For these reasons this option was not taken forward.

Upgrading of the Existing Road. The existing 35 km road runs through the Gudauri ski resort and over the Jvari Pass (2,400 masl). The narrow road, steep gradient and tight hairpins create traffic safety problems (in particular for HGVs) and these are worse in adverse weather conditions. Around 8 km of road is also within the SPA/IBA area, and would have greater impacts on the river, whilst the road runs along the known bird migration corridor of the Tetri Aragvi river. For the above reasons this option was not taken forward.

Alternative Routes. An initial nine options were considered and three “corridors” were considered technically feasible and commercially viable namely:

1. along the river near the existing road (lower level) with a tunnel under the Jvari Pass; this was discounted because of a number of concerns including the potential for direct impact on the Kazbegi Protected Area,
2. up to the Kvesheti plateau and connecting to Gudauri area where the tunnel portal would be located. This was discounted due to difficult geological conditions.
3. up to the Kvesheti plateau and then entering the Tskere valley. This was selected as the preferred option as it avoids direct impacts on the Kazbegi National Park (the road is located in a tunnel below the park).

Various tunneling options were also considered including cut and cover, drill and blast (D&B), boring (using Tunnel Boring Machine (TBM)) and NATM (sequential excavation – New Austrian Tunneling Method). Given the length of the main tunnel (> 8 km), advancement rates of D&B and TBM and the geotechnical characteristics of the rocks the use of a TBM for the main tunnel was considered the most appropriate. For other sections selection between mechanical and drill and blast excavation technique (in NATM tunnels) will be made on case by case basis depending upon locations that may be particularly sensitive to vibration.

Further details of the project are provided in the international EIA which contains a detailed evaluation of the alternatives assessed (Section C) and explains how the alternative taken forward has specifically sought to avoid areas of greater conservation value.

3.5 Habitat Evaluation and Sensitivity

A detailed description of the habitats that the road passes through is provided as an Annex to this report, along with a description of initial fauna surveys. These initial surveys have been supplemented by further studies in the autumn of 2018 which are provided as a standalone report, and the results of all these surveys have been used to inform this CHA and AA.

Georgia is currently aligning its traditional habitat classification system with that of the European Nature Information System (EUNIS)³. As part of this (as well as the development of both the Emerald Network and the new National Biodiversity Strategy and Action Plan), some 27 national priority habitats have been identified that are considered both sensitive and under threat. Two of these **priority habitats** have been identified within the project Aol namely:

- **9BF-GE: Sub-alpine birch krummholz** This habitat is represented by forested areas of tall birch trees with closed canopies and is typically found from 1,800-2,300m above sea level. At higher elevations sub-alpine forest of up to 3m tall elfin birch and mountain ash are found together with Caucasian evergreen rhododendron (*Rhododendron caucasicum*) and other evergreen shrubs. Other typical species include *Betula litwinowii*, *B. radeana*, *B. pendula*, *Sorbus caucasigena*, *Salix caprea*, *S. kazbegensis*, *Rhododendron caucasicum*, *Vaccinium myrtillus*, *V. uliginosum*, *V. vitis-idaea*, *Daphne glomerata*, *D. mezereum*, *Anemone fasciculata*, *Polygonatum verticillatum*, *Swertia iberica*, *Festuca drymeja*, *Calamagrostis arundinacea*, *Dolichorrhiza renifolia*, *D. caucasica*, *Cicerbita racemosa*. **Some 2.5ha of this habitat have been identified that are within the direct Project area of influence near the Tunnel 5 northern portal.** Of these 0.1 ha is expected to be affected by the proposed Scheme and will require ecological compensation.
- **70GE03: Low grass marshes** These are found at up to 2300m asl in the lowland and low zone of the mountains. They support horsetail communities including *Equisetum heleocharis*, *E. palustris*, and *E. ramosissimum* and *Hyppuris vulgaris* is a rare obligatory helophyte, *Sparganium erectum* (*S. polyedrum*) or *S. simplex* is also found. **Some 0.7 ha of low grass marshes have been recorded on the plateau near Zakatkari.** The scheme has been modified to avoid impacts to this habitat.

Three other “natural”⁴ (but not priority) habitats have been identified within the proposed road corridor namely:

- **Hornbeam forest (*Carpinus betulus*). 91CB-GE:** Hornbeam is widely distributed in Georgia and thrives on fertile, well-drained soils, often together with beech, oak and/or *Rhododendron luteum*. Around 0.3 ha of Hornbeam forest was identified that will be lost to the Project area, mostly near the bridge crossings of the southern part of the road.
- **Alluvial forest with Alder (*Alnus glutinosa*) & ash (*Fraxinus excelsior*) (91E0)** These forests are present both within forested areas and as a narrow line along the rivers. A range of herbaceous species are found including *Holcus lanatus*, *Paspalum paspaloides*,

³ <https://eunis.eea.europa.eu/>

⁴ Unlike some financial institutions, the EBRD does not use the term “natural habitat” which is used by IFC/ADB to describe areas composed of viable assemblages of native species where human activity has not essentially modified primary ecological functions or species composition. Such areas are likely to include priority biodiversity features.

Briza minor, *Pycnus colchicus*, *Poa trivialis* and *Polygonum persicaria*. Some 45 ha of this habitat was identified within the Project area, but only around 0.7 ha is expected to be directly impacted by the scheme.

- **Alpine rivers and their ligneous vegetation (323 GE)** - Shrubs and “crook-stem” forest habitat is found along the mountain rivers of the Project area with secondary meadows and stands of pine also present in gorge areas. Along the silty river banks a thin scrub of hawthorn (*Crataegus kyrtostyla*), oriental hornbeam (*Carpinus orientalis*), and Jerusalem thorn (*Paliurus spina-christi*) is present. Sandier banks are covered with a thick undergrowth which can completely disappear when flooded (and then revive again). Species present include annual plants such as cereals and perennial dicotyledons with *Deschampsia cespitosae* community on river banks and in waterlogged areas. Other typical plants include: Tinweed (*Equisetum arvense*), sedges (*Carex canescens*, *C. hirta*, *C. Irrigua*), and marsh grass (*Parnassia palustris*), etc. Around 72ha (16% of the total) of this habitat is present within the Project area, including 16ha proposed within the northern disposal area. Around 1.4ha are expected to be permanently affected by the main scheme, and further areas may be affected by disposal areas. All of this will require ecological compensation. However no areas that are expected to be affected support the stands of ecologically valuable sea buckthorn habitat (see later).

Remaining habitats within the Project Aol are considered to be “**modified**” habitats, where human activity has substantially modified the primary ecological functions and species composition. These include areas of agricultural and cultivated habitats (62GE04), pastures (62GE05) and sub-alpine meadows (61GE02) – although most of the latter will not be affected by the works which will pass beneath them in the tunnel. All of these habitats have the potential to support notable species (see flora and fauna), but none are considered notable in their own right.

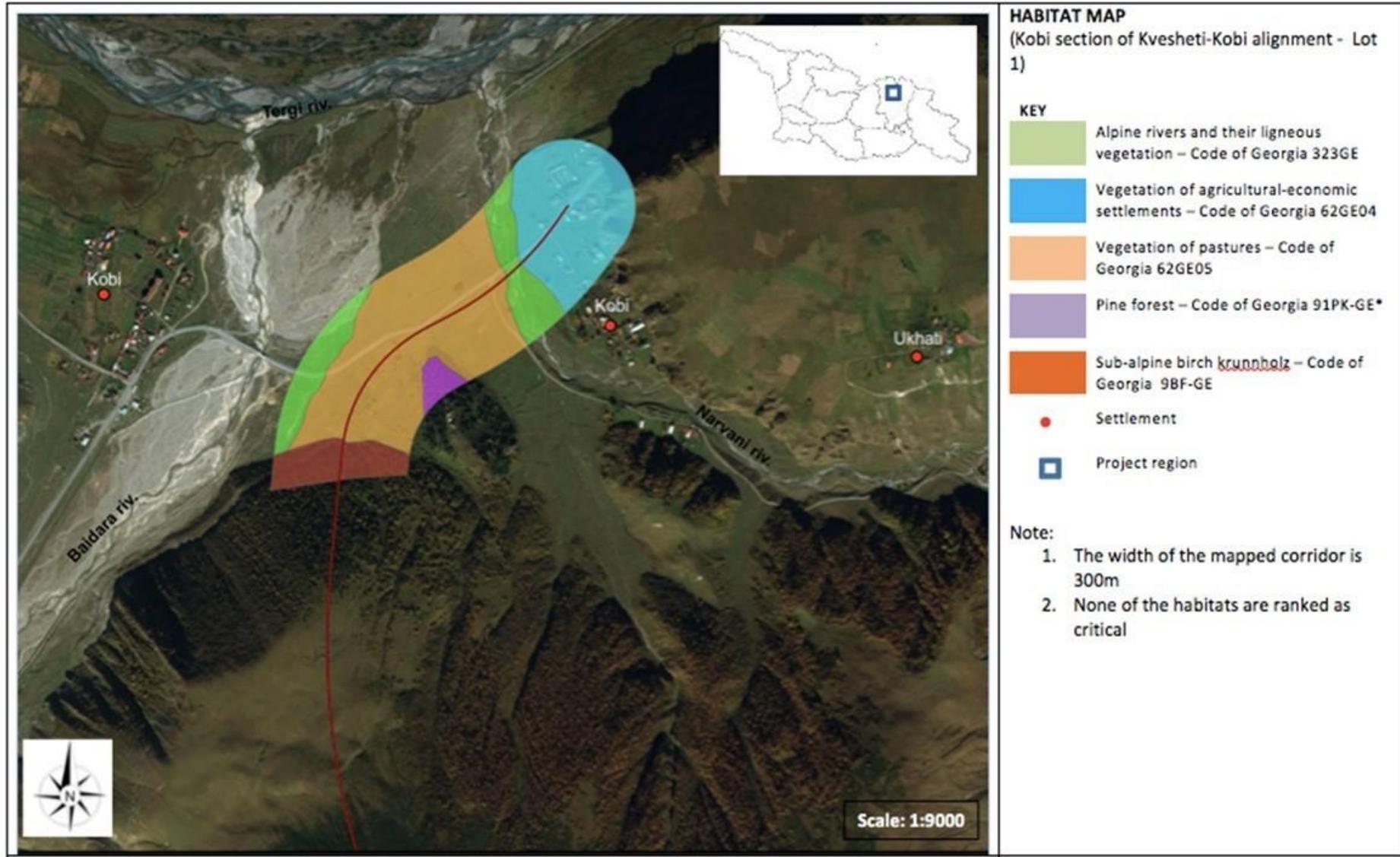
Priority and Other Natural Habitats in the Project Corridor

Georgian Code	Habitat	Total in Project Aol	Lost to Main Scheme	Disposal sites	Where
9BF-GE	Sub-alpine birch krummholz	2.5ha	>0.1ha	0.0ha	Tunnel 5 Northern Portal
70GE03	Low grass marshes	0.7ha	0	0.0ha	Zakatkari plateau
Total		3.2ha	>0.1 ha	0ha	
323GE	Alpine rivers and their ligneous vegetation	56 ha	1.4ha	15.7ha	Tunnel 5 Both portals
91E0	Alluvial forests/ Alluvial forest with Alder and ash	44.6ha	0.7ha	0ha	Both lots
91CB-GE	Hornbeam forest (<i>Carpinus betulus</i>)	22.4	0.3	0.8	Near Gorge crossings
Total		123ha	2.4ha	16.5ha	

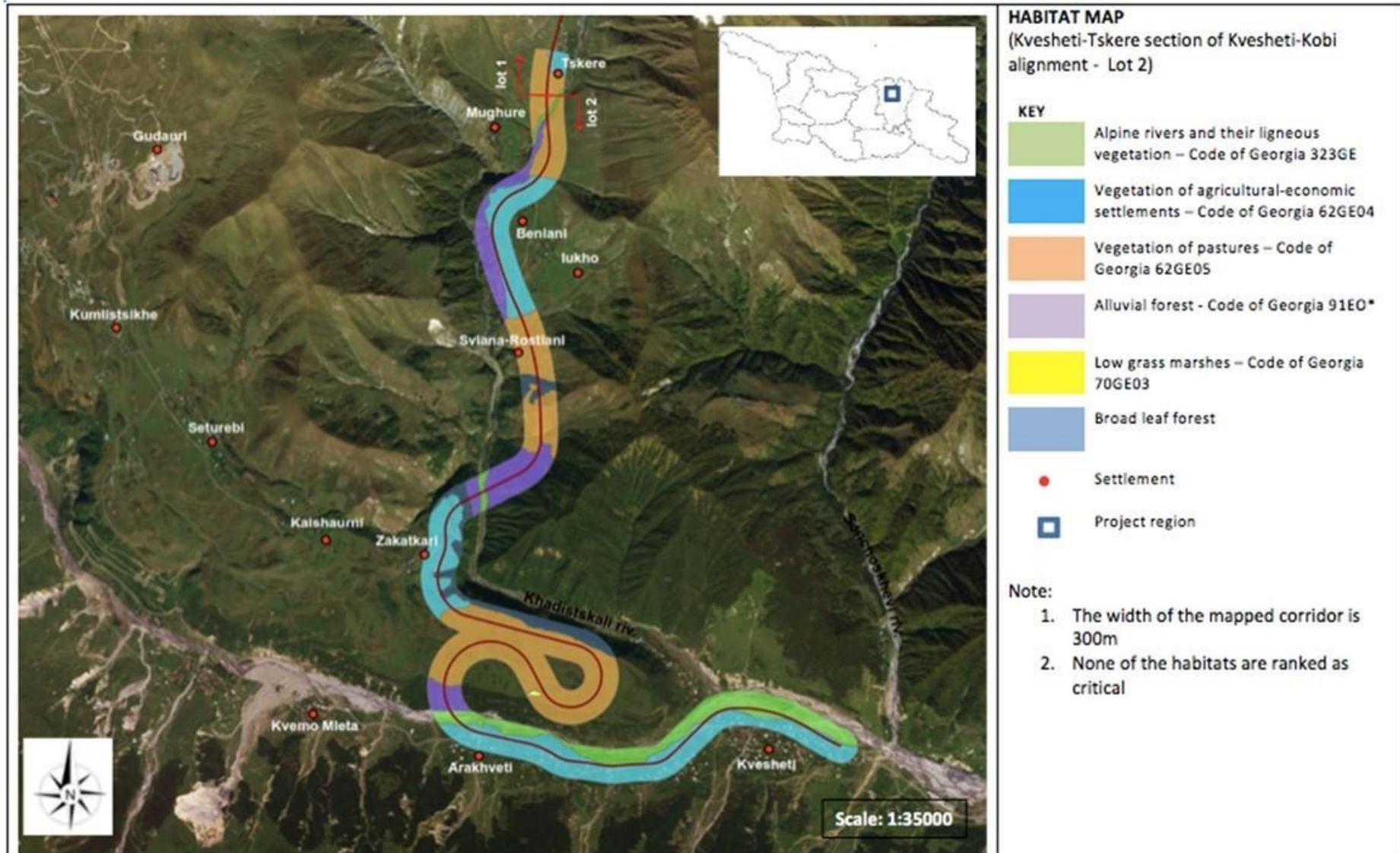
Overall, the main scheme is expected to result in the direct loss of some around **2.5ha of natural habitat** and around 14ha of modified habitat. As already mentioned, spoil disposal sites will not include any areas of priority habitat and will be subject to further review by project regulators and lenders prior to development. Current plans are that they will be primarily in areas of modified habitat but some 16.5ha of natural habitat may also be affected. Most of the natural habitat to be affected (>87%) is alpine river habitat, which is generally very common in the area. All areas of natural habitat will be replaced during project restoration and no valuable areas of sea buckthorn (see later) will be affected.

A habitat map of the affected areas is shown in the figures below.

Habitat Map – Lot 1



Habitat Map – Lot 2



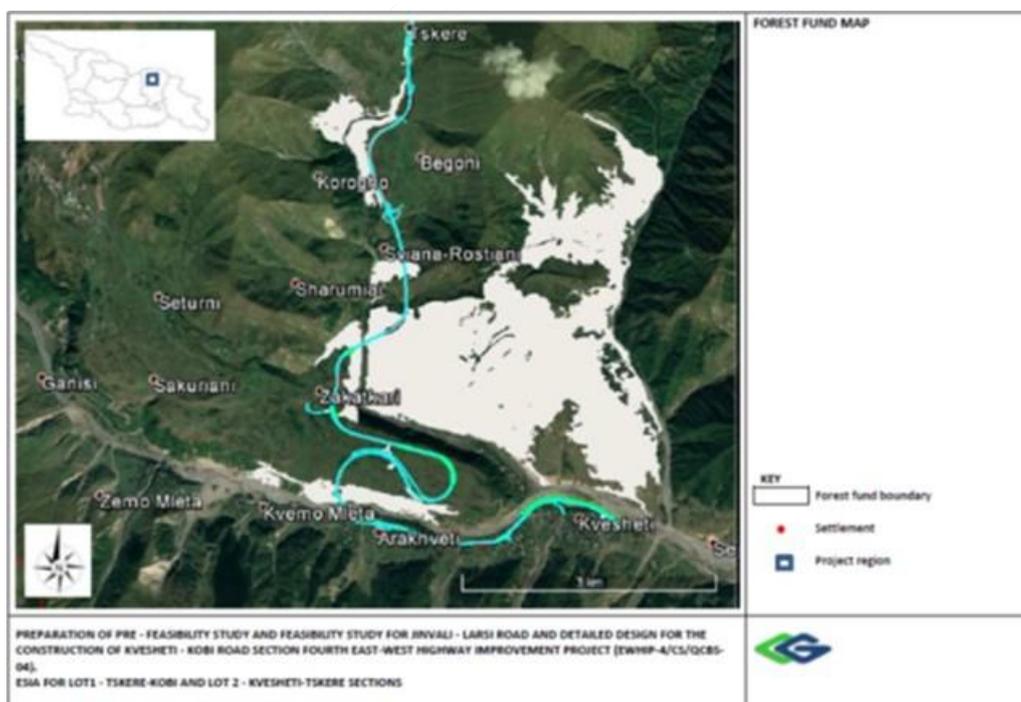
3.6 Forest Resources

Georgia has large areas of natural forests (albeit not in the high mountains) and within the broader region in which the project is located there are around 265,000 ha of forest. These provide a wide range of ecosystem services including water regulation, soil protection and climate stabilization as well as important habitat for many relict, endemic and endangered species of plants and animals (about 65% of Caucasus species depends on forests). Forest stands are protected through the Forest Code of Georgia⁵ which regulates functions and use of forest, including protection, management of water catchment basin, wood production etc. Under these regulations private ownership of forest and commercial woodcutting is allowable, but only under license. The Forest Code also sets categories of protected forests, and lists floristic species of the Red List. Forest ecosystems in Georgia are threatened by unsustainable utilization of forest resources, overgrazing, forest pests and diseases; alien invasive species; and forest fires.

Forested areas within the Project Aol are generally patchy and partly modified, although in some areas (e.g. the Khadistskali gorge) patches of natural forest occur. These are typically mixed-species deciduous forests, with oak and hornbeam) although at the higher elevations (eg near the Tunnel 5 northern portal) more conifer trees are found. Narrow strips of riparian woodland dominated by *Alnus barbata* are present alongside rivers and streams. The State Forest Fund (SFF) is a state-managed/controlled forest area under the management of the MoEPA but is not a protected area as such (although many forested areas are protected). The MoEPA requires all trees to be taken off the SFF registration or “de-listed” before they can be cut.

The Project Aol has been surveyed to determine the extent of the SFF that will be affected by the Project. The list of species by plots is listed below. In total 20 species have been registered with *Populus tremula*, *Alnus incana*, *Corylus avellana* dominating the inventory. No protected species were recorded during this survey, although three GRL vulnerable trees were recorded during the initial walkover survey as described in the table below.

Forest Fund Map



⁵ The Forest Code is a framework law and requires execution of detailed regulations.

Summary of State Forest Fund Inventory

During the site surveys (see **ESIA Appendix H**), single individuals of three GRL **Vulnerable species** were recorded within areas of deciduous and mixed woodland, namely *Quercus macranthera* (high mountain oak), *Ulmus minor* Miller (Small elm), and *Ulmus glabra* (Bare elm). The forest fund inventory has since confirmed that none of these will be affected by the scheme itself.

#	Common name	Latin name	Plot #													
			1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	Common medlar	<i>Mespilus germanica</i>	1		1		7	3								
2	Common hazel	<i>Corylus avellana</i>	998	15	14		1026	1563		114	4	4	8	2		3
3	European ash	<i>Fraxinus excelsior;Fraxinus americana</i>	15	1			35	1					2			
4	Hawthorn	<i>Crataegus kyrtostyla</i>	11	2			22	6								
5	Litwinow's birch	<i>Betula litwinowii</i>	5		1			14			2	1	1			3
6	European aspen	<i>Populus tremula</i>	23			1	82	33			1		1	55		
7	Grey alder	<i>Alnus incana</i>	26	2	51			422	146	73		3				
8	Caucasian pear	<i>Pyrus caucasica</i>	6	3	3		13	4		5				6		
9	Common hornbeam	<i>Carpinus caucasica</i>	7	1			12	6								
10	Cherry plum	<i>Prunus divaricata</i>	1	2			10	2				1	1	2		
11	Georgian oak	<i>Quercus iberica</i>	4					1			1	1	1			
12	Red dogwood	<i>Thelycrania australis</i>	2													
13	Field maple	<i>Acer campestre</i>	27				46	10								
14	Alder buckthorn	<i>Frangula alnus</i>	1													
15	Rowan-tree	<i>Sorbus caucasigena</i>		4	2						3	1	3			1
16	Sweet cherry	<i>Cerasus silvestris</i>			1	1	8	2					1			
17	Caucasian maple	<i>Acer laetum</i>				2										
18	Oriental beech	<i>Fagus orientalis</i>						72					1			
19	Goat willow	<i>Salix caprea</i>								43	13	6	14	37	4	9
20	Sycamore maple	<i>Acer pseudoplatanus</i>								9			1	2		
	Total		1127	29	73	5	1261	2139	146	244	24	17	34	104	4	16

3.7 Rivers and Streams

The valleys within the Project area support “braided” rivers with seasonal flows that vary with time of year and have greatest flow after snowmelt. Of these the three most important for the project are the:

- Tetri (or “White”) Aragvi which runs parallel to Kvesheti and Arakveti (where the road will cross it)
- Khada (or Khadistskali) River which runs through the Khada valley (the project route) to join the Aragvi at Kvesheti
- The Tergi (or Terek) River which runs adjacent to the Tunnel 5 northern portal and ultimately drains to the Caspian Sea. The Narvana River and Bidara River confluence with the Tergi just near the northern portal.

Although information on freshwater biodiversity and critical habitats in Georgia remains limited, the freshwater ecosystems of Georgia are known to support some 91 fish species, over 100 crustacea species, 58 shellfish species and more than 2,600 algae species. The WWF Global Freshwater Program identified 18 freshwater critical habitats in the country, which are considered particularly important migration routes and feeding/breeding grounds for fish. None of these are within the Project Aol.

3.8 Conclusions

The low grass marshes (on the Zakatkari plateau) and the sub-alpine birch krummholz (near the Tunnel 5 northern portal) are considered the habitats with the greatest potential conservation value. These will not be affected with the exception of >0.1 ha of birch.

4 Appropriate Assessment for EU Designated Sites

This Section outlines the potential for the Project to impact upon the designated value of the European designated areas which the Lot 1 area overlaps.

4.1 The “Appropriate Assessment” Process

The EU Habitats Directive requires competent authorities to undertake a formal assessment of the implications of any new plans or projects that may be capable of affecting the designated interest features of European Sites. This is intended to ensure that associated impacts “will not compromise the integrity, conservation objectives and/or biodiversity importance” of such areas. The Project Aol includes two sites which fall under this requirement, namely the:

- **Kazbegi National Park and Proposed Emerald Site⁶**
- **Proposed Khevi SPA.**

Appropriate Assessment screening is required for all plans and projects which are not wholly directly connected with, or necessary to, the conservation management of the site’s qualifying features. It comprises of three distinct stages namely:

1. screening for any Likely Significant Effects (either alone or in combination with other plans or projects).
2. where such effects cannot be excluded, assessing them in more detail through an appropriate assessment (AA) to ascertain if there is an adverse effect on the integrity of the site.
3. If such an adverse effect on the site cannot be ruled out, and no alternative solutions can be identified, then the project should only proceed if i) there are imperative reasons of over-riding public interest and ii) necessary compensatory measures can be secured.

As the conservation designation process itself is still in development in Georgia, the proposed Emerald sites have been based on existing National Park Areas, many of which in turn have been restricted to areas of traditionally forested land. This explains the fragmented nature of many protected areas (including the Kazbegi NP – see later) and also why many such areas do not have site citations or management plans (also the case with Kazbegi). In many cases the designations themselves are also in the process of being revised to enable multi-use landscapes to be designated. As is the case with Kazbegi this may result in the changing (or even de-listing) of some areas currently considered IUCN category I or II equivalent. Within Kazbegi it is understood that whilst this may be the case, no extensions to the existing Emerald Sites are proposed. The designation of SPA sites in Georgia is also recent and most sites in Georgia (including those of the Khevi SPA) are still awaiting approval of final boundaries.

4.2 The Kazbegi National Park/ Emerald Site

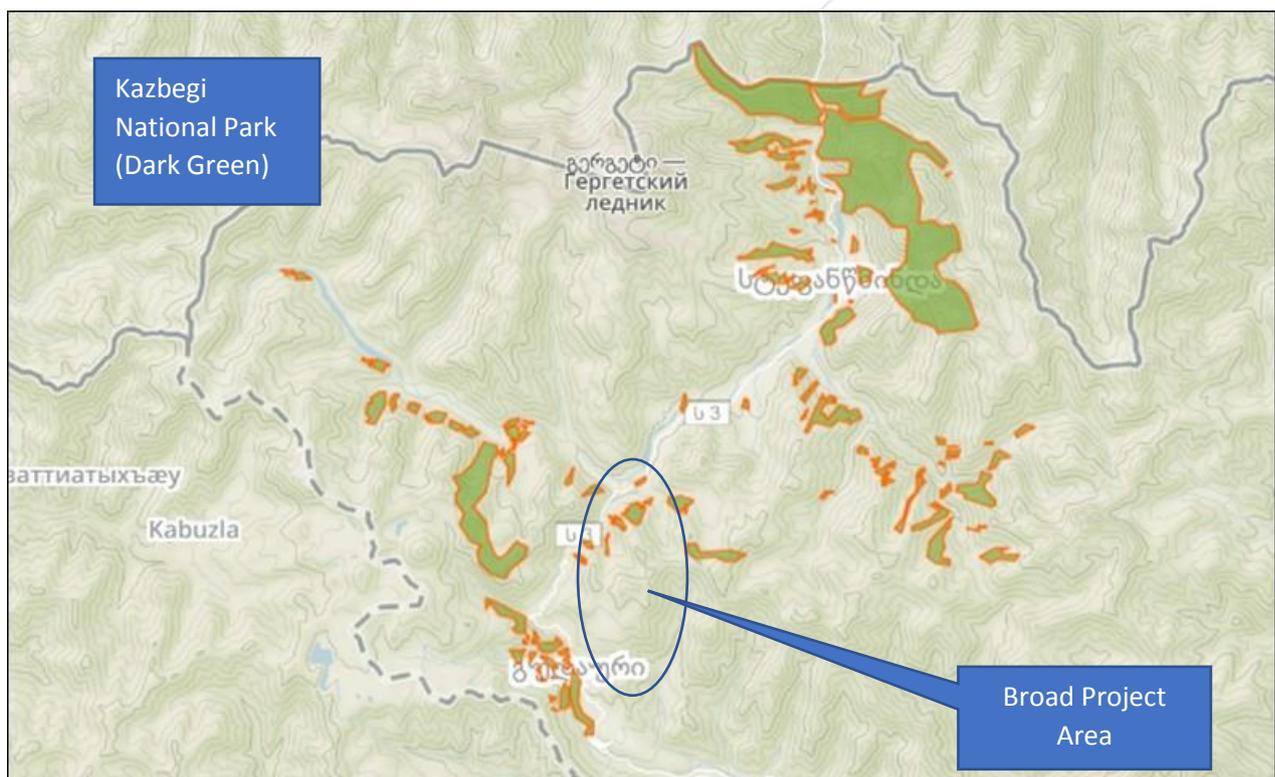
The Kazbegi National Park was designated as a fragmented series of sites as shown in the following diagram (although this has been updated as of January 2019 - see notes at the end of the this section) . Most of the fragments are of forest land on north facing slopes, although the original core area of Park (much further to the north than the proposed scheme) contains a broader assemblage of habitats. Between them the fragments cover some 8,707 hectares in and around the valleys and northern slopes of the Caucasus Mountains. Some

⁶ Emerald Sites are also referred to as Areas of Special Conservation Interest (ASCIs). The ASCI citation for the Kazbegi site can be found at

<http://natura2000.eea.europa.eu/Emerald/SDF.aspx?site=GE0000009&release=2>

3407 ha (mostly the northern core) are considered a **zone of strict environmental protection** and the remainder includes both visitors zones and zones of traditional use. The Park fragments also include a number of sites designated as “natural monuments” for aesthetic as well as ecological value (IUCN Category III equivalent). The sites are administered jointly by the Kazbegi National Park Administration, and the zone of strict protection area itself is considered an IUCN Protected Area Management Category II equivalent.

This delineation of the Kazbegi National Park was not, however, based on a systematic site prioritization process, but is the result of a somewhat erratic history. In 1976, the Dedtoraki and Khde Strict Protected Areas in the north, which had existed since 1946, were joined together to form the Kazbegi Strict Protected Area. This was extended by addition of forested patches, to a total area of 3,481 ha. Further extensions in 1987 resulted in a 8,707 ha in 1987 mosaic of many isolated forest patches with little connectivity between them. In 2007 it was re-designated as a National Park without further changes to its boundaries⁷. Subsequent revisions in 2018 are now looking to consolidate the boundaries, although the Park has no formal citation or management plan yet, and is still being managed by means of provisional regulations. The entire National Park has, however, been included within Georgia’s initial Emerald Site network.



Over 1300 plant species have been recorded from the National Park of which over 25% are endemic, many special alpine or subalpine species. The Park also supports a range of fauna such as East Caucasian tur, chamois and brown bear as well as birds of prey (eg golden eagle, vulture and bearded vulture) Caucasian Black Grouse and Caucasian Snowcock. - see Section 6 of this document). The Park is one of the most visited of Georgia’s protected areas and a new administrative and visitors centre has recently been constructed with the

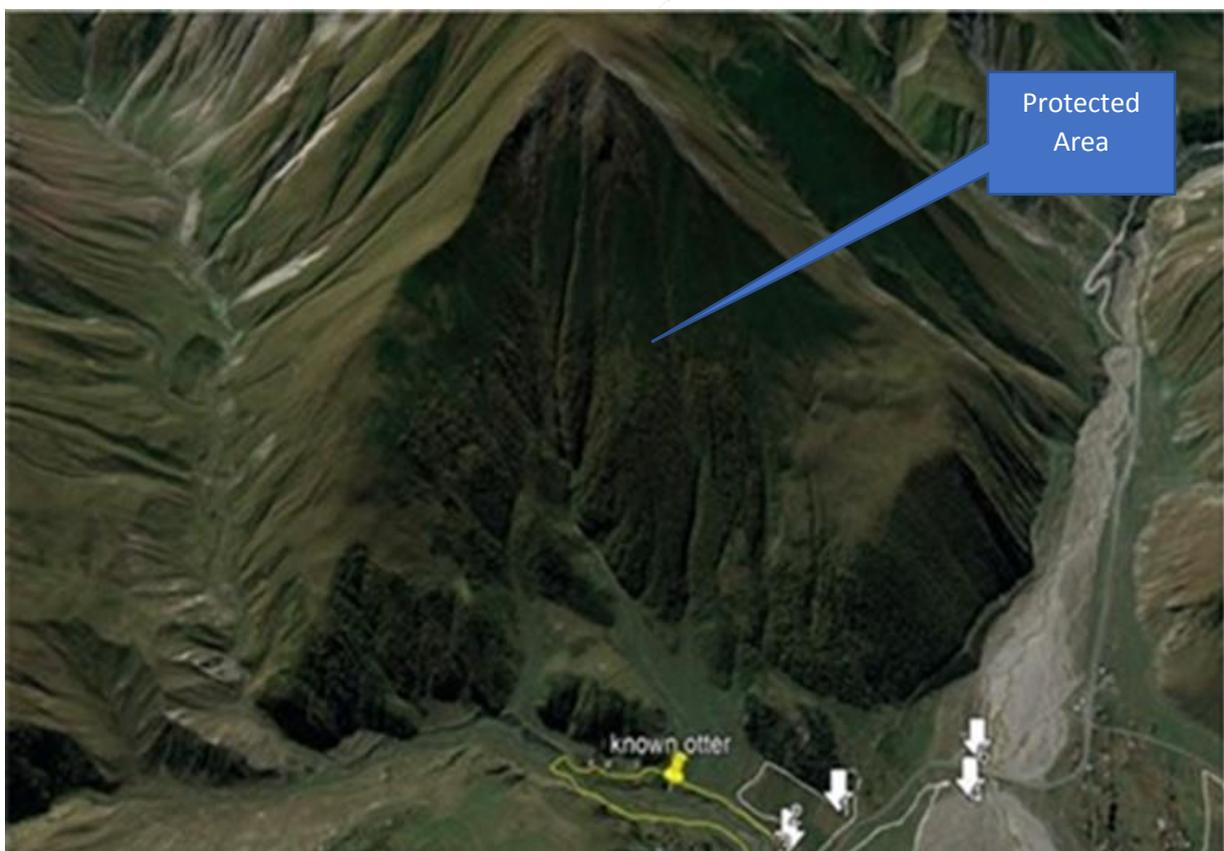
⁷ See Feasibility Study for the Ecoregional Programme III (Georgia), Kazbegi Project <http://tjs-caucasus.org/wp-content/uploads/2013/09/Final-Rep-Feasibility-Study-Kazbegi-Project.pdf>

help of the Caucasus Nature Fund (CNF) and others.



The proposed road scheme runs at a depth of 200m under one fragment of the National Park and rejoins the existing road just before it passes beneath another fragment. These two areas are discussed further below.

Fragment 1: Forested land on the North Face of the “Saddle-back Mountain Ridge”



The north face of the mountain (and the adjacent slopes) is designated for the forestry cover that it supports as shown in the accompanying figures. No particularly rare or vulnerable

Kvesheti – Kobi Road Upgrade Critical Habitat Assessment (CHA)

species or assemblages are reported to be present but forests represent only 4% of the cover of the National Park and are also protected for their role in slope stabilisation. The northern portion of the proposed tunnel passes at a depth of some 200m under this northern face before emerging at the northern portal as shown in the figure below (white shape: designated area).



Fragment 2: West Facing Cliffs below Ukhati and above the Existing Road



These cliffs are used by a number of bird species such as wall creepers, but also for a range of sports activities including rock climbing which increase levels of disturbance. The Potential for the project to impact on these, and other features of the Park, is addressed further below. In addition to the National Park being affected by a lack of data, management plans and resources, these two sites are located very close to the nationally important Gudauri skiing area, as well as the existing road. As a result they suffer from high levels of disturbance, as well as unplanned development and illegal hunting.



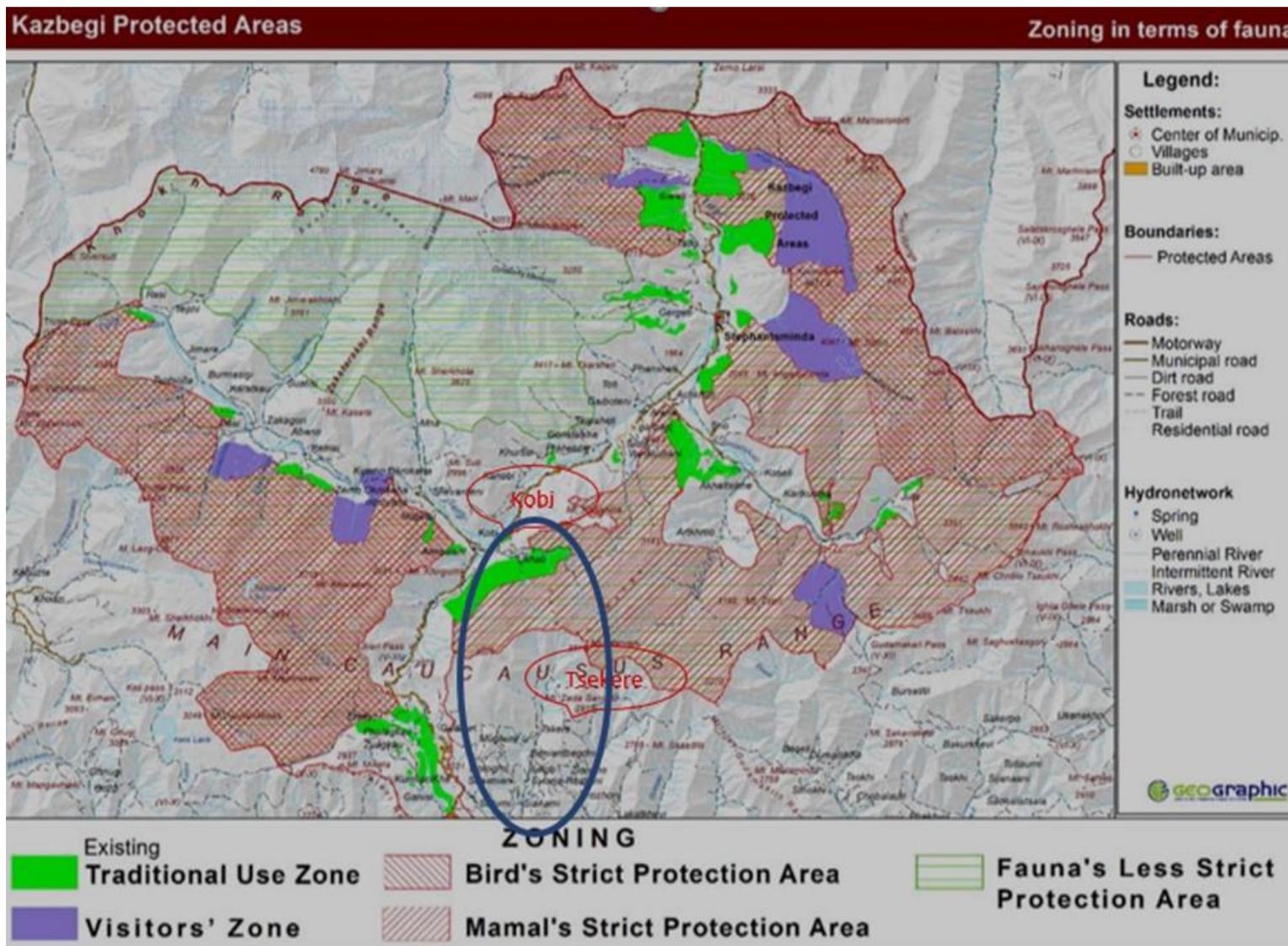
Key:
Nature monuments: (1) Abano mineral lake; (2) Truso travertines; (3) Sakhizari cliff; (4) Keterisi mineral volcano; (5) Jvari pass travertines
 (6) Kazbegi National Park

Park Expansion Programme

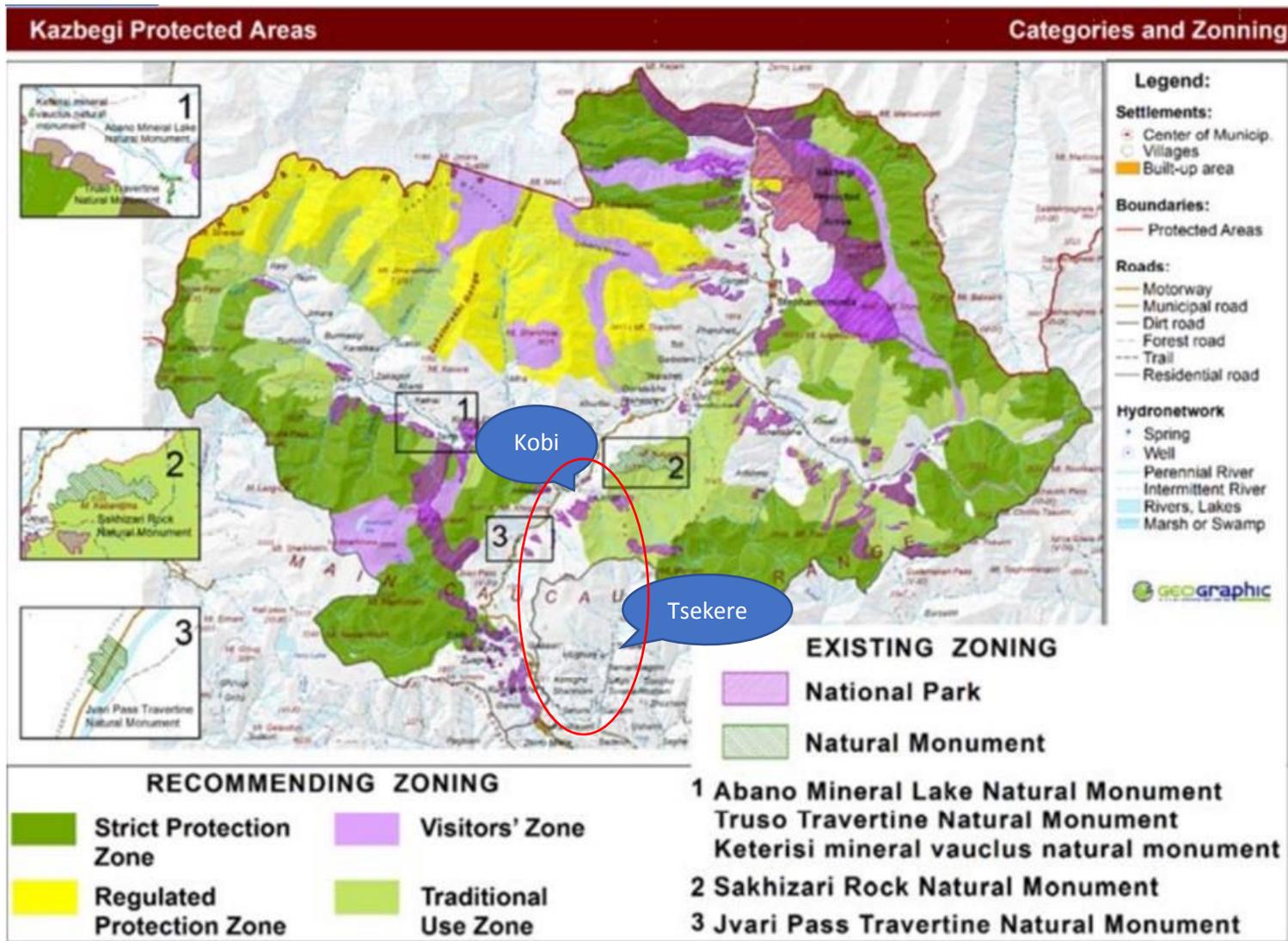
The Government has recently approved an expansion to the Kazbegi National Park boundaries, to include both areas of strict ecological protection and areas of traditional livelihoods. Whilst they may be subsequently revised further, the new boundaries were adopted through a change in the law on the Status of Protected area which was approved on 27.12.2018 and published officially on 03.01.2019. This extends the overall area of the National Park to some 78,204 ha, but excludes the Khada valley. The change does mean that in addition to the fragment of Emerald Site discussed above the tunnel will also pass under a small adjacent area that is also now included in the Park (see figure below).

The proposed expanded Park area is shown on the following pages. Its development has been supported by a range of organisations including the BMZ/KfW “Support Programme for Protected Areas in the Caucasus, Georgia”; the Caucasus Nature Fund (CNF), the UNDP/GEF project on “Catalyzing Financial Sustainability of Georgia’s Protected Areas System” and the EU backed “Strengthening of Management of Protected Areas of Georgia” (TWINNING) project has been helping in the development of protected area management plans.

Initial Proposals for the Expanded National park, showing the Project Area (circled).



Developed Proposals for the Expanded National park, showing the Project Area (circled).



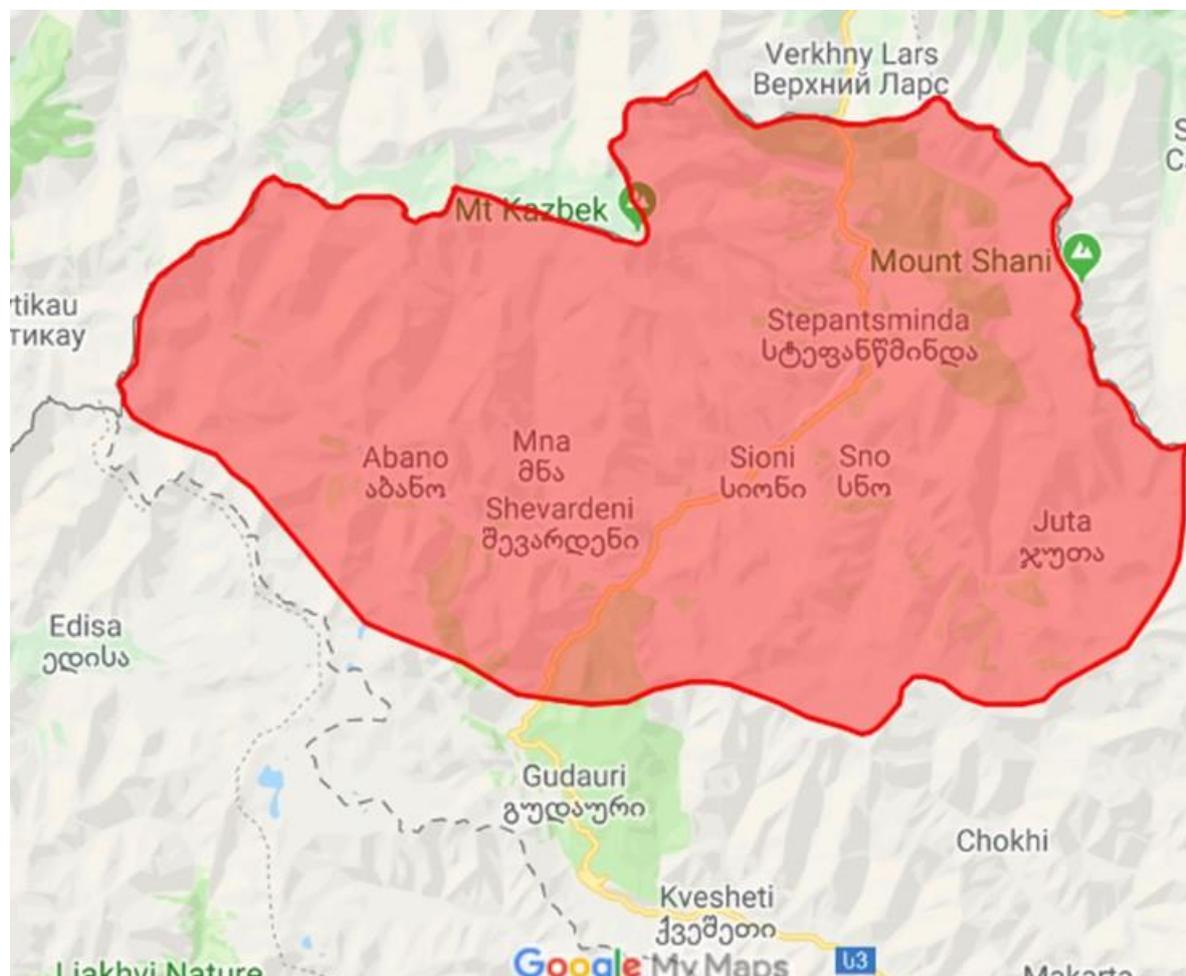
Current Proposals for the Expanded National park, showing the proposed scheme (green = old NP, grey = new)⁸



⁸See <https://matsne.gov.ge/ka/document/view/4440030?publication=0>

4.3 The Khevi SPA (SPA 9)⁹

The proposed¹⁰ SPA is located at an altitude of between 1300-5000 meters and has a proposed Area of some 95,000 ha. It includes most of the Kazbegi IBA (GEO21 – see later) and around 9.46% of the SPA is covered by the existing Kazbegi Protected Areas/National Park. The existing road runs through the middle of the SPA as shown in the diagram below.



The SPA includes forested mountain slopes up to 2000 meters above sea level with Pine (*Pinus Sosnowskyi*), Birches (*Betula litwinowii*, *Betula pendula*), Poplar (*Populus tremula*), Sorb (*Sorbus caucasigena*) and Buckthorn (*Hippophae rhamnoides*). Above 2000 meters, habitats are typically subalpine and alpine meadows and scrublands with Rhododendron (*Rhododendron caucasicum*), Meadow Fescue (*Festuca varia*), Bellflower (*Campanula latifolia*), Mat-grass (*Nardus stricta*), Sosnowsky Hogweed (*Heracleum sosnowskyi*), and Monkshood (*Aconitum nasutum*) amongst others. (Kvachakidze 2010).

The SPA has been designated for the following reasons:

- **IBA criteria B2:** It is considered one of the most important areas in the country for one or more species with an unfavourable conservation status in Europe (SPEC 1. 2 or 3) and for which the site-protection approach is thought to be appropriate

⁹ See <http://aves.biodiversity-georgia.net/spa-n-9>

¹⁰ It is understood that all SPA sites in Georgia are still proposed pending formal approval planned for 2019.

- **IBA criteria C2:** It is an area that is used regularly by 1% or more of the Georgian population of a species listed in Annex I of the Birds Directive (2009/147/EC) in any season
- **IBA criteria C5:** It is an area that comprises a migratory “bottleneck” where over 5000 storks, or over 3000 raptors or 3000 cranes regularly pass on autumn migration

The site citation¹¹ references the following bird species as being of particular conservation importance:

- **Caucasian Grouse** (*Lyrurus mlokosiewiczii*) which has a large breeding population within the SPA (see Gavashelishvili et al. 2010)
- **Bearded vulture** (*Gypaetus barbatus*) which has 2-3 breeding pairs within the SPA
- **Griffon Vulture** (*Gyps fulvus*) which has 15-20 breeding pairs within the SPA
- **Black Vulture** (*Aegypius monachus*) which also has 15-20 pairs within the SPA and is a year-round resident. (Galvez et al. 2005).
- **Güldenstädt's Redstart** (*Phoenicurus erythrogastrus*) and **Great Rosefinch** (*Carpodacus rubicilla*), which have a large breeding population in the SPA
- **Soaring birds** – the area is used by over 30 000 raptors for migration in autumn and spring.

All these species are included on the red list of Georgia as Vulnerable (VU) or in the case of Black Vulture as Endangered (EN). Caucasian Grouse and Black Vulture are also classified on the IUCN red list as Near Threatened (NT).

Criteria B2 Species

With regards to **Criteria B2** the following SPEC 1 (species of **Global** Conservation concern):and SPEC 3 (species of **European** conservation concern, not concentrated in Europe) species are referred to in the citation. No SPEC 2 (species of **European** conservation concern concentrated in Europe) species are referenced:

Scientific name	English name	European population status	Global Red List Category	Georgian Population size	Units	European population %	Population trend since 2000	Direction	Magnitude %
SPEC 1: SPECIES OF GLOBAL CONSERVATION CONCERN									
<i>Aegypius monachus</i>	Cinereous or Black Vulture	Rare	NT	9-30	Pairs	<1%	Stable		0
<i>Gypaetus barbatus</i>	Bearded Vulture	VU	NT	19-22	Pairs	3%	Stable		0
<i>Lyrurus mlokosiewiczii</i>	Caucasian Grouse	NT	NT	7,551-15,759	Males	64%	Unknown		Unknown
SPEC 3: SPECIES OF EUROPEAN CONSERVATION CONCERN NOT CONCENTRATED IN EUROPE									
<i>Carpodacus rubicilla</i>	Great Rosefinch	Rare	LC	Present	Pairs	Unknown	Unknown		Unknown
<i>Phoenicurus erythrogastrus</i>	White-winged Redstart	Rare	LC	Present	Pairs	Unknown	Unknown		Unknown

In addition, whilst designated as GRL: VU, the Griffon Vulture (*Gyps fulvus*) is not included in either schedules 1,2 or 3 of the Species of European Concern. There are now some 32,400-

¹¹ See <http://aves.biodiversity-georgia.net/spa-n-9>

34,400 pairs recorded in Europe and the population appears to be increasing¹². A number of other SPEC 1, 2 or 3 species have also been recorded within the SPA, but they are not included within the SPA citation as the area is not considered one of the most important areas in the country for them. These are discussed further under the critical habitat assessment and include the following:

SPEC	Definition	Non-citation species present
1	SPECIES OF GLOBAL CONSERVATION CONCERN:	Falco cherrug (Saker Falcon); Neophron percnopterus (Egyptian Vulture); Streptopelia turtur (European Turtle-dove)
2	SPECIES OF EUROPEAN CONSERVATION CONCERN CONCENTRATED IN EUROPE	Crex crex (Corncrake); Tetraogallus caucasicus (Caucasian Snowcock)
3	SPECIES OF EUROPEAN CONSERVATION CONCERN NOT CONCENTRATED IN EUROPE	Falco naumanni (Lesser Kestrel); Milvus migrans (Black Kite)

Criteria C2 Species

With regard to **IBA criteria C2**: (an area used regularly by 1% or more of the Georgian population of a Birds Directive Annex I species), the following are considered to qualify as trigger species for this criteria:

- **Black Vulture *Aegypius monachus***: Normally breeds colonially on trees, mainly in evergreen oaks *Quercus* in mountainous areas at 300-1,400 m. Resident. Habitat loss and alteration is a significant threat. Disturbance of nest-sites, predominantly through forest exploitation such as the creation of forest tracks or clearance of woodland is another serious problem, which can result in breeding failure. Resident in Europe with about 1,000 pairs in total (and a Georgian population of up to 35 pairs of which over half are expected to be in the SPA).
- **Bearded Vulture, *Gypaetus barbatus***. Inhabits mountainous areas. Nests are placed in small caves or on cliff ledges. An important food source is bone marrow, which it gets at by drooping large bones from the air on to hard rock surfaces so that the bone shatters. Resident. The Lammergeier is a very rare European species. In the EU the numbers of breeding pairs are not over 90 pairs. Today, the main threats are habitat alterations related to the opening of new roads and tracks, and human disturbance caused by tourist, hunters, climbers, parachutists and photographers. Resident in Europe with 80-100 pairs in total (and a Georgian population of 19-22 pairs, of which 2-3 are within the SPA).

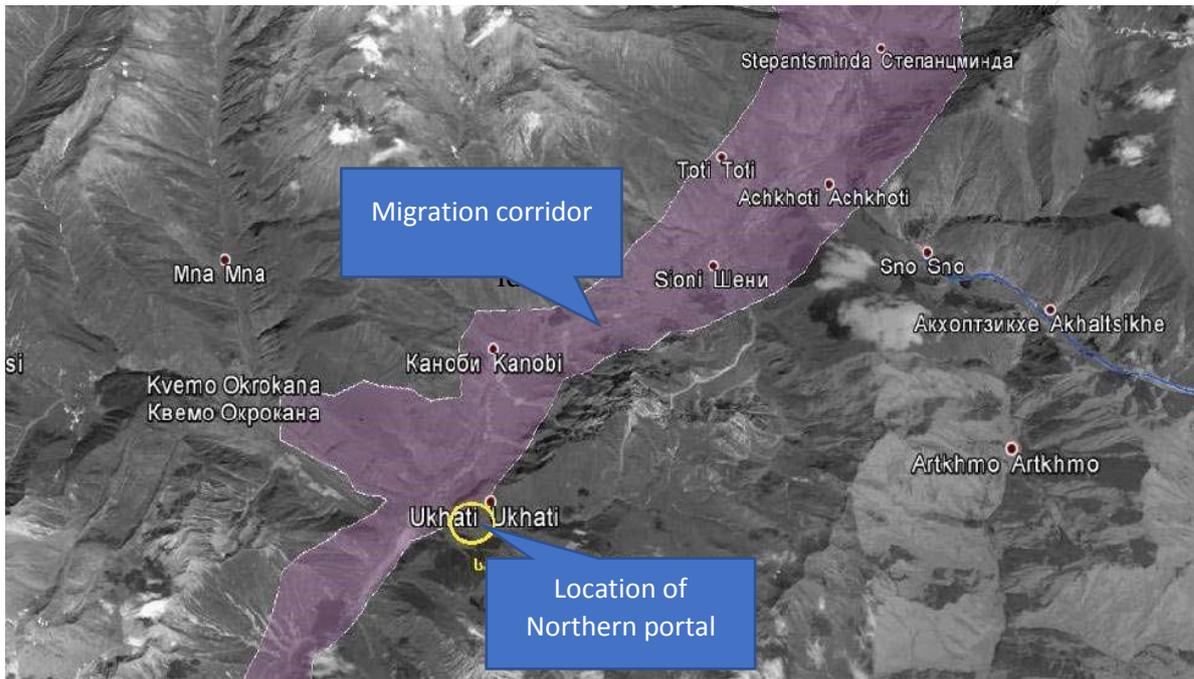
In addition, whilst the following species are listed in Annex I of the Birds Directive, they are not included in the site citation and the area is not considered to regularly support 1% or more of the Georgian population in any season:

- | | |
|-----------------------|--------------------------------|
| • Egyptian Vulture | <i>Neophron percnopterus</i> . |
| • Griffon Vulture | <i>Gyps fulvus</i> |
| • Golden Eagle | <i>Aquila chrysaetos</i> |
| • Long-legged Buzzard | <i>Buteo rufinus</i> |
| • Corncrake | <i>Crex crex</i> |

¹²https://www.birdlife.org/sites/default/files/attachments/European%20Birds%20of%20Conservation%20Concern_Low.pdf

Criteria C5

With regards to **IBA criteria C5**: the IBA includes an area that is considered a migratory “bottleneck” where over 3000 raptors regularly pass on autumn migration. Whilst the proposed Project Area itself is not seen as a major migration route (see Supplementary Ecological Surveys, ESIA Appendix H) the Tergi river valley which passes the Northern Portal is used by both raptors and passerines during migration, with wetlands and areas of woodland along the route used by resting birds during passage times. The site is listed in table 3 of the “Memorandum of Understanding on the Conservation of **Migratory Birds of Prey** in Africa and Eurasia”.



Migration corridor

The proposed Project overlap with the Khevi SPA is shown in the Figure below:



4.4 Likely Significant Effects Screening

As outlined above the key elements to be included in the screening assessment are as follows:

Kazbegi Emerald Site: Forested land on the northern face of the Saddleback Ridge and cliffs located below Ukhati¹³

Khevi SPA: species shown in the table below.

Species	IBA Trigger	SPA criteria B2	criteria C2	criteria C5
Cinereous Vulture	No	SPEC 1	Yes	N/A
Bearded Vulture	No	SPEC 1	Yes	N/A
Caucasian Grouse	Yes	SPEC 1	No	N/A
Great Rosefinch	No	SPEC 3	No	N/A
White-winged Redstart	No	SPEC 3	No	N/A
Migrating Raptors	N/A	N/A	N/A	Yes

Whilst Corncrake is not an SPA trigger species, it is an IBA trigger species. Particular attention has therefore been paid to it in the Critical Habitat Assessment reported later.

The next stage of the screening process is to understand if the project is likely to have any significant effects on any of these features. Full details of expected project impacts, proposed mitigation and residual impacts are provided in the Project ESIA, but with regards to the above triggers the following are noted:

Designation	Trigger	Likely	Significant Residual Impact?
Emerald Site	Forested Land	This site is not designated specifically for its fauna conservation potential, rather its forestry value. It will not be directly affected by landtake as the tunnel will pass underneath it. Any disturbance during construction works, will be temporary. The existing road already runs alongside the location of the proposed northern portal (which is itself some distance from the designated area) so no operational effects are expected. No significant residual impacts on the designated value are expected.	No
Emerald Site	Ukhati Cliffs	The cliffs beneath Ukhati are located above and adjacent to the existing road, as well as some distance from the proposed northern portal. They will not suffer any landtake as a result of the project and any disturbance during construction will be short-term. Operational impacts are not expected to change significantly from the current position. Large areas of the cliffs are used by	No

¹³ Note that whilst a large number of species are listed in the overall ASCI citation, the vast majority of these are associated with the National Park fragments to the north, not the single fragment that the project passes under.

		sport climbers which affects their conservation potential. Significant residual impacts are considered unlikely.	
SPA	Black Vulture	Black vulture breeding grounds are not located close to the proposed Project Aol and the area is also not considered particularly important for feeding. No significant residual impacts are expected to this species (see also CHA/PBF assessment).	No
SPA	Bearded Vulture	Bearded vulture breeding grounds are not located close to the proposed Project Aol and the area is also not considered particularly important for feeding. No significant residual impacts are expected to this species (see also CHA/PBF assessment).	No
SPA	Caucasian Grouse	Main grouse breeding grounds are not located close to the proposed Project Aol and the area is also not considered particularly important for feeding. Significant residual impacts are considered unlikely. This species is also discussed further in the CHA/PBF assessment.	Unlikely
SPA	Great Rosefinch	This species spends the summers at altitude but over-winters in areas of seabuckthorn in the river valleys. No specific areas of seabuckthorn are located within the Project Aol as most are present further north (near Stepasminda). Significant residual impacts are considered unlikely. This species is also discussed further in the CHA/PBF assessment.	Unlikely
SPA	White-winged Redstart	This species spends the summers at altitude but over-winters in areas of seabuckthorn in the river valleys. No specific areas of seabuckthorn are located within the Project Aol as most are present further north (near Stepasminda). Significant residual impacts are considered unlikely. This species is also discussed further in the CHA/PBF assessment.	Unlikely
SPA	Migrating Raptors	The main migration route follows the existing road, and the removal of traffic from that road may even have a minor positive impact for migrating species. Any disturbance to areas near the northern portal is expected to be temporary. Significant residual impacts are considered unlikely. This issue is also discussed further in the CHA/PBF assessment.	Unlikely

Based on the Screening above, the Project is considered unlikely to have a significant effect on the Kazbegi Emerald Sites or the Khevi SPA qualifying interests and as such no further analysis is proposed on this specific issue. However, taking a precautionary approach, surveys in the Spring of 2019 will be carried out to understand if any additional mitigation measures are required.

The development of the road could, however, increase access to, and exacerbate cumulative impacts on, the broader Kazbegi landscape. As with many other parts of the Caucasus, this is already under pressure from hunting, an unregulated livestock industry, habitat destruction for development and economic pressures following the collapse of the Soviet Union. Conservation objectives have been further complicated by a lack of effective tools for data collection, storage and analysis. The project EIA and BAP therefore include a number of actions to help support overall conservation objectives within this mixed landscape setting.

4.5 The CHA Process for Legally Protected Areas and Internationally Recognised Areas

In addition to the AA discussed above, internationally recognized areas of high biodiversity value often support areas of critical habitat (IFC PS6 GN53) or Priority Biodiversity Features. This is particularly so for areas that meet the criteria of **IUCN’s Protected Area Management categories Ia, Ib and II** and is also the case for the **majority** of Key Biodiversity Areas (**KBAs**) (and associated Important and Biodiversity Bird Areas - IBAs).

EBRD PR6 and similar safeguards such as those of ADB also recognises that *“Where the project occurs **within** or has the potential to adversely affect an area that is protected through legal or other effective means, and/or is internationally recognised,¹³ or proposed for such status by national governments, the client **must identify and assess potential project-related impacts and apply the mitigation hierarchy so that impacts from the project will not compromise the integrity, conservation objectives and/or biodiversity importance of such an area.**”* (PR6 para 19). Footnotes to the paragraph highlight that i) the PR is guided by the IUCN definition of “Protected Area” and ii) that sites identified under international conventions or agreements, include, but are not limited to, UNESCO Natural World Heritage Sites, UNESCO Man-and-Biosphere Reserves and the Ramsar List of Wetlands of International Importance

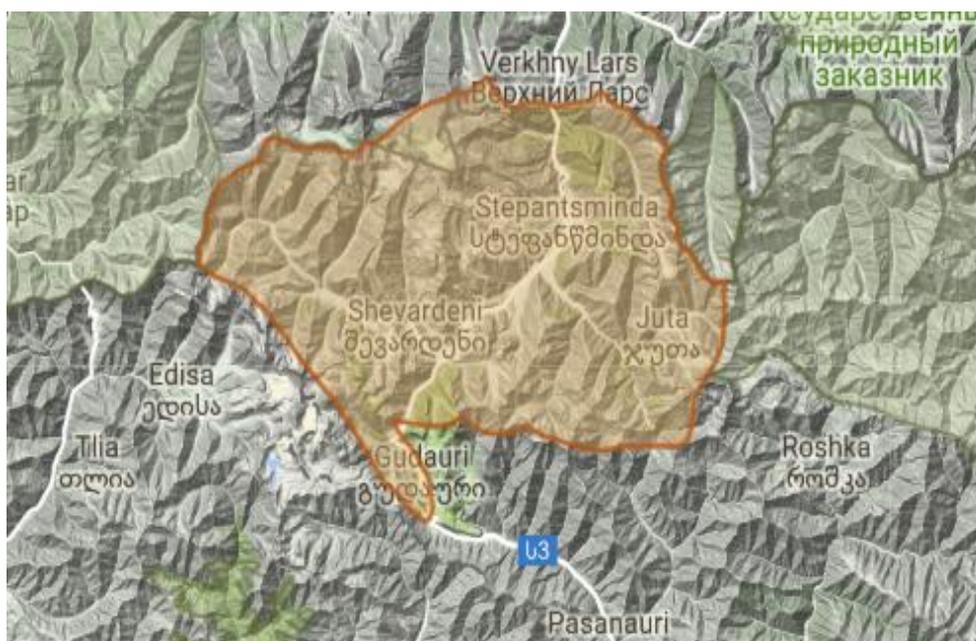
In addition to the National Park and SPA, Lot 1 of the Project (the tunnel and northern portal) also overlaps with the internationally recognised **Kazbegi KBA and IBA**, described in more detail below. Whilst these designations themselves have not been assumed to automatically mean that CH or PBF is present they are considered to have greater **potential to contain areas of CH or PBF** and have therefore been subject to particular scrutiny during the CH/PBF assessment in line with the guidance outlined in EBRD PR6 Section 4.5. If the project has the potential to adversely impact “priority biodiversity features and/or critical habitat **within such legally protected areas or internationally recognised areas of biodiversity value**” the client should both i) seek to avoid such impacts in accordance with the relevant paragraphs of PR6 relating to PBF and CH and ii):

- *“demonstrate that any proposed development is legally permitted, which may have entailed that a specific assessment of the project related impacts on the protected area has been carried out as required under applicable law*
- *act in a manner consistent with any government recognised management plans for such areas*
- *consult protected area managers, relevant authorities, local communities and other stakeholders on the proposed project in accordance with PR 10*
- *implement additional programmes, as appropriate, to promote and enhance the conservation objectives of the protected area”.*

4.6 Consideration of CH / PBF for the Designated and Recognised Sites

As well as the EU designated sites discussed under the AA, there are two internationally recognised areas of conservation importance co-located with the Project Aol, which also have the potential to support areas of CH or PBF. These are the **Kazbegi Key Biodiversity Area (KBA)** and the **Kazbegi Important Bird and Biodiversity Area (IBA)**. Both areas have the same boundaries (and contain the Khevi SPA) as shown below, although the reasons for their designation differ.

The Kazbegi KBA and IBA (see figure below for project location)



The Kazbegi Key Biodiversity Area

Key Biodiversity Areas (KBAs) are sites of potentially global conservation significance. Whilst they do not have uniformly high conservation value, they can contain high value areas that are best managed as part of a larger integrated landscape. They are usually mapped by national conservation organizations, but usually require additional national-level mechanisms to legally protect them. The proposed Kazbegi KBA has been nominated for the following trigger species and important habitats:

Feature	Details
Birds	<ul style="list-style-type: none"> • Caucasian Blackgrouse (<i>Tetrao mlokosiewiczii</i>); • Caucasian snowcock (<i>Tetraogallus caucasicus</i>); • Great rosefinch (<i>Carpodacus rubicilla</i>); • Gldenstdt's Redstart (<i>Phoenicurus erythrogaster</i>); • Corncrake (<i>Crex crex</i>)
Large Mammals	<ul style="list-style-type: none"> • Eastern Caucasian Tur (<i>Capra cylindricornis</i>); • Caucasian Chamois (<i>Rupicapra rupicapra</i>); • Brown Bear (<i>Ursus arctos</i>);
Small Mammals	<ul style="list-style-type: none"> • Long-clawed mole (<i>Prometheomys schaposchnikowi</i>); • Kazbegi Birch Mouse (<i>Sicista kazbegica</i>).
Cliff Habitats used for breeding by:	<ul style="list-style-type: none"> • Bearded Vulture (<i>Gypaetus barbatus</i>– nationally vulnerable), • Griffon Vulture (<i>Gyps fulvus</i>– nationally vulnerable),

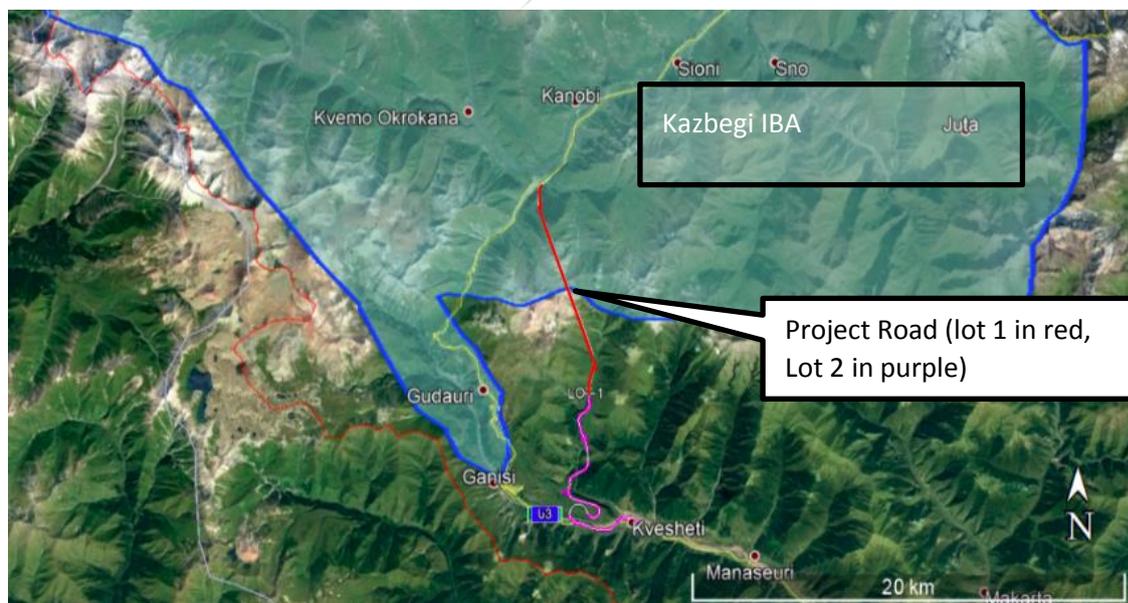
	<ul style="list-style-type: none"> • Egyptian Vulture (<i>Neophron percnopterus</i>– globally endangered), • Golden Eagle (<i>Aquila chrysaetos</i> – nationally vulnerable).
Riparian forest	Dominated by Seabuckthorn (<i>Hippophae rhamnoides</i>) on the River Tergi. This provides food and cover for many passerines and small mammals, and is the only wintering habitat for Great Rosefinch (<i>Carpodacus rubicilla</i>) and Gldenstdt's Redstart (<i>Phoenicurus erythrogaster</i>), as well as a major stronghold of Corncrake (<i>Crex crex</i>) and providing cover for Otter (<i>Lutra lutra</i>).
Mountain Forest	Areas of forests that grow on slopes dominated by birch (<i>Betula litwinowii</i>), juniper (<i>Juniperus spp</i>) and pine (<i>Pinus cochiana</i>) trees. Forest cover in Kazbegi District is very low (4% of the district) but it can support a high diversity of species (including endemics) as well as providing protection from landslides, avalanches, flash floods and sediment load.

The Khazbegi IBA

Important Bird and Biodiversity Areas (IBAs) are part of the KBA “umbrella” designation identified exclusively for bird conservation reasons and based on a set of internationally agreed, standardized criteria. They are identified by national stakeholders and/or Birdlife International. They are also used as the basis for designation of “Special Protected Areas” under the EU Birds Directive. The 95,000 ha Kazbegi IBA¹⁴ (GEO21) includes the Kazbegi National Park and has been designated for supporting:

- >20 breeding pairs of Caucasian Black Grouse (*Lyrurus mlokosiewiczii*)
- >20 calling males of Corncrake (*Crex crex*)

As with the KBA, the site is also designated for its breeding birds of prey and wintering populations of Great Rosefinch and Gldenstdt's Redstart. The overlap of the existing and proposed road with the KBA/IBA sites is shown below.



14 see <https://sabuko.ge/iba/>, <http://datazone.birdlife.org/site/factsheet/kazbegi-iba-georgia>

Potential for CH/PBF

Whilst the Project has been designed to **avoid** potential impacts to the KBA, IBA, National Park and Emerald Sites, to the extent practical, the nature of these sites means that they have a high potential to support species and habitats that represent either CH or PBF.

These include the following habitats or species:

Habitats

- Protected Areas: Forested Land
- Protected Areas: Cliff Habitats
- Riparian forest (including seabuckthorn)
- Mountain Forest (including priority habitats)

Species

- Caucasian Black Grouse (*Tetrao mlokosiewiczzi*);
- Caucasian snowcock (*Tetraogallus caucasicus*);
- Great rosefinch (*Carpodacus rubicilla*);
- Güldenstädt's Redstart (*Phoenicurus erythrogaster*);
- Corncrake (*Crex crex*)
- Eastern Caucasian Tur (*Capra cylindricornis*);
- Caucasian Chamois (*Rupicapra rupicapra*);
- Brown Bear (*Ursus arctos*);
- Long-clawed mole (*Prometheomys schaposchnikowi*);
- Kazbegi Birch Mouse (*Sicista kazbegica*).
- Bearded Vulture (*Gypaetus barbatus*),
- Black vulture (*Aegypius monachus*)
- Griffon Vulture (*Gyps fulvus*),
- Egyptian Vulture (*Neophron percnopterus*),
- Golden Eagle (*Aquila chrysaetos*).

Other

- Migrating Raptor flyways

These are discussed further under the critical habitat assessment in the following sections.

5 THE CH/PBF ASSESSMENT PROCESS

5.1 Definition of Critical Habitat

Critical Habitat (CH) is considered to be the most significant and highest priority areas of the planet for biodiversity conservation. It takes into account both global and national priority setting systems and builds on the conservation biology principles of 'vulnerability' (degree of threat) and 'irreplaceability' (rarity or uniqueness). There is no universally accepted or automatic formula for making determinations on critical habitat and the involvement of external experts and project specific assessments is of utmost importance, especially when data are limited (IFC PS6 Guidance Note 2018).

Critical Habitat is defined by the EBRD (PR6 para 14) as “**the most sensitive biodiversity features**” that typically comprises of one or more of the following:

- (i) highly threatened or unique ecosystems;
- (ii) habitats of significant importance to “endangered” or critically endangered species;
- (iii) habitats of significant importance to endemic or geographically restricted species;
- (iv) habitats supporting globally significant migratory or congregatory species;
- (iv) areas associated with key evolutionary processes; or
- (v) ecological functions that are vital to maintaining the viability of biodiversity features described in this paragraph.”

A similar approach is used by the ADB and the IFC in Performance Standard (PS) 6 paragraph 16 which states that “Critical habitats are areas with **high** biodiversity value, including¹⁵.”

- (i) habitat of significant importance to Critically Endangered and/or Endangered species;
- (ii) habitat of significant importance to endemic and/or restricted-range species;
- (iii) habitat supporting globally significant concentrations of migratory species and/or congregatory species;
- (iv) highly threatened and/or unique ecosystems; and/or
- (v) areas associated with key evolutionary processes

Areas which have been legally protected for their conservation value, or are recognised internationally for their conservation value, are also likely to trigger critical habitat and/or Priority Biodiversity features, as discussed further in Section 6. This is specifically recognised in the IFC Guidance to PS6.

Both EBRD and IFC then go on to say that Critical habitat must not be further fragmented, converted or degraded to the extent that its ecological integrity or biodiversity importance is

¹⁵ IFC Guidance Note 6 (IFC, 2012b) also recognises that Critical Habitat **may** include Legally Protected Areas in IUCN Categories I-II; and Internationally Recognised Areas, as described previously.

compromised. Consequently, in areas of critical habitat, the client will **not implement any project activities** unless it can be demonstrated that:

- the project does not lead to measurable adverse impacts on **those biodiversity features for which the critical habitat was designated**
- the project is designed to deliver **net gains for critical habitat impacted by the project**
- the project is not anticipated to lead to a net reduction in the population of any endangered or critically endangered species, over a reasonable time period
- a robust and appropriately designed, **longterm biodiversity monitoring and evaluation programme** aimed at assessing the status of critical habitat is integrated into the client's adaptive management programme.

Critical habitat is generally determined using quantitative thresholds of biodiversity priority based on precedents such as IUCN Red List (IUCN, 2012) criteria and Key Biodiversity Area (KBA) thresholds.

5.2 Definition of Priority Biodiversity Features

EBRD PR6 also uses these concepts of vulnerability and irreplaceability to define areas that, whilst not as globally important as Critical Habitat, are still of significant ecological importance often at a regional level. Such areas are referred under the EBRD PR6 Guidance as **Priority Biodiversity Features (PBF)** and as such are given more consideration than the “Natural Habitat” definition used within PS6. Priority Biodiversity Features are defined in EBRD PR6 paragraph 12 as “a subset of biodiversity that is particularly irreplaceable or vulnerable, but at a lower priority level than critical habitats”. They may include areas that contain

- (i)Threatened habitats
- (ii)Vulnerable species
- (iii)Significant biodiversity features identified by a broad set of stakeholders or governments
- iv) Ecological structure and functions needed to maintain the viability of priority biodiversity features.

A comparison of CH and PBF criteria is provided below. Where a project could have **significant, adverse and irreversible** impacts to priority biodiversity features, it should only go ahead if appropriate mitigation measures are put in place, in accordance with the mitigation hierarchy, **to ensure no net loss** and preferably a net gain of priority biodiversity features over the long term, to achieve measurable conservation outcomes.

Critical Habitat and Priority Biodiversity Features should always be considered when evaluating a project. Their presence does not, however, prevent a project from going ahead *per se*. Instead, whilst they should be considered throughout project design and delivery, they are of greatest importance if the project is expected to have a **residual significant impact** on the habitat or species for which the CH or PBF has been designated.

Comparison of EBRD CH and PBF Criteria (after Table 2 of the EBRD PR6 Guidance Note)

Critical habitat trigger as per EBRD PR6 (2014)	Priority biodiversity features trigger as per EBRD PR6 (2014)
<p>(i) Highly threatened or unique ecosystems. Ecosystems that are at risk of significantly decreasing in area or quality; have a small spatial extent; and/or contain concentrations of biome restricted species. For example: i) Ecosystems listed as, or meeting criteria for, Endangered or Critically Endangered by the IUCN Red List of Ecosystems ii) Areas recognised as priorities in official regional or national plans, such as National Biodiversity Strategy and Action Plans iii) Areas determined to be of high priority/significance based on systematic conservation planning carried out by government bodies, recognised academic institutions and/or other relevant qualified organisations (including internationally-recognised NGOs).</p>	<p>(i)Threatened habitats Habitats considered under pressure by national, regional or international assessments. These include natural and priority habitats identified under the EU Habitats Directive (Annex I).</p>
<p>(ii)Habitats of significant importance to endangered or critically endangered species Areas supporting species at high risk of extinction (Critically Endangered or Endangered) on the IUCN Red List of Threatened species (or equivalent national/regional systems). For example: Alliance for Zero Extinction sites; Animal and plant species of community interest in need of strict protection as listed in EU Habitats Directive (Annex IV).</p>	<p>(ii)Vulnerable species Species listed by the International Union for Conservation of Nature (IUCN) or any other national/regional lists (such as national Red Lists) as Vulnerable (VU) or equivalent. These include animal and plant species of community interest identified under the EU Habitats Directive (Annex II).</p>
<p>(iii)Habitats of significant importance to endemic or geographically restricted species. Areas holding a significant proportion of the global range or population of species qualifying as restricted-range under Birdlife or IUCN criteria. For example: Alliance for Zero Extinction sites or Global-level Key Biodiversity Areas and Important Bird and Biodiversity Areas identified for restricted-range species.</p>	<p>(iii)Significant biodiversity features identified by a broad set of stakeholders or governments: Eg. Key Biodiversity Areas and Important Bird and Biodiversity Areas; nationally and internationally important species or sites for conservation of biodiversity; many areas meeting natural habitat definitions of other international financial institutions.</p>
<p>(iv) Habitats supporting globally significant (concentrations of) migratory or congregatory species Areas that support a significant proportion of a species' population, where that species cyclically and predictably moves from one geographical area to another (including within the same ecosystem), or areas that support large groups of a species' population that gather on a cyclical or otherwise regular and/or predictable basis. For example Global-level Key Biodiversity Areas and Important Bird and Biodiversity Areas identified for congregatory species Wetlands of International Importance designated under criteria 5 or 6 of the Ramsar Convention.</p>	<p>No Equivalent</p>
<p>(v) Areas associated with key evolutionary processes Areas with landscape features that might be associated with particular evolutionary processes or populations of species that are especially distinct and may be of special conservation concern given their distinct evolutionary history. For example Isolated lakes or mountaintops or Populations of species listed as priorities by the Edge of Existence programme.</p>	<p>No Equivalent</p>
<p>(vi) Ecological functions that are vital to maintaining the viability of biodiversity features described (as critical habitat features) Ecological functions without which critical biodiversity features could not persist. For example Where essential for critical biodiversity features, riparian zones and rivers, dispersal or migration corridors, hydrological regimes, seasonal refuges or food sources, keystone or habitat-forming species.</p>	<p>(iv) Ecological structure and functions needed to maintain the viability of priority biodiversity features. Where essential for priority biodiversity features, riparian zones and rivers, dispersal or migration corridors, hydrological regimes, seasonal refuges or food sources, keystone or habitat-forming species.</p>

5.3 The Critical Habitat Assessment Process.

Critical Habitat and Priority Biodiversity Feature Assessment (referred to here as CHA) is a process to identify those areas of highest biodiversity value which are considered particularly sensitive to impacts and where special attention must be paid. **The project type, impacts and proposed mitigation are not considered relevant in the identification of CH/PBF and both natural and modified habitats may contain areas that could qualify as critical habitat (CH).**

The CHA process commences with initial Project screening and scoping to identify potential CH trigger habitats or species present within the project “Aol”. If such triggers are present the following process should then be followed (as per IFC and EBRD guidance):

1. **Determine trigger features** for which the analysis is to be undertaken.
2. **Define the area of analysis** (or Designated Management Unit – see below) to be used for the assessment. The extent of this area will depend on the biodiversity features of interest and the ecological functions required to maintain them. Different triggers may require different areas of analysis.
3. **Undertake stakeholder consultation and desktop review** of available data (including that obtained during screening) to understand the biodiversity within the landscape from the perspective of all relevant stakeholders.
4. **Verify available information** within the area, to the extent practical, including by in-field data collection and via engagement of qualified specialists.
5. **Confirm biodiversity triggers** likely to meet critical habitat criteria, as defined by PR6/PS6 and based on the importance of the study area(s) to each biodiversity feature (see detailed information on trigger thresholds below).
6. **Determine critical habitat/PBF status** (of each area of analysis) based on analysis of all collected data.

Following this analysis, the potential for the project to affect any CH/PBF features must then be assessed and requirements for changes in project design and/or specific species or habitat action plans determined

5.4 Screening for CH/PBF

For the current Project the potential to trigger CH or PBF was initially considered based on initial consultations and desk-based study as reported in the Project ESIA. The initial study area used covered a **50km radius** around the proposed footprint of the road and included use of the IBAT¹⁶ tool to screen for biodiversity features that could trigger CH and PBF. This initial desk work was then followed up with a combination of further studies, field work (see Appendix H of the ESIA) and consultation with national biodiversity experts (as well as the Agency for Protected Areas) to determine which CH and/or PBF “trigger” species or habitats were likely to be affected in any way by the proposed project.

The following potential CH/PBF triggers were considered for further analysis:

- Designated sites and other nature conservation areas of recognised importance nationally or internationally. These were both subject to Appropriate Assessment

¹⁶ Integrated Biodiversity Assessment Tool – see www.ibat-alliance.org

(see Section 6) and the ecological features and species that they support (both designation criteria and others) were also subject to CHA.

- Species and habitats of global, national and/or regional conservation importance including nationally rare, restricted-range and threatened species, globally Critically Endangered or Endangered species (IUCN Red List)
- Species included within Annex II and IV of the EU Habitats Directive and Annex I of the Birds Directive.
- Other species based on feedback provided by local and international biodiversity experts during the ESIA.

5.5 Determination of Project DMUs

Critical Habitat and Priority Biodiversity Features exist regardless of a project. They are not defined by the project footprint, its Area of Influence, or its potential impacts.

The Project Area of Influence (AoI) has been defined as the area in and around the project footprint where the project may have a direct or indirect impact (positive or negative) on the social and environmental conditions already present (see Project EIA). In some instances different AoIs have been used for different social and environmental parameters, and for many mobile faunal species the AoI tends to be a smaller area than that used for the Critical Habitat Assessment as described further below.

Instead, the CHA process refers to areas “*within which the biological communities and/or management issues have more in common with each other than they do with those in adjacent areas*” (IFC PS6 2012 GN6, paragraph 65).

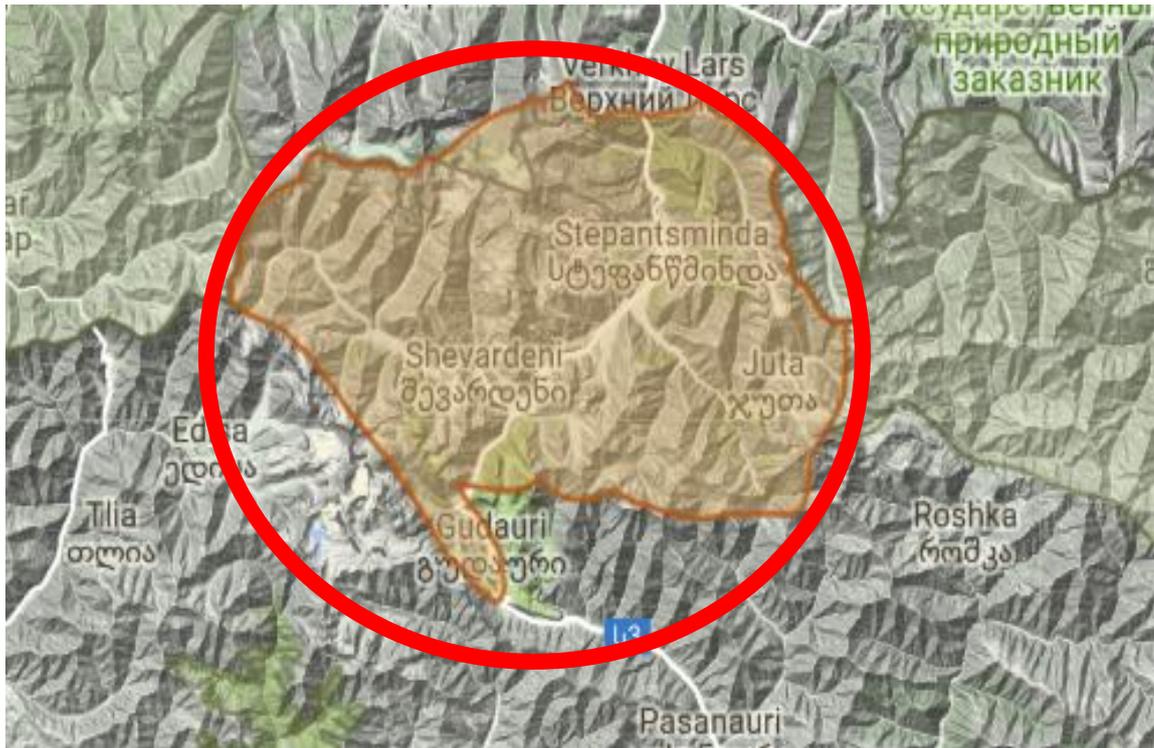
These areas, referred to as Discrete Management Units (DMUs)¹⁷ typically vary depending on the species or biodiversity feature of concern. Thus, whilst a small, rare ecosystem may be an appropriate DMU for a locally endemic plant species it would not be appropriate for a wide-ranging fauna species.

¹⁷ This has been updated in the IFC 2018 Guidance as “**ecologically appropriate areas of analysis**” (EcAoA) as follows. The DMU process has been retained for this project, but the outcomes are considered the same.

*GN58. The project should identify an **ecologically appropriate area of analysis** to determine the presence of critical habitat **for each species with regular occurrence in the project’s area of influence, or ecosystem**, covered by Criteria 1-4. The client should define the boundaries of this area taking into account the distribution of species or ecosystems (within and sometimes extending beyond the project’s area of influence) and the ecological patterns, processes, features and functions that are necessary for maintaining them. These boundaries may include catchments, large rivers or geological features. The client will use this **area of analysis to assess applicability of the critical habitat criteria and thresholds** (see paras GN69 – GN82) in order to determine critical habitat for the species and/or ecosystems concerned. Critical habitats boundaries should be equivalent in scale to areas mapped for practical site-based conservation management activities. For some wide-ranging species, critical habitat may be informed by areas of aggregation, recruitment, or other specific habitat features of importance to the species. In all cases, the critical habitat should consider the distribution and connectivity of such features in the landscape/seascape and the ecological processes that support them. **Where it can be shown that multiple values have largely overlapping ecological requirements and distributions, a common or aggregated area of critical habitat may be appropriate.** The final area(s) of critical habitat against which project impacts will be **assessed should be revised based on additional knowledge documented through field work and other assessment after the initial critical habitat assessment has been conducted.***

Applying this approach to the project, three specific areas of analysis have been defined as follows:

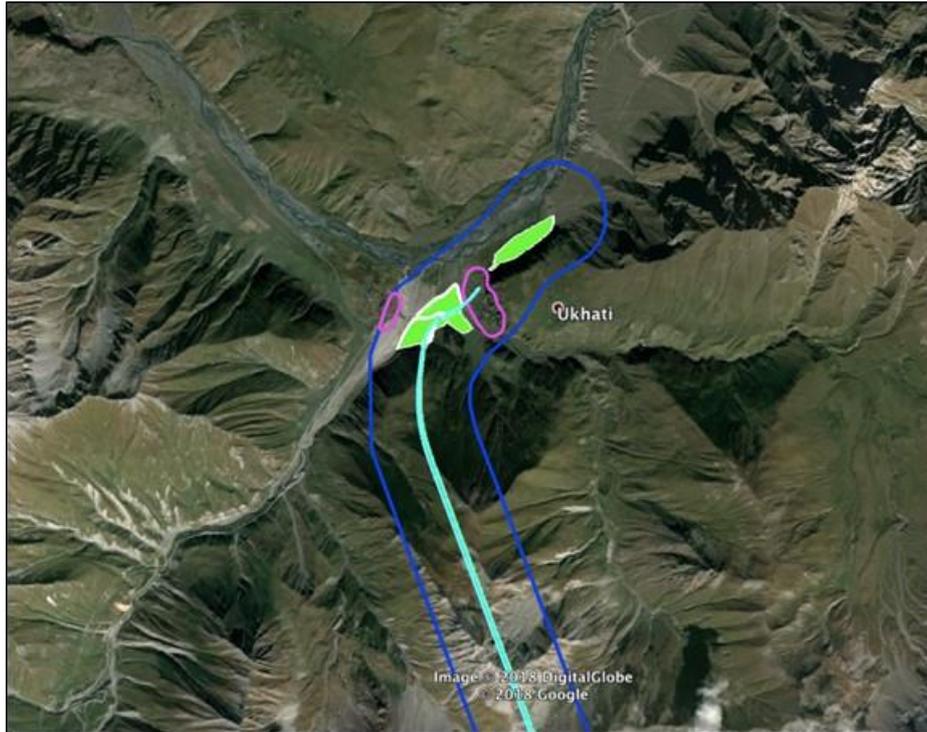
- For designated sites and mobile fauna, the DMU was taken to be the a broad region that incorporates that Kazbegi KBA/IBA, Khevi SPA and National Park as well as the Project direct Aol itself. The area encompasses over 100,000 ha in total and addresses species that move widely in the area to the extent that information on them is available.



The Larger DMU for more mobile species (red)

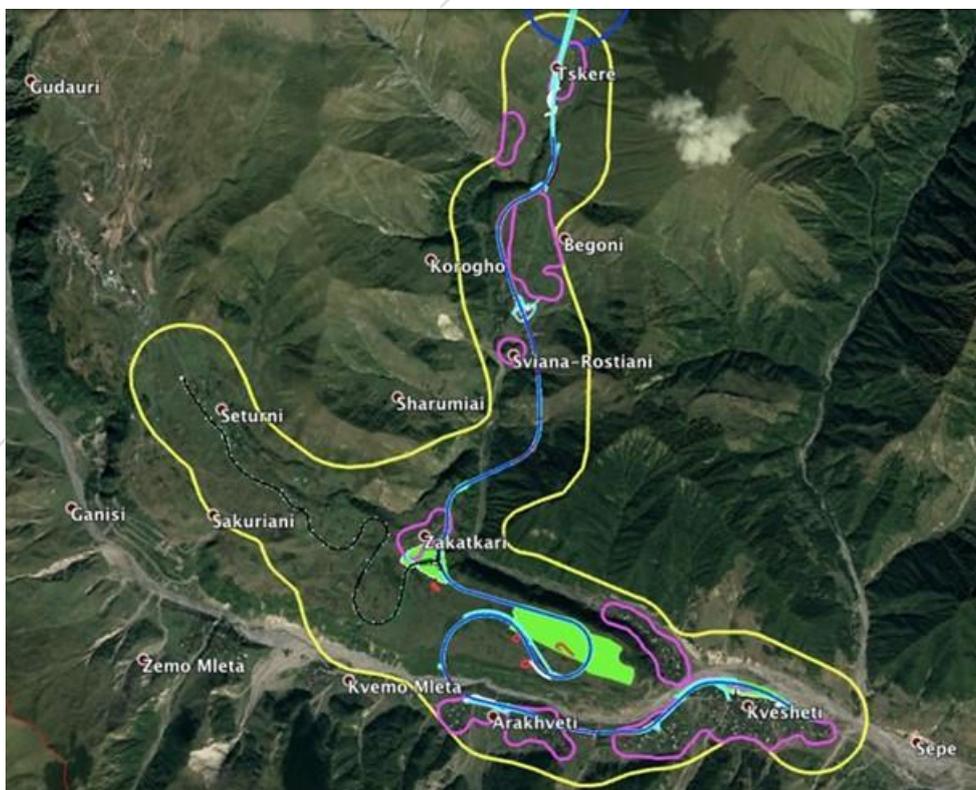
- For plants and less mobile species the DMU was taken to be the Project direct Aol, which was an area of 300m either side of the centreline of the proposed road (around 1500 ha).

The smaller DMU is shown in the figures below. Key: Yellow line: Lot 2 'Area of Influence' / Turquoise line: Project road / Purple line: Village / Green area: Spoil disposal site / Black line: Gudauri Access road *Note: Although Gudauri access road is included in the Area of Influence it has not been studied in detail as part of this version of the EIA, and as such the villages in this area have not been assessed to date. It will, however, be assessed subsequently.*



The Smaller Area of Analysis for less mobile species and habitats (Lot 1)

Key: Blue line: Lot 2 'Area of Influence' / Turquoise line: Project road / Purple line: Village / Green area: Spoil disposal site



The Smaller Area of Analysis for less mobile species and habitats (Lot 2)

6 CRITICAL HABITAT AND PRIORITY BIODIVERSITY FEATURE ASSESSMENT

6.1 Potential Triggers of Critical Habitat

The following potential CH Triggers have been applied (based on IFC PS6 / GN6 (2012) and Table 2 of EBRD PR6 Guidance Note):

	Critical habitat trigger	Potential Trigger Features/Species
Highly threatened or unique ecosystems	Ecosystems that are: <ul style="list-style-type: none"> • at risk of significantly decreasing in area or quality; • have a small spatial extent; and/or • contain concentrations of biome restricted species¹⁸. 	The ecosystems present within both areas of analysis are considered representative of the alpine habitats found across the Caucasus. As such they are not of small spatial extent nor considered to be at specific risk of significantly decreasing in area or quality. Whilst there is increasing infrastructure development in the Caucasus, most of the area is proposed for national or international conservation designations. No biome restricted species are present that are not addressed under Criteria C2 below. The Caucasian Grouse is considered a restricted range species ¹⁹ .
	i) Ecosystems listed as, or meeting criteria for, Endangered or Critically Endangered by the IUCN Red List of Ecosystems	No ecosystems have been identified within the AoAs that are listed as on the IUCN Red List of Ecosystems.
	ii) Areas recognised as priorities in official regional or national plans, such as National Biodiversity Strategy and Action Plans	The Kazbegi designated/recognised sites are included within the National Biodiversity Action Plan and have been identified based on input from internationally recognised NGOs. The sites have been designated for the species that they support rather than the sensitivity of the broader ecosystems <i>per se</i> but could trigger CH for the Lot 1 works (Lot 2 works are outside of the designated areas). This is discussed further above and under the species triggers below
	iii) Areas determined to be of high priority/significance based on systematic conservation planning carried out by government bodies, recognised academic institutions and/or other relevant qualified organisations (including internationally-recognised NGOs).	
Habitats of significant importance to endangered or critically endangered species	IUCN Red List CR or EN Species	<ul style="list-style-type: none"> • Egyptian vulture <i>Neophron percnopterus</i> (IUCN: EN GRL: VU) • Possibly Saker falcon
		Smaller Area of Analysis only
		<ul style="list-style-type: none"> • (Kazbegi Birch Mouse <i>Sicista kazbegica</i> (IUCN: EN, GRL:VU))
	Georgian Red List CR or EN Species	<ul style="list-style-type: none"> • Black (Cinereous) Vulture <i>Aegypius monachus</i> (IUCN: NT GRL: EN) • Caucasian Chamois <i>Rubicapra rubicapra</i> (ssp <i>caucasica</i>) (IUCN: LC GRL: EN) • Eastern Caucasian or Dahestanian Tur <i>Capra cylindricornis</i> (IUCN: NT, GRL:EN) • Brown Bear <i>Ursus arctos</i> (IUCN: LC GRL EN II, IV) • Eurasian Lynx <i>Lynx lynx</i> (IUCN: LC GRL: CR)
	Alliance for Zero Extinction sites;	Not Applicable

¹⁸ Biome restricted species are considered to be those with distributions of greater than 50,000km² but whose distributions are largely or wholly confined to one biome. Terrestrial vertebrate species with an extent of occurrence (EOO) of 50,000km² or less are considered to be “restricted range” - see <http://biodiversitya-z.org>

¹⁹ The Kazbgi IBA is listed in part for Black Grouse under criteria A2 “Restricted-range species” as a Secondary Area (SA). Such areas supports one or more restricted-range species, but do not qualify as an EBA because less than two species are entirely confined to it – see Criteria C3.

	Animal and plant species of community interest in need of strict protection as listed in EU Habitats Directive (Annex IV).	<ul style="list-style-type: none"> Eurasian Otter <i>Lutra Lutra</i> (IUCN: NT GRL: VU; HD II, IV) Grey Wolf, <i>Canis lupus</i> (IUCN: LC; Not GRL; HD: II, IV)
		<p>Smaller Area of Analysis only</p> <ul style="list-style-type: none"> Tessellated Water Snake, <i>Natrix tessellate</i> (IUCN LC; HD Annex IV) European Tree Frog <i>Hyla arborea</i> (IUCN: LC; HD IV).
Habitats of significant importance to endemic or geographically restricted species.	<p>Areas holding a significant proportion of the global range or population of species qualifying as restricted-range under Birdlife or IUCN criteria.</p> <p>For example: Alliance for Zero Extinction sites or Global-level Key Biodiversity Areas and Important Bird and Biodiversity Areas identified for restricted-range species.</p>	<ul style="list-style-type: none"> Caucasian Grouse <i>Lyrurus mlokosiewiczzi</i> (IUCN NT) is a restricted range species. The Khevi IBA was designated for this species in 2002 under IBA criteria A1, A2 (and also corncrake under IBA criteria A1) with >21 male grouse recorded at the time.
Habitats supporting globally significant concentrations of migratory or congregatory species	Areas that support a significant proportion of a species' population, where that species cyclically and predictably moves from one geographical area to another (including within the same ecosystem),	Whilst the area is recognised for its importance as a migratory flyway, the vast majority of birds pass through the area and are not considered to "support a significant proportion of a population" for any particular species.
	Areas that support large groups of a species' population that gather on a cyclical or otherwise regular and/or predictable basis.	
	Global-level Key Biodiversity Areas and Important Bird and Biodiversity Areas identified for congregatory species	The area is not recognised as a KBA or IBA for congregatory species.
	Wetlands of International Importance designated under criteria 5 or 6 of the Ramsar Convention.	The area is not designated under the Ramsar Convention.
Areas associated with key evolutionary processes	Areas with landscape features that might be associated with particular evolutionary processes or populations of species that are especially distinct and may be of special conservation concern given their distinct evolutionary history. For example Isolated lakes or mountaintops or Populations of species listed as priorities by the Edge of Existence programme.	Whilst a number of such areas are present within the Caucasus, no specific features have been identified by stakeholders within either of the Areas of Analysis and no populations have been identified that are included within the Edge of Existence programme.
Ecological functions that are vital to maintaining the viability of biodiversity features described (as critical habitat features)	Ecological functions without which critical biodiversity features could not persist. For example where essential for critical biodiversity features, riparian zones and rivers, dispersal or migration corridors, hydrological regimes, seasonal refuges or food sources, keystone or habitat-forming species.	No ecological functions have been identified as vital to maintaining the biodiversity features described above. The Kazbegi migration corridors, whilst of significant conservation importance, is a reflection of topographical rather than ecological functions. Local rivers are considered PBF as described below.

6.2 Potential Triggers of Priority Biodiversity Features

The following potential PBF Triggers have been identified based on Table 2 of the EBRD PR6 Guidance Note:

Priority biodiversity features trigger as per EBRD PR6 (2014)		
Threatened habitats	Habitats considered under pressure by national, regional or international assessments. These include natural and priority habitats identified under the EU Habitats Directive (Annex I).	No Habitats Directive Annex I habitats have been identified within the Areas of Assessment.
		<p>Smaller Area of Analysis only</p> <p>National Priority Habitats 9BF-GE: Sub-alpine birch krummholz and 70-GE03 Low grass marsh are present and could trigger PBF.</p>
Vulnerable species	IUCN Red List VU Species	<p><i>Smaller Area of Analysis only</i></p> <ul style="list-style-type: none"> • <i>European Turtle-dove (Streptopelia turtur)</i> (IUCN: VU); • <i>Dinnik’s Viper (Vipera dinniki)</i> (IUCN: VU; GRL: VU). • <i>Lesser Kestrel (Falco naumanni)</i>, • <i>Corncrake (Crex crex)</i> (IUCN LC and not GRL but IBA qualifying species under A1 > 20 males)
	Georgian Red List VU Species	<p>Bearded vulture (Lammergeyer) (<i>Gypaetus barbatus</i>) (IUCN: NT GRL: VU)</p> <p>Griffon vulture (<i>Gyps fulvus</i>) (IUCN:LC GRL: VU)</p> <p>Golden eagle (<i>Aquila chrysaetos</i>) (IUCN: LC GRL: VU)</p> <p>Long-legged Buzzard (<i>Buteo rufinus</i>) (IUCN: LC GRL: VU)</p> <p>Caucasian snowcock (<i>Tetraogallus caucasicus</i>)(IUCN LC, GRL VU</p> <p>•Caucasian black grouse (Tetrao mlokosiewiczzi) IUCN NT, GRL VU and IBA trigger species</p> <p>Great rosefinch (<i>Carpodacus rubicilla</i>) and Güldenstädt’s (white winged) redstart (<i>Phoenicurus erythrogaster</i>) (IUCN Red List LC/GRL VU),</p> <p>Salmo trutta Brown trout LC VU</p>
	Animal and plant species of community interest identified under the EU Habitats Directive (Annex II).	<p>Smaller Area of Analysis only</p> <p><i>Quercus macranthera</i> (high mountain oak), <i>Ulmus minor</i> Miller (Small elm), and <i>Ulmus glabra</i> (Bare elm).</p> <p>Long-clawed mole (<i>Prometheomys schaposchnikowi</i>) (IUCN: LC; GRL: VU).</p> <p>Caucasian Squirrel (<i>Sciurus anomalus</i>) (LC VU)</p> <p>Grey dwarf hamster (<i>Cricetulus migratorius</i>) (LC VU)</p>
Significant biodiversity features identified by a broad set of stakeholders or governments:	Eg. Key Biodiversity Areas and Important Bird and Biodiversity Areas; nationally and internationally important species or sites for conservation of biodiversity; many areas meeting natural habitat	The Kazbegi designated/recognised sites are included within the National Biodiversity Action Plan and have been identified based on input from internationally recognised NGOs. The sites have been designated for the species that they support rather than the sensitivity of the broader ecosystems <i>per se</i> but could trigger CH for the Lot 1 works

	definitions of other international financial institutions.	(Lot 2 works are outside of the designated areas). This is discussed further above and under the species triggers below
Ecological structure and functions needed to maintain the viability of priority biodiversity features.	Where essential for priority biodiversity features, riparian zones and rivers, dispersal or migration corridors, hydrological regimes, seasonal refuges or food sources, keystone or habitat-forming species.	Two ecological functions have been identified as vital to maintaining the biodiversity features described above: the sea buckthorn habitats in the Tergi River valley (important for overwintering Great Rosefinch and Gldenstdt's Redstart) local rivers (important for otters, trout and other fish).

6.3 Thresholds for Triggering CH/PBF

The IUCN document “A Global Standard for the Identification of Key Biodiversity Areas and Red List Categories and Criteria” includes numerical thresholds for the first four critical habitat criteria (CHC) of i) CR/EN species; ii) endemic/restricted-range species; iii) migratory/congregatory species; and iv) threatened and unique ecosystems (IFC PS6 GN55). These thresholds are considered **indicative** and the involvement of external experts and project specific assessments is still required. For the other criterion (v): areas associated with key evolutionary processes and vi) ecological functions that are vital to maintaining the viability of biodiversity features described) there are no numerical thresholds and best available scientific information and expert opinion should be used. (GN56).

For **IFC Criterion 1** species (EBRD Criterion 2): IFC PS6 GN paras 68 and 69 clarifies that **all species present listed as CR and EN on the IUCN Red List of Threatened Species should be considered potential CH triggers** given their risk of extinction in the wild. Thresholds for CH are:

- a) areas that support globally-important concentrations of an IUCN Red-listed EN or CR species (0.5% of the global population AND 5 reproductive units of a CR or EN species);
- b) Areas that support globally-important concentrations of an IUCN Red-listed VU species, the loss of which would result in the change of the IUCN Red List status to EN or CR and meet the thresholds in GN70(a).
- c) As appropriate, areas containing nationally/regionally-important concentrations of an IUCN Red-listed EN or CR species.

The inclusion **nationally/regionally CR or EN** species should be determined in consultation with competent professionals. For this project all nationally/regionally CR/EN species likely to be present within the DMU are considered as potential trigger species, and have been evaluated further to determine the potential for CH triggering in the context of the national/regional populations.

For **IFC Criterion 2** (restricted range/endemic species) IFC PS6 GN73 clarifies that the threshold for CH is considered as *areas that regularly hold ≥10% of the global population size AND ≥10 reproductive units of a species.*

An analysis of these and the other thresholds that could trigger CH/PBF with regards to Critically Endangered, Endangered and Vulnerable Species is provided below.

The following may trigger **Critical Habitat/PBF** as a result of the area being of “significant importance to IUCN Endangered species²⁰”

Species	Status within Project Area of Influence (Aol)	Status within Broader Area of Analysis (DMU)	CH or PBF?
Birds			
Egyptian vulture <i>Neophron percnopterus</i> (IUCN EN; GRL:VU)	At least one pair is known to breed regularly within the Aol. Other birds may also forage over the area.	This species occupies a large range, but is declining in much of it and is listed as “vulnerable” in Georgia . It forages over open country and scavenges at human settlements, as its broad diet includes carrion and organic waste. It typically nests on ledges or in caves on cliffs crags and rocky outcrops, but occasionally also in large trees, buildings and electricity pylons (They tend to favour caves with a study in Greece indicating only 29% of nests were on ledges (Valchos et al., 1998 – see http://old.lifeneophron.eu/files/docs/1471335966_554.pdf) Pairs normally hold down a territory and may have more than one nest site in it (Kurtev et al., 2008). The species breeds in the National Park and is a KBA citation species. The national breeding population is estimated at 100-140 pairs, and the European population at 3000-4700 pairs (see BirdLife International (2017) European birds of conservation concern: populations, trends and national responsibilities. As the local population is <3% of the National Population<3% European population CH is not considered triggered, although the known nest site is considered a PBF.	PBF
Black Vulture <i>Aegypius monachus</i> (IUCN: NT GRL: EN)	Not known to breed in the Aol, but is found foraging here.	The species forages over many kinds of open terrain, and nests in trees or on rocks, often in very loose colonies. Its diet consists mainly of carrion from medium-sized or large mammal carcasses. Whilst the European population is increasing, this is a rare bird in Georgia. It is found year round in the National Park and 15-20 pairs breed in rocky areas there. Whilst the national population is only ~1% of the EU population of ~ 2,500 breeding pairs, as the Kazbegi birds represent 50-60% of the Georgian population of ~ 30 breeding pairs this species is considered to trigger CH.	CH
Saker Falcon <i>Falco cherrug</i> (IUCN: EN; GRL: CR)	Not recorded from the Aol, and not expected to regularly occur. IUCN range maps indicate could be present..	This species occurs in a wide range across the Palearctic region but appears to be undergoing a very rapid decline. It is found in open grassy landscapes where it hunts close to the ground for mid-sized diurnal terrestrial rodents (especially ground squirrels). It uses copses or cliffs for nest sites occupying the old nests of other birds. A Saker Global Action Plan and Saker Falcon Adaptive Management Framework have been put in place for its conservation. It may be present in the National park but only 1-3 pairs are known to breed in Georgia and it is not thought to occur regularly in the project area.	No
Mammals			
Caucasian Chamois <i>Rubicapra rubicapra (ssp caucasica)</i> (IUCN: LC GRL: EN)	Possibly present in higher areas of the Aol but not recorded to date.	The local subspecies of the northern chamois (~440,000 individuals) the Caucasian Chamois is restricted to the Caucasus Mountains in southern Russia, Georgia and Azerbaijan. A KBA citation species, at risk from hunting, it is known from the southern part of the KBA, including the Sakhizrebi area, and the slopes of the Truso gorge and Sno valley to the NW and NE of the northern portal as well valleys to the south of the project. The broader DMU is considered a PBF for this species.	PBF
Eastern Caucasian Tur <i>Capra cylindricornis,</i>	This species has not been recorded within the Project Aol and is	A KBA citation species at risk from hunting, only about 3,000 animals remain in Georgia. Around half of these animals are found in the north of the Kazbegi National park area where it has been recorded from the slopes of the Truso and Dariali gorges, the Khde gorge and some steep scree areas east of Stepantsminda. The	No

²⁰ Note that no GRL, IUCN EN, CR or VU plant species have yet been recorded within the Project AoI. Further work will be undertaken in Spring 2019 to specifically look for such species and should any such species be found they will be recorded and the CHA updated to reflect this fact.

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(IUCN: NT GRL:EN)	not expected to regularly occur	species is not thought to occur regularly in the project area.	
Brown Bear <i>Ursus arctos</i> (IUCN: LC GRL: EN)	Regularly recorded from the Aol but not thought to breed there.	Known to be present in the DMU and a KBA citation and EU Focal species Small, isolated populations are present in Georgia with around 1,600 individuals nationally. Traces of bear are sometimes seen near cattle barns and it has been recorded at the start of Lot 1 near the mountain birch forests. species. Given the small numbers present and huge distances travelled seasonally by this species the DMU is not considered CH, but is considered a PBF.	PBF
Eurasian Lynx <i>Lynx lynx</i> (IUCN: LC GRL: CR)	Occasional potential sightings within the Aol but no breeding expected	Although still critically endangered, recent research suggests that this species has a larger population size than previously thought,. IUCN range maps indicate it may be resident in the study area and locals speak about a cat seen in the middle flow of the Narvani river 5-6 years ago. Home ranges are typically > 120 km ² for males and 80 to 500 km ² for females. Given the lack of known breeding areas and the large distances travelled by this species, the DMU is not considered CH but may qualify as PBF.	PBF
Eurasian Otter <i>Lutra Lutra</i> (IUCN: NT GRL: VU)	Present in the Aol and likely to be breeding	National population is estimated at around 400 individuals. Numbers reportedly in decline following a decline in wild fish stocks and habitat destruction. Vulnerable to removal of bank side vegetation, and persecution due to perceived depredation on fish. KBA designation species that has been recorded in the Direct Project Aol which is considered as PBF.	PBF
Grey Wolf <i>Canis lupus</i> (IUCN: LC Not GRL)	Regularly recorded from the Aol but not thought to breed there.	An Annex II and priority EU carnivore species with declining populations. Local residents report that wolves are regularly seen across the area, in winter and early spring but are not considered to den here. Wolves are not considered endangered in Georgia, (in 2012, an estimate of 1,500 wolves was made nationally by Illia State University) and given the wide range of habitats that they occupy the DMU is not considered either CH or PBF for this species.	No
Kazbegi Birch Mouse <i>Sicista kazbegica</i> (IUCN: EN GRL: VU)	Likely Likely	This mouse is endemic to the Kazbegi region and is a KBA designation species. It lives in area of mixed forest (1,500 -2,300 masl) and subalpine meadows with tall grass. It is found across the area and is locally common where present. The size of the population within the DMU is unknown, but given the reported local abundance of this species it is considered to trigger PBF but not CH criteria.	PBF
Reptiles & Amphibians			
Tessellated Water Snake <i>Natrix tessellate</i> (IUCN: LC; Not GRL)	Likely Likely	A largely aquatic species that is common in much of its range, this species is not endangered but is Habitats Directive listed. It has been recorded in the Project surveys, and is found near rivers and wetland areas as it feeds on fish and amphibians. The Project Aol is not recognised as supporting an important population at a local or national level.	No
European Tree Frog <i>Hyla arborea</i> (IUCN: LC Not GRL)	Yes Yes	A widespread lowland species that has been recorded up to 2,300m asl.and is common in suitable habitats in parts of its range. Generally associated with open, well-illuminated broad-leaved and mixed forests, bush and shrublands, meadows, gardens, vineyards, orchards, parks, lake shores and low riparian vegetation. Dark and dense forests are avoided.This species is not endangered but is Habitats Directive listed. It has been recorded in the Project surveys, and is found near rivers and wetland areas as it feeds on fish and amphibians. The Project Aol is not recognised as supporting an important population at a local or national level. Recorded in the Project surveys. Not endangered but Habitats Directive listed.	No

The following have the potential to trigger PBF as a result of “Habitats of significant importance vulnerable species”

Species	Status within Project Area of Influence (Aoi)	Status within Broader Area of Analysis (DMU)	PBF
Birds			
Bearded vulture <i>Gypaetus barbatus</i> (IUCN: NT GRL:VU)	Feeds within the project Aoi, but not found breeding here.	A widely distributed species but one that is very rare in some areas and thought to be in decline overall as a result of poisoning, habitat degradation, disturbance of breeding sites and collision with powerlines. Resident in the DMU with 2-3 pairs breeding on rock ledges in the NP (nationally important), it has vast home ranges and prefers remote, mountainous areas, with precipitous terrain, usually above 1,000 m. Principle food is carrion, with its diet including a large proportion of bones. Nests are on remote overhung cliff ledges or in caves and will be re-used over the years. A KBA designation species the breeding pairs represent >10% of the 19-22 pairs present in Georgia (which in turn represent ~ 3% of the EU population). The DMU is considered a PBF.	Yes
Griffon vulture <i>Gyps fulvus</i> (IUCN: LC GRL: VU)	Feeds within the project Aoi, but not found breeding here.	This species has an extremely large range and a growing population. A KBA citation species, some 15-20 pairs breed in the ravine of the National Park. It feeds almost exclusively on carrion and its nest is usually built on a rocky outcrop, with sheltered ledges or small caves preferred. Effective protection in areas with a plentiful supply of food has been shown to catalyse impressive population recoveries. The breeding population in the DMU is considered a PBF trigger.	Yes
Golden eagle <i>Aquila chrysaetos</i> (IUCN: LC; GRL: VU)	Feeds within the project Aoi, but not found breeding here.	This is the most widespread of the Aquila eagles although generally uncommon across its range. Resident in the Caucasus, the species' diet is very broad, taking mammals, birds, reptiles, fish, amphibians, insects and carrion. Nesting occurs on cliff ledges and where these are not available, in large trees or similar artificial structures. Nests are constructed from sticks and are added to in successive years, growing to 2m in diameter. It is known to breed in the Kazbegi NP which may be regionally important and is considered a PBF trigger.	Yes
Long-legged Buzzard <i>Buteo rufinus</i> (IUCN: LC; GRL: VU)	Not recorded from Aoi and not expected to regularly occur.	This species has an extremely large range. European numbers (17% of global population) are currently increasing but overall the species is considered stable. It is a species of open areas and feeds mainly on small mammals and nests on cliff ledges and crags. IUCN range maps indicate it may be present in the DMU but it is not expected to occur regularly in the area.	No
Caucasian snowcock <i>Tetraogallus caucasicus</i> (IUCN: LC GRL: VU)	Not reported to be present in the Aoi, and not expected to regularly occur. It is found further north in the NP.	A KBA citation species that is endemic to the Caucasus, it is found in the Alpine and sub-Alpine zones of the high mountain ranges generally at altitudes of 2,300 - 4,000 m (occasionally from 1,800 m). Birds use mountain slopes with rocky outcrops, alpine meadows, clumps of bushes and patches of melting snow but avoid forest, scrub and large areas of snow cover. Threatened by habitat degradation caused by overgrazing by domestic stock and hunting. Some 500-3000 pairs are found in Georgia, or between 10-50% of the EU population (5,100-10,300 pairs). Whilst birds could be present at the top of the Khada valley, there is no evidence of this in any of the studies or literature reviewed which indicates the birds are generally found nearer to Stepatsminda. As this species is not expected to occur regularly in the area accessed by the project it is not expected to trigger CH or PBF.	No
Caucasian black grouse <i>Tetrao mlodosiewiczzi</i> (IUCN: NT GRL: VU; IBA Sp)	Not recorded within the Aoi but may be present in areas with wood near the northern portal.	This KBA and IBA citation species has been suffering population declines due to habitat fragmentation hunting and wood cutting. It is found in subalpine meadows and subalpine forests throughout the region on north-facing slopes with Rhododendron and Juniperus, and on the edge of birch forest in spring and winter, at elevations of 1,300-3,000 m. Meadows used for hay production are important for breeding birds and lek sites are found above the timber line not far from winter food resources such as <i>Betula litwinowii</i> , <i>Quercus macranthera</i> , <i>Fagus orientalis</i> , <i>Juniperus</i> and <i>Rosa</i> spp (Klaus and Vitovich 2006). The Georgian population is estimated as 7,500-15,750 lekking males which represents >60% of EU pop (11,500-25,500 males). The overall Mtskheta-Mtianeti Region supports about 25% of the Georgian population, most of which are probably in Kazbegi National park. The	Yes

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		DMU is therefore considered as a PBF.	
Great rosefinch <i>Carpodacus rubicilla</i> & Güldenstädt's redstart <i>Phoenicurus erythrogaster</i> (IUCN: LC; GRL: VU)	Present and potential breeder	KBA citation species and a small & isolated population separated from its “main” range in the Himalayas. Overwinters in Sea Buckthorn (<i>Hippophae rhamnoides</i>) bushes and berries especially within the upper Terek basin and Tergi valley near Stepantsminda. Wintering grounds in particular are considered to qualify as PBF.	Yes
European Turtle-dove <i>Streptopelia turtur</i> (IUCN: VU Not GRL)	Present and potential breeder	A widespread migrant breeder across much of central and southern Europe, typically found in woodland areas often near human habitation. Frequently relies on agricultural land for feeding and typically breeds in woodlands >1000m asl. Recorded by IBAT in the study area, but no specific conservation requirements in the DMU.	No
Lesser Kestrel <i>Falco naumanni</i> (IUCN: LC; GRL: CR)	Not recorded yet from within Aol and not expected to regularly occur	Severely declined during the second half of the 20th century, but now appears to be stable or increasing slightly in many parts of its range. Usually a colonial breeder, often in the vicinity of human settlements, it forages natural and managed grasslands, and non-intensive cultivation. It is mainly migratory and most breeders overwinter in sub-Saharan Africa. The IUCN range maps indicate it may breed or feed in the study area. The species is considered critically endangered in Georgian with >100 pairs but it is not expected to occur regularly in the area.	No
Corncrake <i>Crex crex</i> (IUCN: LC Not GRL) IBA Sp)	May be present across the Aol	A long-distance migrant that breeds in open or semi-open habitats, mainly meadows with tall grass. It is a KBA and IBA citation species and significant populations have been recorded in and around Kazbegi. The species has a high conservation priority in parts of its range but is not on the GRL, and has a national population estimated at between 10,000-50,000 males. However, given the KBA citation this is considered to qualify as PBF.	Yes
Mammals			
Bats: Various species	May be present in areas with vegetation across the Aol	All 32 Georgian bat species are protected under the Eurobats convention and a number of species are likely to be present within the Project Aol. Of particular note is the likely presence of 3 habitats directive Annex II species, namely Lesser Mouse-eared Myotis (<i>Myotis blythi</i>), Greater Horseshoe Bat (<i>Rhinolophus ferrumequinum</i>), and Lesser Horseshoe Bat (<i>Rhinolophus hipposideros</i>). These species are considered to qualify as PBF.	Yes
Long-clawed mole <i>Prometheomys schaposchnikowi</i> (IUCN: LC GRL: VU)	Likely to be found in the Aol	Sole representative of a monotypic genus which is endemic to the region. Found in the Alpine zone in tall grass meadows on slopes with long-standing snow cover but also on meadows inside forest and on arable land. Has a fairly small range, but there are no major threats and the species has been found in degraded areas such as arable. IUCN range maps indicate it may be resident in the study area. Given the lack of threats this is not considered to trigger PBF within the DMU.	No
Caucasian Squirrel <i>Sciurus anomalus</i> (IUCN: LC; GRL: VU)	Likely to be found in the Aol	Still relatively abundant where found, the species lives mostly in mixed and deciduous forest. IUCN range maps indicate it may be resident in the study area but consultation indicates that there is no reason to consider the large or small DMU as PBF.	No
Grey dwarf hamster <i>Cricetulus migratorius</i> (IUCN: LC; GRL: VU)	Likely to be found in the Aol	Very wide ranging, and is abundant in at least parts of its range. No major threats are known at the global level and now also inhabits agricultural land and gardens, although forests and damp habitats are avoided. IUCN range maps indicate it may be resident in the study area, but there is no reason to consider the large or small DMU as PBF.	No
Other			
Dinnik's Viper <i>Vipera dinniki</i> (IUCN: VU GRL: VU)	Likely to be found in the Aol	Listed as Vulnerable because its extent of occurrence is less than 20,000 km ² , its distribution is severely fragmented, and the species is declining due to persecution, over-collecting and overgrazing of its habitat. It inhabits the upper-forest zone, stream borders, shrub forests, subalpine and alpine meadows, rocky scree, talus slopes and montane moraines and the DMU is considered potential PBF.	Yes
Various Fish eg Brown Trout <i>Salmo trutta</i> (IUCN: LC GRL: VU)	Likely to be found in the Aol	The fish of Kazbegi are poorly studied, although the Brook Trout (<i>Salmo fario</i>) and Brown trout (<i>Salmo trutta</i>) are both recorded regularly and are listed as GRL “Vulnerable”. This is primarily because of the effect of illegal poaching which saw trout populations decline by around 30% between 1995-2005	Yes

6.4 Summary of Identified CH/PBF Triggers have been identified:

Criteria	Assessment
CH Triggers	
Highly threatened or unique ecosystems	<ul style="list-style-type: none"> the Kazbegi KBA/IBA and Khevi SPA The Kazbegi National Park and Emerald Site
Habitats of significant importance to endangered or critically endangered species	<ul style="list-style-type: none"> Black Vulture <i>Aegypius monachus</i>
Habitats of importance to endemic or restricted range species.	<ul style="list-style-type: none"> Caucasian Black Grouse <i>Tetrao mlokosiewiczii</i>
Habitats supporting globally significant concentrations of migratory or congregatory species.	The Kazbegi flyway is a recognised migratory route the vast majority of birds pass over or through the area and it is not recognised for congregatory (rather than migratory) species
Areas associated with key evolutionary processes	None particularly here (although the Caucasus as a whole are recognised for this).
Vital ecological function	None. The Kazbegi migration corridor is a reflection of topographical rather than ecological functions. Local rivers are categorized as PBF.

Based on the above analysis the following PBF Triggers have been identified:

PBF Assessment	
Threatened habitats	<ul style="list-style-type: none"> 9BF-GE: Sub-alpine birch krummholz 70-GE03 Low grass marsh
CR or EN species for which it qualifies as PBF but not CH	<ul style="list-style-type: none"> Birds: Egyptian vulture <i>Neophron percnopterus</i> Mammals: Caucasian Chamois <i>Rubicapra rubicapra</i>; Brown Bear <i>Ursus arctos</i>; Eurasian Lynx <i>Lynx lynx</i>; Eurasian Otter <i>Lutra Lutra</i> Kazbegi Birch Mouse <i>Sicista kazbegica</i>
Vulnerable species	<ul style="list-style-type: none"> Birds: Bearded vulture <i>Gypaetus barbatus</i>; Griffon vulture <i>Gyps fulvus</i>; Golden eagle <i>Aquila chrysaetos</i>; Great rosefinch <i>Carpodacus rubicilla</i> & Gldenstdt's redstart <i>Phoenicurus erythrogaster</i> Corncrake <i>Crex crex</i> Bats: Various species Dinnik's Viper <i>Vipera dinniki</i> Various Fish eg Brown Trout <i>Salmo trutta</i>
Significant biodiversity features	See CH triggers
Ecological structure and functions	<ul style="list-style-type: none"> sea buckthorn habitats in the Tergi River valley Rivers (important for trout and other fish).

6.5 Potential Impacts on CH/ PBF

Having determined the potential for CH or PBF to be present within the AoA, an assessment is then required of the potential for the road construction and operation to affect the proposed CH/PBF features, and hence the need for any specific species or habitat action plans. The results of this assessment are provided in the Table overleaf.

Species/Habitats	CH/ PBF	Reason for Protection	Potential for Significant Residual Impacts from Construction or Operation of the Road?	BAP?
9BF-GE: Sub-alpine birch krummholz	PBF	This is a National Priority Habitat	Whilst this habitat will not be affected by spoil disposal works, some 0.1 ha of habitat could be directly affected near TI 5 Northern Portal. Impacts to this habitat should be minimised and there will be need for compensatory habitat restoration. This is also potential habitat for bears, grouse and other species and mitigation will also be needed for temporary and permanent disturbance effects.	Birch Krummholz Restoration Plan
70- GE03 Low grass marsh	PBF	This is a National Priority Habitat	Impacts to this habitat will be avoided during spoil disposal on the Zakateri plateau. There is however, the potential for accidental impacts.	Low Grass Marsh Plan
Sea buckthorn habitats in the Tergi River valley	PBF	This is an SPA Criterion Habitat and is important for overwintering Great Rosefinch and Gldenstdt's Redstart, as well as otter and corncrake.	No such habitat has been identified that will be affected by the scheme. Existing habitat will be mapped and protected during works, especially from spoil disposal.	No – but additional mapping to avoid
Local Rivers	PBF	This is a sensitive habitat and support Notable species including otters and salmonid fish.	A number of rivers are crossed by the scheme. This could result in temporary disturbance as well as risks from water pollution and severance of wildlife corridors. An adaptive management approach with monitoring will be undertaken to address these impacts.	Monitoring and Adaptive Management to be applied
Natural Woodland Habitat	PBF	These areas of natural habitat support a range of species. In addition 3 GRL VU species have been recorded (Quercus macranthera (high mountain oak), Ulmus minor Miller (Small elm), and Ulmus glabra (Bare elm).	None of the GRL species are expected to be affected by the project. However up to 1.1 ha of Hornbeam Forest may be lost to the Scheme, together with the species they support. Impacts to this habitat should be avoided where practical and compensatory habitat created if this cannot be done.	Natural habitat to be restored to ensure no net loss
Endemics Plant species	PBF	A number of endemic species (but not endangered or vulnerable) have been identified near the northern portal.	Additional surveys should be undertaken to identify the areas that support these and other endemic species and impacts to these habitats should be minimised and if required offset.	Endemic Plant Action Plan
Black Vulture Aegypius monachus (IUCN: NT GRL: EN)	CH	The 15-20 pairs that breed in rocky areas in the National park represent over 50% of the Georgian population of ~ 30 breeding pairs	The species does not breed in the Aol, but is found year round foraging across the broader area The birds are, however, habituated to the existing road and are not expected to suffer any significant impacts from	No although additional surveys to be done

			construction or mitigation. A watching brief will be maintained on this species and should any impact be observed they will be mitigated using an adaptive management approach.	
Caucasian black grouse Tetrao mlokosiewiczii (IUCN: NT GRL: VU; IBA Sp)	CH	The overall Mtskheta-Mtianeti Region supports about 25% of the Georgian population, most of which are probably in Kazbegi National park. This qualifies as a Restricted Range Species	This species has not been recorded within the AoI but may be present in fringe areas of birch woodland near the northern portal that may be impacted on by construction and operation disturbance. Further surveys in spring 2019 will confirm this but a precautionary approach will be adopted in the meantime.	Black Grouse - additional surveys and Action Plan
Egyptian vulture Neophron percnopterus (IUCN EN; GRL:VU)	PBF	The population present in the National Park is <5% of the national breeding population (100-140 pairs) but the known nest site is considered a PBF.	At least one pair is known to breed regularly within the AoI. Other birds may also forage over the area. Tunnel 1 construction may affect the breeding pair recorded from the cliffs there, as may road operations and an action plan is required.	Egyptian Vulture Action Plan
Bearded vulture Gypaetus barbatus (IUCN: NT GRL:VU)	PBF	2-3 pairs breeding on rock ledges in the NP (nationally important), the breeding pairs represent >10% of the 19-22 pairs present in Georgia.	These species feeds within the project AoI, but not found breeding here. The birds are habituated to the existing road and breeding areas will not be disturbed by the works. A watching brief will be maintained on this species and should any impact be observed they will be mitigated using an adaptive management approach.	No although additional surveys to be done
Griffon vulture Gyps fulvus (IUCN: LC GRL: VU)	PBF	Some 15-20 pairs breed in the ravine of the National Park. The breeding population in the AoA is considered a PBF trigger.		
Golden eagle Aquila chrysaetos (IUCN: LC; GRL: VU)	PBF	It is known to breed in the Kazbegi NP which may be regionally important and is considered a PBF trigger.		
Great rosefinch Carpodacus rubicilla (IUCN: LC; GRL: VU)	PBF	KBA citation species and a small & isolated population separated from its "main" range in the Himalayas. Overwinters in Sea Buckthorn (Hippophae rhamnoides) bushes and berries especially within the upper Terek basin and Tergi valley near Stepantsminda.	Present and potential breeder. The sea buckthorn habitat is considered particularly important when overwintering. Whilst such habitat is not expected to be adversely affected by the scheme, a precautionary approach will be adopted and a plan for the sea buckthorn area developed.	Sea Buckthorn will be mapped and retained
Güldenstädt's redstart Phoenicurus erythrogaster (IUCN: LC; GRL:VU)	PBF			
Corncrake Crex crex (IUCN: LC Not GRL) IBA Sp)	PBF	This is a KBA and IBA citation species and significant populations have been recorded in the Kazbegi valleys and hay meadows. Species remains a high conservation	May be present across the AoI and has the potential to be affected by habitat loss and/or disturbance.	Corncrake Action Plan

		priority in significant parts of its range.		
Caucasian Chamois Rubicapra rubicapra (ssp caucasica) (IUCN: LC GRL: EN)	PBF	A KBA citation species, at risk from hunting, it is known from the southern part of the KBA, including the Sakhizrebi area, and the slopes of the Truso gorge and Sno valley to the NW and NE of the northern portal as well valleys to the south of the project.	This is possibly present in higher areas of the Khada valley but has not been recorded to date. A precautionary approach will be taken to this species given the risks associated with opening up the valley to access (and hunting), so specific actions will be taken to avoid adverse impacts (see BAP).	Chamois – additional surveys and Action Plan
Brown Bear Ursus arctos (IUCN: LC GRL: EN)	PBF	Known to be present in the AoA with traces of bear are sometimes seen near cattle barns and it has been recorded at the start of Lot 1 near the mountain birch forests.	Regularly recorded from the AoI but not thought to breed there and no significant impacts are expected. A watching brief will be maintained on this species and should any impact be observed they will be mitigated using an adaptive management approach.	No
Eurasian Lynx Lynx lynx (IUCN: LC GRL: CR)	PBF	IUCN range maps indicate it may be resident in the study area and locals speak about a cat seen in the middle flow of the Narvani river 5-6 years ago.	Occasional potential sightings within the AoI but no breeding expected. A watching brief will be maintained on this species and should any impact be observed they will be mitigated using an adaptive management approach.	No
Eurasian Otter Lutra Lutra (IUCN: NT GRL: VU)	PBF	KBA designation species that has been recorded in the Direct Project AoI which is considered as PBF.	This species is present in the AoI and the areas it uses will be directly affected by the project. An action plan is needed.	Otter Action Plan
Kazbegi Birch Mouse Sicista kazbegica (IUCN: EN GRL: VU)	PBF	This mouse is endemic to the Kazbegi region and is locally common where present. The size of the population within the AoA is unknown.	Lives in mixed forest (1,500 -2,300 masl) and subalpine meadows with tall grass. Unlikely to travel more than 15m from their nest. No significant residual impact is expected to the population.	No
Bats: Various species (eg Myotis blythi, Rhinolophus ferrumequinum, and Rhinolophus hipposideros).	PBF	All 32 Georgian bat species are protected under the Eurobats convention and a number of species are likely to be present within the Project AoI.	Bats could be affected by both habitat loss and disturbance as well as operational impacts. An action plan is needed.	Bat Action Plan
Dinnik's Viper Vipera dinniki (IUCN: VU GRL: VU)	PBF	Occurs in less than 20,000 km ² , its distribution is severely fragmented, and the species is declining due to persecution, over-collecting and overgrazing of its habitat.	Present in the broader AoI, the viper inhabits the upper-forest zone and is found near streams, shrub forests, meadows and rocky scree. An adaptive management approach will be adopted for this species based on monitoring of any induced mortality.	Monitoring and adaptive management
Various Fish eg Brown Trout Salmo trutta (IUCN: LC GRL: VU)	PBF	Brook Trout (Salmo fario) and Brown trout (Salmo trutta) are both recorded regularly and are listed as GRL "Vulnerable".	Likely to be found in the AoI and could be affected by accidental or chronic pollution. To be supported through the rivers action plan.	Monitoring and Adaptive Management to be applied

7 CONCLUSIONS

Based on the above analysis, and in addition to the overall 18.9 ha of natural habitat to be offset to achieve no-net loss as part of the general construction works (see Section 3), the following specific biodiversity action plans are proposed for the project:

- Birch Krummholz and Low Grass Marsh habitats
- Endemic Plant Species
- Notable Birds: Black Grouse; Egyptian Vulture; Corncrake
- Migratory Raptors
- Notable Mammals: Caucasian Chamois, Otter; Bats

Further details of these are provided as a stand-alone BAP document. Additional studies are being undertaken in spring 2019. If required, this CHA document and the associated BAP document will be updated as a result of those studies. The BAP itself will ultimately be the responsibility of the Georgian Roads Department, but will be delivered through a combination of activities to be undertaken under the supervision of the Project Engineer and Contractor as outlined further in the International EIA document, and the BAP itself.

APPENDICES

Appendix A: Detailed Habitat Description

4.1 Lot 1: Northern Portal Tunnel 5

The project section ends near the village of Kobi, in the Narvani River gorge (elevation of 1976m). During strong rain and snow-melt season the stone-loamy sand flatland meadow here floods and the river banks are practically devoid of vegetation. In higher areas mixed grasses are present and the land is used as a pasture. Overall the vegetation between the proposed exit portal and the end of the new alignment is recorded as **strongly degraded meadow**.

The northern tunnel portal itself is located in the slope adjacent to the Baidara River. Vegetation in the area is sparse. On the slope where the portal will be located thin stands of young pine *Pinus kochiana*, Litwinow's Birch *Betula litwinowii*, and willow (*Salix caprea* and *Salix arbuscula*) with mixed grasses. Species recorded included fescue (*Festuca varia*), Lady's mantle (*Alchemilla tephrosericae*), Kura clover (*Trifolium ambiguum*), Buttercup (*Ranunculus caucasicus*), Wormwood (*Artemisia absinthium*), Meadow foxtail (*Alopekurus pratensis*), Caraway (*Carum meifolium*), Carpenter's weed (*Achillea millefolium*), Thistle (*Cirsium caucasicum*), Bristly hawkbit (*Leontodon hispidus*). The area is used for cattle grazing and is strongly degraded.



An area of medium-age mixed woodland to the north-east of the project includes Pine (*Pinus sosnovskyi*), Litwinow's birch (*Betula litwinowii*) and Goat willow (*Salix caprea*), and further forested areas to the north-east of the village of Kobi (other side of the Narvana River) are included as part of the Kazbegi National Park (see later). However, no mature trees are present in the section from the tunnel portal to the end point of the road and the **landscape is generally not considered particularly sensitive**.

Data from the broader area notes the presence of a number of endemic (but common) species within areas of meadow and woodland edges. These include the Caucasian endemic plants: *Gladiolus caucasicus*, *Ligularia subsagittata*, *Parnassia palustris*, *Iris caucasica*, and *Ranunculus baidarae*. During the site survey, one of these (*Ligularia subsagittata*) was recorded in the area adjacent to the tunnel portal. Whilst endemic, the species is not considered endangered and can be found in all mountain regions of the

Caucasus (including forest zones, humid meadow and agricultural land.) Indeed no IUCN and/or Georgian Red List species have been found during the botanical surveys.

Generally the environs of the northern portal were considered as supporting typical sub-alpine local complexes of plants from three main habitat types: **vegetation of pastures (62GE05)**; **subalpine birch krummholz (9BF-GE)**; and **Alpine rivers and their ligneous vegetation (323 GE)**.



Subalpine birch krummholz (9BF-GE);

Areas of subalpine birch krummholz were present along the slopes above the Tergi and its tributaries (including the Baidara) together with areas of meadow and pine inclusions.

Habitats on the other bank of the Baidara and Tergi rivers (as well as the environs of Kobi) consisted of **Alpine rivers and their ligneous vegetation (323 GE)** and **Vegetation of pastures (62GE05)**. On the banks bushes of *Crataegus*, *Rosa canina*, *Salix arbuscula*, *Rhododendron flavum*, *Salix caprea* and *Paliurus spina-christi* are sometimes met. Vegetation on the sandy bank of the river is generally seasonal with a mix of annual and perennial grasses and dicotyledonous plants.



Vegetation on the Right Bank of the River Baidara Alpine rivers and their ligneous vegetation



Project corridor – left bank of the Narvani River Vegetation of pastures 62GE05



Right bank of the Tergi river Habitat: Alpine rivers and their ligneous vegetation (323 GE)

In addition to the above, a number of specific sub-communities are found in this area including the following:

Sub Community	Details
<i>Deschampsia cespitosae</i>	Met along the river banks and waterlogged areas. Typical plants are - <i>Equisetum arvense</i> , sedges (<i>Carex canescens</i> , <i>C. hirta</i> , <i>C. Irrigua</i>), <i>Parnassia palustris</i> , etc.
<i>Festuca ovina</i> meadows	Found on the south oriented slopes. The plants are low, coverage percent low, species composition – poor. Typical species are: <i>Koeleria albobvii</i> , <i>Bromopsis riparia</i> , <i>Agrostis tenuis</i> , <i>Carex buschiorum</i> , <i>Pulsatilla violacea</i> , <i>Thymus collinus</i> .
<i>Geranium</i> spp.	Common on the slopes of the Greater and the Lesser Caucasus ridges in stony areas and moraines. <i>Geranium ibericum</i> uses to be found in the edges of the forested areas, medium inclination slopes and flat areas. Species such as <i>Calamagrostis arundinacea</i> , <i>Inula orientalis</i> , <i>Rhododendron caucasicum</i> – found mainly on the north slopes.
<i>Stachys macrantha</i>	Typical sub-community for meadows in the central and eastern parts of Greater Caucasus and Lower Caucasus ridges.
<i>Anemone fasciculata</i>	Found on slopes with optimum humidity and flat areas. On drier slopes it is ousted by <i>Hedysarum caucasicum</i> .

<i>Veratrum lobelianum</i> in sub-alpine meadows	Present in the central and western parts of the Lower Caucasus. It is poisonous and not consumed by cattle, therefore it is well preserved in overgrazed areas. The plant is found in <i>Trollius patulus</i> and <i>Ranunculus caucasicus</i> subcommunities.
<i>Astragalus captiosus</i>	Common on the overgrazed south sloped of the central part of the Caucasus ridge.

4.2 Lot 1: Southern Portal Tunnel 5

The southern portal of the main tunnel is located near the village of Tskere, within the Khadistskali valley at an elevation of some 1880m. The area has traditionally been used to be used for extensive cattle grazing; but a declining permanent population in the villages of the gorge means that most of the areas are no longer in use. Vegetation is classified as **Pastures and meadow degraded by ants and rodents (62GE05).**

Communities observed on the right bank of the river here includes: *Heracleum*, *Agasyllis*, *Ligusticum*, *Alchemilla*, *Rumex alpinus*, *Cirsium*, *Leucanthemum vulgare*, *Cirsium* and other plant communities whilst on the pastures meadows White hellebore (*Veratrum lobelianum*) is found.

The extensive grassland damage by rodents and ants means that overall the ecological value of the pasture and hay meadows is considered to be low.



Goat willow (*Salix caprea*) and Whitebeam (*Sorbus caucasigena*) were also recorded within the gorges of the river, whilst individual mature trees of Aspen (*Populus tremula*), Red bud maple (*Acer trautvetteri*), Litwinow's Birch (*Betula litwinowii*), Caucasian pear (*Pyrus caucasica*), Rowan (*Sorbus caucasigena*) and Goat willow (*Salix caprea*) were recorded at the village.

Adjacent to the south portal of the tunnel the vegetation was also recorded as **Vegetation of pastures: Degraded pasture meadow (62GE05)**, although some areas of subalpine high grass, deep, humus rich and humid areas were also present.



On the left bank of the river, on the south slope at higher elevations Litwinow's Birch (*Betula litwinowii*) and Azalea (*Rhododendron luteum*) copses were present, with occasional juniper bushes. **Non-native Azaleas** were common in these meadows. The plant is poisonous, is not grazed by domestic animals, and is spreading unhindered in the region. It was also recorded in glades together with other shrubs (eg hazelnut *Corylus avellana* groves, bilberry- *Rubus idaeus* bushes).



Betula litwinowii, *Rhododendron flavum* and *Juniperus depressa*

In areas of **wet meadow** near Tsekere Marshmarigold (*Caltha palustris*) and Monk's-rhubarb (*Rumex alpinus*) were recorded. **Vegetation of agricultural-economic settlements and cultivable land (62GE04)** was present in the area to be directly affected near Tskere section.

4.3 Lot 2: Southern End: Kvesheti to Tunnel 1

Around Kvesheti the habitats are classified as **Alpine rivers and their ligneous vegetation (323 GE)** and the sandy and stone substrate of the riverine area supports shrubs including Tamarix (*Tamarix*) and Willow (*Salix arbuscula*). The area is degraded by human activities, including domestic waste dumped on the slopes and commonly recorded species included Sosnowsky's hogweed (*Heracleum sosnowskyi*), thistles (*Cirsium* sp.), European water-plantain (*Alisma plantago-aquatica*), Dwarf nettle (*Urtica urens*), Monk's-

rhubarb (*Rumex alpinus*), rush (*Luzula* sp, *Juncus*), Puzzlegrass (*Equisetum*), clover species (*Trifolium* sp.), primula (*Primula macrocalyx*), Purple Orchid (*Orchis purpurea*), etc.



Alpine rivers habitats at Kvesheti

In higher areas between the project alignment and existing road, most habitats are planted homestead plots (**62GE04 - Vegetation of agricultural-economic settlements and cultivable land**) and species present include walnut, poplar, apple (*Malus orientalis*), European wild pear (*Pyrus caucasica*), Common nut (*Corylus avellana*), willow (*Salix alba*), Mountain-ash (*Sorbus caucasigena*), Litwinow's Birch (*Betula litwinowii*), and Pomegranate (*Punica granatum*).



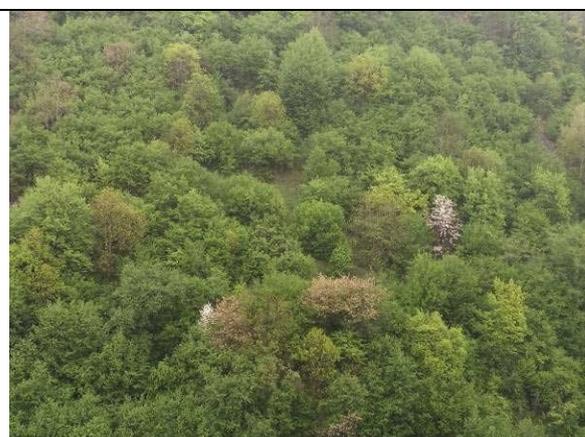
Area adjacent to Kvesheti: Vegetation of agricultural-economic settlements and cultivable land (62GE04)

At the end of Kvesheti, near the bridge, the proposed road alignment follows the existing road towards the village of Arakveti before crossing the Tetri Aragvi River. Flat areas here are fenced and used for agricultural activities (**Vegetation of agricultural-economic settlements and cultivable land – 62 GE04**).

Kvesheti – Kobi Road Upgrade Critical Habitat Assessment (CHA)



After crossing the Tetri Aragvi, the road will enter a tunnel located in the forested slope, on the left bank of the river. The habitat here is classified as **Alluvial forests (91E0*)** and dominant species include Oriental hornbeam (*Carpinus orientalis*) with Acer (*Acer* sp.), Poplar (*Populus tremula*), Ash (*Fraxinus excelsior*), Hawthorn (*Crataegus*), Cornel (*Cornus mas*), Cherry plum (*Prunus divaricata*), common dogwood (*Thelycrania australis*), Goat willow (*Salix caprea*), apple (*Malus orientalis*) as well as individual Sessile oaks (*Quercus iberica*).



Project corridor – Tunnel 1 portal area Alluvial forests (91E0 *)

4.4 Lot 2: North of Tunnel 1 to Zakatkari

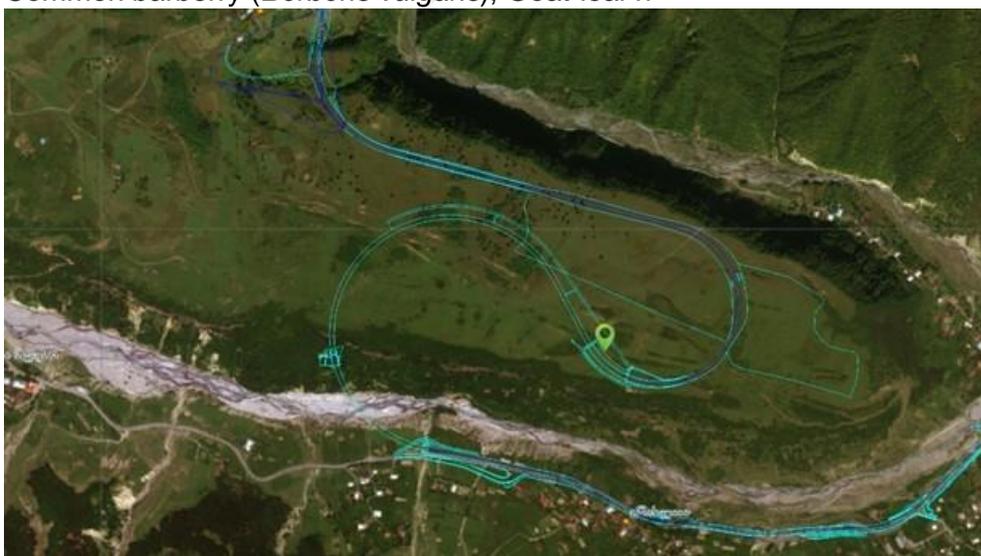
North of Tunnel 1 the road passes onto the large plateau towards the village of Zakatkari. The area is used as a pasture and habitats are mostly **vegetation of pastures (62GE05)** with **low grass marshes (70GE03)** in wetter areas.



Plateau area: Habitat 62GE05: Vegetation of pastures

Aerial Photograph of the Plateau. Low grass marsh areas re found in some of the darker areas away from the plateau edges.

Shrubs including yellow azalea (*Rhododendron flavum*) (a widespread invasive that cattle do not graze) are also present around the plateau area, as well as scattered copses with Oriental hornbeam (*Carpinus orientalis*) and Goat willow (*Salix caprea*). Individual trees of hazel (*Corylus avellana*), Cherry plum (*Prunus divaricata*), Bird cherry (*Cerasus silvestris*), Common barberry (*Berberis vulgaris*), Goat-leaf h



oneysuckle (*Lonicera caprifolium*) are also present with European wild pear (*Pyrus caucasica*) and apple (*Malus orientalis*) more common (often mature trees). Fruits of these trees are used by cattle and wild animals as a fodder. Woodland areas next on the fringes of the grasslands support Oriental hornbeam (*Carpinus orientalis*) and Common hornbeam

(*Carpinus caucasica*) with Poplar (*Populus tremula*), high mountain Red bud maple (*Acer trautvetteri*), Ash (*Fraxinus excelsior*) and various berries and fruit trees/bushes.



Plateau area: Habitat 70GE03 - Low grass marshes

A number of areas currently suggested for spoil disposal support low grass marsh areas and waterlogged meadow where water and wetland plants are found. Plant species here include: *Luzula*, *Eguisetum* and *Juncus*. Other areas support common grasses and plants such as *Alchemilla*, *Rumex alpinus*, *Cirsium*, *Juncus*, *Carex* and other low productive plant communities. The meadow is of low value as a pasture and is overgrazed area with ant mounds and rodent burrows common, along with fragments of burnt invasive Yellow azalea (*Rhododendron flavum*) bushes²¹. Shrubs of mountain willow (*Salix arbuscula*) and Oriental hornbeam (*Carpinus orientalis*) are also present but forest areas are outside the boundaries of proposed spoil disposal site and will not be affected.

View of the plateau



²¹ According to information obtained on the site the bushes have been burnt by shepherds to protect cattle and sheep from wolves that might be using the shrubs as a shelter.



View of the area with burnt yellow azalea bushes and vegetation of agricultural-economic settlements and cultivable land (62GE04)

Continuing towards Zakatkari the land continues to be used for agricultural purposes (pastures and mowing land) with two habitats present here namely **62GE04 - Vegetation of agricultural-economic settlements and cultivable land** and **62GE05 - Vegetation of pastures**.



Pastures adjacent to Zakatkari village Habitat: 62GE05 - Vegetation of pastures

4.5 Lot 2: Zakatkari across the Khadistskali River

Vegetation of the north and the south slopes on the right and the left banks of the Khadistskali river differ significantly in both species composition and quantity.



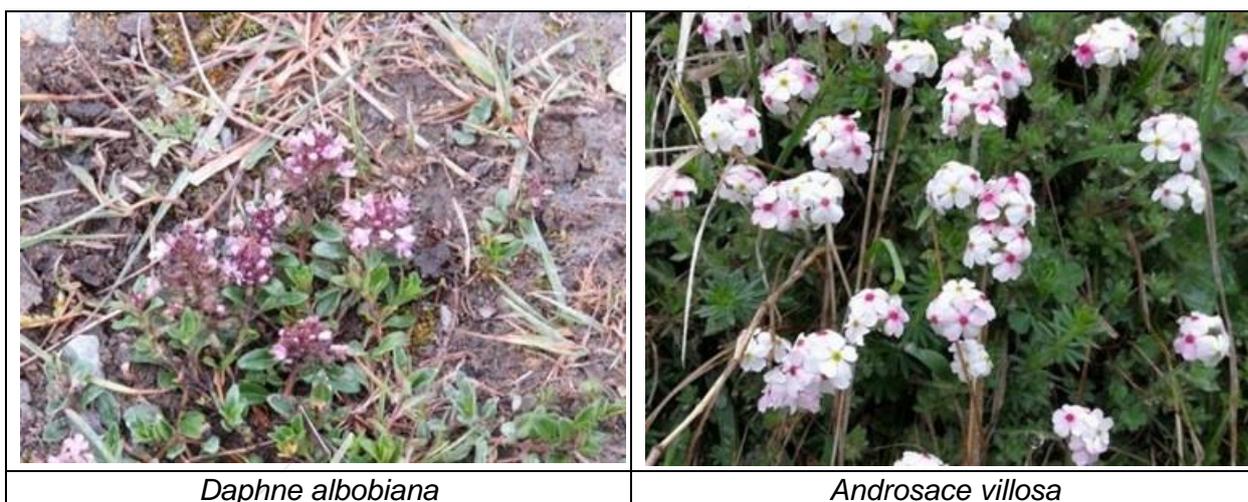
On the

right bank of the river, the steep wooded sides are dominated by mature sycamore (*Acer pseudoplatanus*) and Ash (*Fraxinus excelsior*) with hornbeam (*Carpinus caucasica*), lime (*Tilia caucasica*), Elm (*Ulmus foliacea*), European wild pear (*Pyrus caucasica*), Goat willow (*Salix caprea*), and Common alder (*Alnus barbata*) also present. Cornelian cherry (*Cornus mas*), hazel (*Corylus avellana*), Cherry plum (*Prunus divaricata*), Mountain ash (*Sorbus caucasigena*), common hawthorn (*Crataegus sp.*), Elder (*Sambucus nigra*) and Honeysuckle (*Lonicera caucasica*) are also present and the groundflora includes *Polygonatum verticillatum*, *Primula macrocalyx*, *Aruncus vulgaris*, *Telekia speciosa*, *Viola sp.*, *Cirsium sp.*, *Achillea setacea*, *Centaurea salicifolia*, *Pachyphragma macrophyllum*, *Driopteris*, *Petasites georgicus* and *Oxalis acetosella*.



Right bank of the Khadistskali: Alluvial forest with Alder (*Alnus glutinosa*) and Ash (*Fraxinus excelsior*): Code of Georgia 91E0*

Access to the area is poor and the mostly mature nature of the trees means that it is considered of potentially **high conservation value**. *Daphne albobiana* (GRL: EN) and *Androsace villosa* have also been recorded in rocky slopes here devoid of forest vegetation, although no such areas will be affected by the project.



On the left bank of the Khadistskali river (southern slope) is hillier with deep gorges overgrown with Alder (*Alnus barbata*) near the river. On the southern slopes the forest is generally sparse although in areas Oriental hornbeam (*Carpinus orientalis*) is common alongside goat willow (*Salix caprea*), Ash (*Fraxinus excelsior*), Common hornbeam (*Carpinus caucasica*), apple (*Malus orientalis*), and European wild pear (*Pyrus caucasica*), with hazel (*Corylus avellana*), common hawthorn (*Crataegus pentaguna*), Cornelian cherry (*Cornus mas*), mountain ash (*Sorbus caucasigena*) and Butterbur (*Petasites georgicus*) also present. Forested areas here are generally secondary and young with few middle-aged trees, mainly in poorly accessible upper areas.



View of vegetation in the tunnel portal area

4.6 Lot 2: Sviana-Rostiani to Beniani-Begoni, Mughure and Tskere



This final section of the alignment is similar to that at Tskere, with two main habitats present namely **Vegetation of agricultural-economic settlements and cultivable land (62GEO4)** and **Vegetation of pastures (62GEO5)**. Species present include: *Sorbus caucasigena*, *Salix caprea*, *Populus tremula*, *Corylus avellana*, *Carpinus orientalis*, *Rosa canina*, *Avenastrum pratense*, *Festuca pratensis*, *Poa pratensis*, *Heracleum*, *Taraxacum officinale*, *Alchemilla*, *Agasyllis*, *Leucanthemum vulgare*, *Nardus stricta*, *Gagea glacialis*, *Ligusticum*, *Rumex alpinus*, *Cirsium sp*, *Tussilago farfara*, *Trollius Patulus*.

Appendix B Results of Initial Fauna Surveys

Please note that these surveys have since been complimented by additional surveys undertaken in autumn 2018, which have informed this CHA and are reported separately. Further work will also be done in Spring 2019 to further enhance our understanding of the ecology of the Aol.

Methodology

The initial fauna surveys involved a combination of desk top studies and walkover surveys of both the existing road and the design alignment in April and May 2018. The field surveys involved transects in which animal species present, and appropriate habitats were identified through a combination of observations and other evidence including excrement, holes, burrows, feathers, fur, etc. The surveyed corridor width was ranging from 50 to 100m depending on location. Specific details on surveys for particular groups are provided below. During these field surveys particular information was collated on the birds in the Kobi area given its location close to Kazbegi National Park and within the Special Protection Area for Birds (SPA 9). Specific searches were also made of reptiles and amphibians in wet areas and under refuges.

Mammals

Desk studies indicate that the following mammals (excluding bats) have been recorded from the broader area and could be present within the Project Aol:

Scientific name	Common name	IUCN	GRL	Lot 1	Lot 2
<i>Erinaceus concolor</i>	Common hedgehog	LC	LC	√	√
<i>Canis lupus</i>	Grey wolf	LC	LC	√	√
<i>Lutra lutra</i>	Eurasian otter	VU	NT		√
<i>Meles meles</i>	European badger	-	LC		√
<i>Dryomys nitedula</i>	Forest dormouse	NE	LC	√	√
<i>Lynx lynx</i>	Eurasian lynx	CR	LC	√	√
<i>Lepus europeus</i>	European hare	-	LC		√
<i>Sciurus anomalus</i>	Caucasian squirrel	VU	LC	√	√
<i>Canis aureus</i>	Golden jackal	-	LC		√
<i>Mustela nivalis</i>	Least weasel	NE	LC	√	√
<i>Felis silvestris</i>	Wild Cat	NE	LC	√	√
<i>Vulpes vulpes</i>	Red fox	LC	LC	√	√
<i>Ursus arctos</i>	Brown bear	EN	LC	√	√
<i>Capreolus capreolus</i>	Roe Deer	LC	LC		√
<i>Sorex raddei</i>	Radde's shrew	NE	LC	√	√
<i>Martes foina</i>	Beech marten	LC	LC	√	√
<i>Martes martes</i>	European pine marten	NE	LC	√	√
<i>Apodemus uralensis</i>	Pygmy field mouse	LC	LC	√	√
<i>Talpa levantis</i>	Levant mole	NE	LC	√	√
<i>Rupicapra rupicapra</i>	Chamois	EN	LC	√	√
<i>Capra cylindricornis</i>	Dahestanian Tur	VU	VU	√	√
<i>Chionomys gud</i>	Gudauro Vole	DD	LC	√	√
<i>Chionomys roberti</i>	Robert's Snow Vole	DD	LC	√	√
<i>Prometheomys schaposchnikovi</i>	Long-clawed mole-vole	VU	NT	√	√

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IUCN - International Union for Conservation of Nature; GRL – Red List of Georgia; LC- Least Concern; NE – Not Evaluated ; EN - Endangered; VU - Vulnerable; CR - Critical; DD – Data deficient

Further research and consultations with local residents indicated that the most common mammals in the area are Red fox (*Vulpes vulpes*) and Beech marten (*Martes foina*). Chamois (*Rupicapra rupicapra*) is known from the National Park area (Sakhizrebi area) and the right bank of the Tergi river. Locals report that in winter and early spring wolves use to be seen in the area and every year there are several cases of wolves attacking the cattle. Locals also mention that traces of bear are sometimes seen near the cattle barns. Others speak about a cat seen in the middle flow of the Narvani river. This can be Eurasian lynx (*Lynx lynx*), however within the last 5-6 years such cases are seldom reported.

Bats (which are all protected by the EUROBATS agreement) may be found in houses, hollows trees and/or rock fissures along the project alignment. The data search recorded 6 species of bats from along the project corridor (all recorded from both Lot 1 and Lot 2) as follows:

Scientific name	Name in English	IUCN	GRL
<i>Myotis nattereri</i>	Natterer's Bat	LC	-
<i>Myotis mystacinus</i>	Whiskered bat	LC	-
<i>Nyctalus leisleri</i>	Leisler's bat	LC	-
<i>Pipistrellus pipistrellus</i>	Common pipistrelle	LC	-
<i>Pipistrellus pygmaeus</i>	Soprano pipistrelle	LC	-
<i>Plecotus auritus</i>	Brown long-eared bat	LC	-

Birds

The initial data search indicated some 26 species of nesting birds had been recorded from the Lot 1 area (mainly passerines and waterfowl) and 43 from the Lot 2 area as shown in the table below. (This information has since been supplemented by further studies that indicate the presence of a number of other breeding species in the wider area, including Egyptian Vulture within the Project Aol itself). The Lot 1 alignment (around 5.5km) is located within the area important for birds (SPA#9), and close to the Kazbegi Protected Areas and more uncommon species may be present here. The following species were recorded as “commonly found” in the literature:

Latin name	Common name	Season	IUCN	GRL	Lot 1	Lot 2
<i>Charadrius dubius</i>	Little Ringed Plover	YR-R, M	LC	-	√	√
<i>Actitis hypoleucos</i>	Common Sandpiper	YR-R, M	LC	-	√	√
<i>Hirundo rustica</i>	Barn Swallow	BB, M	LC	-	√	√
<i>Hirundo rupestris</i>	Eurasian Crag martin	BB, M	LC	-	√	√
<i>Athene noctu</i>	Little Owl	M	LC	-		√
<i>Strix aluco</i>	Tawny Owl	YR-R	LC	-		√
<i>Anthus spinoletta</i>	Water Pipit	BB, M	LC	-	√	√
<i>Passer domesticus</i>	House sparrow	YR-R	LC	-		√
<i>Motacilla alba</i>	White Wagtail	YR-R, M	LC	-	√	√
<i>Motacilla cinerea</i>	Grey Wagtail	YR-R, M	LC	-	√	√
<i>Lanius collurio</i>	Red-backed Shrike	BB, M	LC	-	√	√
<i>Lanius excubitor</i>	Greater Grey Shrike	WV	LC	-		√
<i>Sylvia atricapilla</i>	Blackcap	BB, M	LC	-	√	√

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<i>Saxicola rubetra</i>	Whinchat	BB, M	LC	-	√	√
<i>Oenanthe oenanthe</i>	Northern Wheatear	BB, M	LC	-	√	√
<i>Phoenicurus ochruros</i>	Black Redstart	YR-R, M	LC	-	√	√
<i>Phoenicurus phoenicurus</i>	Common Redstart	BB, M	LC	-		√
<i>Emberiza melanocephala</i>	Black-headed Bunting	BB, M	LC	-		√
<i>Phylloscopus collybita</i>	Common Chiffchaff	BB, M	LC	-		√
<i>Sitta europaea</i>	Wood Nuthatch	YR-R	LC	-		√
<i>Turdus merula</i>	Eurasian Blackbird	YR-R	LC	-	√	√
<i>Parus major</i>	Great Tit	YR-R	LC	-	√	√
<i>Parus caeruleus</i>	Blue Tit	YR-R	LC	-	√	√
<i>Aegithalos caudatus</i>	Long-tailed Tit	YR-R, M	LC	-		√
<i>Troglodytes hiemalis</i>	Winter Wren	YR-R	LC	-	√	√
<i>Carduelis carduelis</i>	European Goldfinch	YR-R, M	LC	-	√	√
<i>Carduelis chloris</i>	European Greenfinch	YR-R, M	LC	-		√
<i>Carduelis flavirostris</i>	Twite	YR-R	LC	-		√
<i>Pyrhacorax pyrrhacorax</i>	Red-billed Chough	YR-R	LC	-		√
<i>Pyrhacorax graculus</i>	Yellow-billed Chough	YR-R	LC	-		√
<i>Corvus corax</i>	Common Raven	YR-R	LC	-		√
<i>Cuculus canorus</i>	Common Cuckoo	BB, M	LC	-		√
<i>Corvus frugilegus</i>	Rook	YR-R, M	LC	-		√
<i>Eremophila alpestris</i>	Horned Lark	YR-R, M	LC	-		√
<i>Delichon urbicum</i>	Northern House Martin	BB, M	LC	-		√
<i>Turdus viscivorus</i>	Mistle Thrush	YR-R, M	LC	-		√
Neophron percnopterus	Egyptian Vulture	BB, M	EN	VU		√
<i>Pernis apivorus</i>	European Honey-Buzzard	BB, M	LC	-		√
<i>Erithacus rubecula</i>	European Robin	M	LC	-		√
<i>Carpodacus erythrinus</i>	Common Rosefinch	BB, M	LC	-		√
<i>Buteo buteo</i>	Common Buzzard	YR-R, M	LC	-		√
<i>Emberiza sp.</i>	Bunting	BB, M	LC	-		√
<i>Sylvia curruca</i>	Lesser Whitethroat	BB, M	LC	-		√

The number and species composition of birds in the area increases during **autumn and spring migrations**, and significant numbers of birds can be registered in lowland areas in **winter** as well. The main migration route crossing the project region starts in the Russian Federation, goes along the Tergi river, over Jvari pass and Gudauri before following the Tetri and Black Aragvi rivers towards the Mtkvari river before eventually heading towards Iran. Area adjacent to the project may be used by raptors and passerines as a resting place during migration. This includes the Tergi gorge (for waterfowl), as well as forest and areas not used for agricultural purposes. The Khadistskali gorge is not considered as migration corridor. Data reviewed indicated that numbers of nesting birds within the study area is rather low, and most species are common.

The **Lot 1** project area is partly located within the Special Protection Area for Birds (SPA#9) – Khevi (Category: B2, C2, C5) and IBA (GEO21). Species of concern: include Caucasian Grouse (*Lyrurus mlokosiewiczzi*), Bearded vulture (*Gypaetus barbatus*), Griffon Vulture (*Gyps fulvus*), Black Vulture (*Aegyptius monachus*), Guldenstadt's Redstart (*Phoenicurus erythrogastrus*), Great Rosefinch (*Carpodacus rubicilla*), and soaring birds. There are large breeding populations of Caucasian grouse (Gavashelishvili et al. 2010), Guldenstadt's Redstart and Great Rosefinch in the Khevi SPA. 2-3 pairs of Bearded vulture

and 15-20 pairs Griffon Vulture breed in Khevi. Black Vulture is Year-round visitor (Galvez et al. 2005). An area is used by over 30 000 raptors for migration in autumn and spring. All of species (except Black Vulture) are included on the red list of Georgia as Vulnerable (VU) and Black Vulture as Endangered (EN). Caucasian Grouse and Black Vulture are also classified on the IUCN red list as Near Threatened (NT). Uncommon species found in the wider areas include many nesting at higher elevations (2500masl) as shown in the table below.

Scientific name	Common name	Season	IUCN	GRL
<i>Phoenicurus erythrogastrus</i>	Güldenstädt's Redstart	YR-R	LC	VU
<i>Carpodacus rubicilla</i>	Great Rosefinch	YR-R	LC	VU
<i>Tetraogallus caucasicus</i>	Caucasian Snowcock	YR-R	LC	-
<i>Lyrurus mlokosiewiczii</i>	Caucasian Grouse	YR-R	NT	VU
<i>Gyps fulvus</i>	Eurasian Griffon Vulture	YR-R	LC	VU
<i>Gypaetus barbatus</i>	Bearded Vulture	YR-R	NT	VU
<i>Falco peregrinus</i>	Peregrine Falcon	YR-R, M	LC	-

The **Lot 2** Kvesheti –Tskere corridor is considered generally less sensitive as it is not located within the main migration corridor or within the SPA. During the site visits most bird species seen (or identified by song) were common species, although the protected Egyptian vulture was seen, as well as other raptors.

	
<p>Egyptian Vulture (<i>Neophron percnopterus</i>)</p>	<p>European Honey-Buzzard (<i>Pernis apivorus</i>)</p>
	
<p>Red-backed Shrike (<i>Lanius collurio</i>)</p>	<p>Common Redstart (<i>Phoenicurus phoenicurus</i>)</p>

	
Yellow-billed chough (<i>Pyrrhocorax graculus</i>)	Common cuckoo (<i>Cuculus canorus</i>)
	
Common rosefinch (<i>Carpodacus erythrinus</i>)	European goldfinch (<i>Carduelis carduelis</i>)
	
White wagtail (<i>Motacilla alba</i>)	Blue tit (<i>Parus caeruleus</i>)

	
<p>Black-headed bunting (<i>Emberiza melanocephala</i>)</p>	<p>Wood nuthatch (<i>Sitta europaea</i>)</p>
	
<p>Long-tailed tit (<i>Aegithalos caudatus</i>)</p>	<p>Eurasian blackbird (<i>Turdus merula</i>)</p>
	
<p>Greater grey shrike (<i>Lanius excubitor</i>)</p>	<p>Great tit (<i>Parus major</i>)</p>

Reptiles

The desk study indicated that 9 reptile species are recorded in and around the **Lot 1 Project Area** including the Artwin lizard (*Darevskia derjugini*) (according to Tarkhnishvili et al 2012-2013). One regional endemic lizard - Georgian lizard (*Darevskia rudis*) and two Caucasus endemic species - Daghestanian Lizard (*Darevskia daghestanica*) and Caucasian Lizard (*Darevskia caucasica*) are also recorded along with three snake species. The **Lot 2 study area** is not considered notable for diversity and endemism of reptile species and no endangered species have been recorded.

During the site visit 2 species of snake and two species of lizards were recorded. Areas of particularly notable habitat recorded included riverine areas where Grass Snake (*Natrix natrix*) and Tessellated Water Snake (*Natrix tessellata*), Caucasian Lizard (*Darevskia caucasica*) and othe lizards, were present as well as other areas supporting Artwin Lizard (*Darevskia derjugini*) and Smooth Snake (*Coronella austriaca*).

Reptiles in the project region (Lot1)

Scientific name	Common name	IUCN	GRL	Lot 1	Lot 2
<i>Coronella austriaca</i>	Smooth Snake	LC	LC	√	√
<i>Natrix natrix</i>	Grass Snake	LC	LC	√	√
<i>Natrix tessellata</i>	Tessellated Water Snake	LC	LC	√	√
<i>Vipera dinniki</i>	Caucasus Subalpine Viper	VU	VU	√	
<i>Darevskia caucasica</i>	Caucasian Lizard	LC	DD	√	√
<i>Darevskia derjugini</i>	Artwin Lizard	NT	LC	√	√
<i>Lacerta strigata</i>	Striped Lizard	LC	LC	√	√
<i>Darevskia daghestanica</i>	Daghestanian Lizard	LC	NT	√	
<i>Darevskia rudis</i>	Georgian lizard	LC	LC	√	√
<i>Anguis colchica</i>	Slow worm	NT	LC		√
<i>Lacerta agilis</i>	Sand Lizard	LC	DD		√

IUCN - International Union for Conservation of Nature; GRL – Red List of Georgia LC-Least Concern; VU- Vulnerable; NT- Near threatened; DD - Data deficient



Smooth Snake (*Coronella austriaca*)



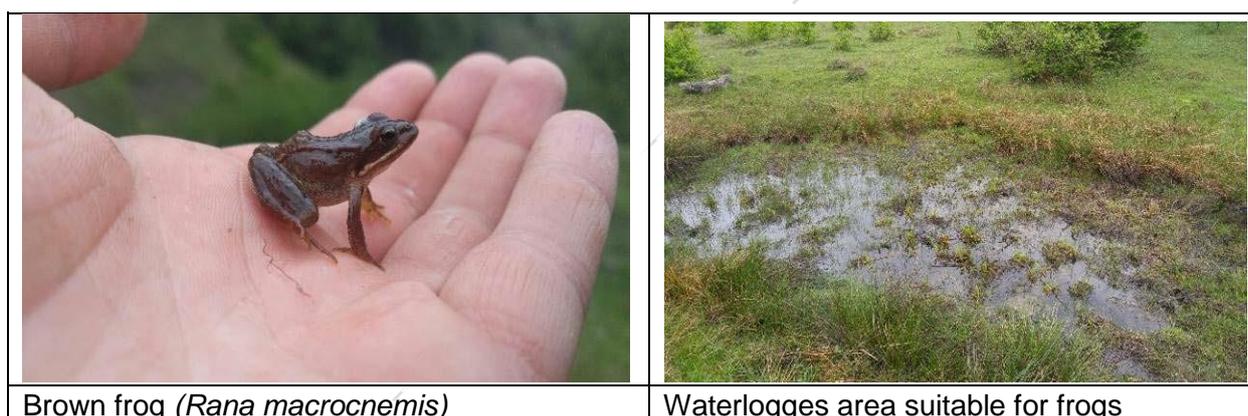
Caucasian Lizard (*Darevskia caucasica*)

Amphibians

Five amphibian species were recorded from the **Lot 1** region based on desk data (Tarkhnoshvili 1985, 1996 data). None of these are protected. No amphibian eggs or adults were recorded in surveys. The Lot 2 area was not notable for diversity of the species or the level of endemism. Several dozen individuals of Lake frogs and one Brown frog were recorded during the site visit in May. Common Treefrog was identified by call. Overall the following amphibians are recorded:

Scientific name	Common name	IUCN	GRL	Lot 1	Lot 2
<i>Bufo verrucosissimus</i>	Caucasian Toad	NT	NT		√
<i>Bufo viridis</i>	Green toad	LC	LC	√	√
<i>Ommatotriton ophryticus</i>	Banded newt	NT	LC	√	
<i>Triturus karelinii</i>	Eastern crested newt	LC	NT	√	
<i>Pelophylax ridibundus</i>	Lake frog	LC	LC	√	√
<i>Rana macrocnemis</i>	Brown frog	LC	LC	√	√
<i>Hyla orientalis</i>	Common Treefrog	LC	LC		√

The following figures show some of the species recorded on site



Brown frog (*Rana macrocnemis*)

Waterlogges area suitable for frogs

Invertebrates

Incidental observations of invertebrates were made during the field surveys. Methods included a combination of capture of insects on the wing; turning over stones and soil; checking of plants; photographing; beating; and checking pond bottoms by sieving. The following invertebrates were recorded (all Lot 2 area):

Latin Name	Common name	GRL	IUCN
<i>Nymphalis antiopa</i>	Mourning-cloak butterfly	NE	NE
<i>Lampyris noctiluca</i>	Glow-worm	NE	NE
<i>Geotrupes spiniger</i>	Dumbledor beetle	NE	NE
<i>Purpuricenus budensis</i>	Red long-horned Beetle	NE	NE
<i>Lucanus ibericus</i>	Scarab beetle	NE	NE
<i>Polyommatus amandus</i>	Amanda's blue butterfly	NE	NE
<i>Polyommatus corydonius</i>	False chalkhill blue butterfly	NE	NE
<i>Polyommatus thersites</i>	Chapman's blue butterfly	NE	NE
<i>Cercopis intermedia</i>	Froghopper	NE	NE

<i>Vanessa atalanta</i>	Red admiral butterfly	NE	NE
<i>Mylabris quadripunctata</i>	Four-spotted blister beetle	NE	NE
<i>Dorcus parallelipedus</i>	Lesser stag beetle	NE	NE
<i>Libellula depressa</i>	Broad-bodied chaser	NE	LC
<i>Pieris rapae</i>	European cabbage butterfly	NE	NE
<i>Plebeius argus</i>	Silver-studded blue butterfly	NE	NE
<i>Aphis urticata</i>	Dark green nettle aphid	NE	NE
<i>Pieris brassicae</i>	Cabbage butterfly	NE	NE
<i>Pyrrhocoris apterus</i>	Firebug	NE	NE
<i>Lymantria dispar</i>	Gypsy moth	NE	NE
<i>Gryllus campestris</i>	Field cricket	NE	NE
<i>Decticus verrucivorus</i>	Wart-biter	NE	NE
<i>Tettigonia viridissima</i>	Great green bush-cricket	NE	NE

Appendix 2 Reptile, Amphibian and Invertebrate Photo Log



Scarab beetle *Lucanus ibericus*



Lampyridae

Fish

Fish species likely to be present were identified through a combination of desk study, field surveys and interviews with local fishermen. The field study included a review of habitat suitability for fish based on river bed geomorphology and general hydrological characteristics, as well as:

1. biological analysis of fish (length; weight; gender, maturity stage; collection, fattening coefficient, meristic and plastic characteristics, the digestive tract content);
2. collection, labeling and preservation of scales for subsequent lab analysis;
3. study of food base - hydroflora and hydrofauna; identification of macroinvertebrates and insects used for feeding;
4. study of the status of living environment of both fish and invertebrates;
5. determination of suspended solids; dissolved oxygen (using field tester Oxi 330i); water and air temperature; pH measurements - on-site;
6. sampling of water for lab analysis;
7. assessment of species composition of zoobenthos/protozoa.

Control fish catches have been performed in 4 locations in the rivers of interest (see below) using a combination of one cast and three wall nets. Control fish catches Surveys were based on catch and release principles and every fish caught was logged. Studies of age, growth and growth rate were made through laboratory analysis of fish scales collected during the field survey.

River	Coordinates
Khadistskali	461245 m E 4700270 m N
Tetri Aragvi	461161.00 m E 4697401.00 m N
Narvani	461166.00 m E 4711527.00 m N
Baidara	459146.00 m E 4711636.00 m N
Tetri Aragvi	(2016 survey data)
TA1-2017	454573.00 m E 4704256.00 m N
TA2_2017	454692.00 m E 4703914.00 m N

Control catches sites

Interviews were also with amateur fishermen with at least 5-10 years of fishing experience have been selected. The questionnaire was drawn up so to reduce the risk of false information. Information confirmed by three or more respondents was assumed as reliable. Based on this work the following fish are expected to be present in the rivers of the project area:

Common name	Scientific name	IUCN	GRL	Tergi	Narvani	Baidara	Tetri Aragvi	Khadistskali
Trout	<i>Salmo trutta morfa fario</i>	LC	VU	√	√	√	√	√
Gudgeon	<i>Gobio gobio</i>	LC	-	√				
Roach	<i>Rutilus rutilus</i>	LC	-	√				
Chub	<i>Squalius cephalus</i>	LC	-	√				
Khramulya	<i>Capoeta capoeta</i>	NE					√	
Kura nase (undermouth)	<i>Chondrostoma cyri</i>	NE					√	
Caucasian river goby	<i>Neogobius constructor</i>	LC					√	
Chub Skelly	<i>Squalius cephalus</i>	LC					√	√
Kura barbel	<i>Barbus lacerta</i>	NE					√	
Kura roach	<i>Rutilus rutilus kurensis</i>						√	

Murtsa	<i>Luciobarbus mursa</i>	NE						√
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During the control trout were recorded in all rivers and this has been confirmed by local residents/fishermen as well as surveys carried out by the team for other assignment in the same area in 2017. 2017 survey data are given below:

Control catches data

River	Species	Qty	Length, m	Weight, g	Gender and maturity stage	Age
Khadistskali	Trout	1	20.5	92	♂ III	3+
Tetri Aragvi	Common roach	2	11.5	18	♀ III	3
			11.0	15	♂ III	3
Tetri Aragvi (2017 data)	Trout	5	17.5	65	♀ V	3+
			18.5	67	♀ V	3+
			19.0	71	♀ V	3+
			13.5	53	♂ V	2+
			15.0	57	♂ V	2+
Tetri Aragvi (2017 data)	Trout	5	15.5	55	♂ VI-II	2+
			17.0	58	♂ VI-II	3+
			25	82	♀ VI-II	3+
			23.5	78	♀ VI-II	3+
			24.0	80	♀ VI-II	3+



Trout species obtained during the control catches in the area

Aquatic Invertebrates and plants

A range of macro-invertebrates were recorded in the rivers as shown in the figures below. These included the following:

- DAPHNIA: Daphnia pulex, D. longispina, D. Magna, D. Lumholtzi.
- ENTOMOSTRACA - Ostracoda; Ostracoda, Eucypris inflata;
- MALACOSTRACA – Amphipoda.

The following aquatic plants were also recorded: *Ulotrix zonata*, *Enteromorpha prolifera* and *Cladophora sp.*

	
<p>Rhyacophila</p>	<p>Trichoptera with case</p>
	
<p><i>Charophyceae</i></p>	<p><i>Charophyceae</i></p>

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<p><i>Rhyacophila</i></p>	<p><i>Epeorus</i></p>
	
<p><i>Plecoptera</i></p>	<p><i>Rhyacophila</i></p>
	
<p><i>Trichoptera with case</i></p>	<p><i>Rhyacophila</i></p>

	
<p><i>Rhyacophila</i></p>	<p>Moss</p>
	
<p><i>Plecoptera; Trichoptera with case; Epeorus</i></p>	<p><i>Epeorus</i></p>
	
<p><i>Trichoptera with case</i></p>	<p><i>Plecoptera</i></p>