



## **KVESHETI – KOBI ROAD NORTH SOUTH HIGHWAY, GEORGIA BIODIVERSITY ACTION PLAN**



## EXECUTIVE SUMMARY

This document provides the Biodiversity Action Plan (BAP) for the proposed Kvesheti to Kobi Road Upgrade Project. It is informed by, and should be read alongside, the Project Critical Habitat Assessment (CHA). The CHA has identified potential areas of Critical Habitat (CH) and Priority Biodiversity Features (PBF) that require special protection or mitigation to ensure that the Project achieves “no net conservation loss” or “net conservation gain” as appropriate.

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 road between Kvesheti and Kobi currently runs for some 35km and is at times impassable in the winter months, whilst also having a poor safety record. The Roads Department is therefore considering the construction of a new section of road of around 22.7km in length (“the Project”) to both bypass Kvesheti and avoid the Jvari pass. This 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 BAPs contained in this document include a set of actions that together can help ensure the conservation or enhancement of potentially affected habitats and species considered of particular conservation value. They build on the key mitigation and compensation measures developed as part of the Project ESIA process and are intended to help the Project comply with both national legislation/policy requirements and international environmental requirements. These include those of both the European Bank for Reconstruction and Development (EBRD) and the Asian Development Bank (ADB).

The BAPs are intended to focus on those species and habitats that need special management, and are based on the use of the Mitigation Hierarchy, with impact avoidance prioritised, followed by reduction and mitigation in severity, with measurable offsets (and/or additional conservation actions) only applied as a when residual impacts are unavoidable. The BAPs include a series of objectives and management measures to mitigate residual impacts to achieve no net loss/net gains of PBF or CH and have been developed with input from a range of stakeholders, including government, EBRD & ADB, external experts, local/international conservation organisations and project-affected communities.

This document includes BAPs for the following notable habitats and species:

- **Habitats: Birch Krummholz and Low Grass Marshes**
- **Endemic Plant Species**
- **Breeding birds: Black Grouse, Egyptian Vulture, Corncrake**
- **Migrating Raptors**
- **Mammals: Chamois, Otter, Bats**

It also includes information on proposed monitoring and additional conservation actions and (as an annex) additional information regarding conservation measures to support no net loss of other natural habitats and notable fauna.

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**ANNEX B: KEY FAUNA FOR WHICH ADDITIONAL DATA SHOULD BE RECORDED AS PART OF THE BEMP/ACAS**

## **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 Biodiversity Action Plan*

Km Kilometre

Masl metres above sea level

NACRES Georgian Centre for Biodiversity Conservation and Research

NATM New Austrian Tunnelling Method

NGO Non-Governmental Organisation

OE Owners Engineer (International Engineering firm employed by RD to manage the contract)

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 is the **Biodiversity Action Plan (BAP)** for the proposed Kvesheti to Kobi Road Upgrade Project (see Section 3 for Project details). It outlines the approach to be taken by the project to meet its obligations regarding the long-term conservation of “notable” species and habitats of local or greater conservation importance. The document has been informed by, and should be read alongside, the Project Environmental Impact Assessment (EIA) and Critical Habitat Assessment (CHA).

### 1.2 Need for the BAP

The proposed road, and particularly its northern end, is located within an area that overlaps (by tunnel only for the National Park/Emerald Site) with areas that are:

- Nationally designated for nature conservation (Kazbegi National Park)
- Internationally designated for nature conservation (Kazbegi Emerald Site and Khevi SPA)
- internationally recognised for nature conservation (Kazbegi KBA/IBA)
- known to support a number of notable species.

As a result, the Project has the potential to impact upon areas that could be considered either “**Critical Habitat**” (CH) and/or “**Priority Biodiversity Features**” (PBF)<sup>1</sup> as defined by ADB Safeguards, IFC Performance Standard 6 and EBRD Performance Requirement 6. Following a Critical Habitat Assessment (CHA) of the scheme, the following habitats or species of notable conservation value have been identified as requiring specific action plans:

- **Habitats: Birch Krummholz and Low Grass Marshes**
- **Endemic Plant Species**
- **Breeding birds: Black Grouse, Egyptian Vulture, Corncrake**
- **Migrating Raptors**
- **Mammals: Chamois, Otter, Bats**

Biodiversity Action Plans have therefore been prepared for each of the above to help ensure that the Project results in “no net loss<sup>2</sup>” with regards to the conservation value of these habitats and species. This document contains those specific action plans.

The CHA also identified a number of habitats and species which, whilst present (or potentially present) within the Aol, are not expected to suffer material adverse impacts from the scheme. These include the following:

- **Habitats:** Sea Buckthorn, Hornbeam Forest, Riverine
- **Fauna:** Large Carnivores; Kazbegi Birch Mouse

Additional information is provided for each of these in the Appendices.

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<sup>1</sup> Full definitions of these terms are included within the CHA documentation.

<sup>2</sup> No Critical Habitat was identified during the CHA. In the event that it had, the Project would have been required to demonstrate “net gain” of any identified habitats or species.

### 1.3 Document Objectives

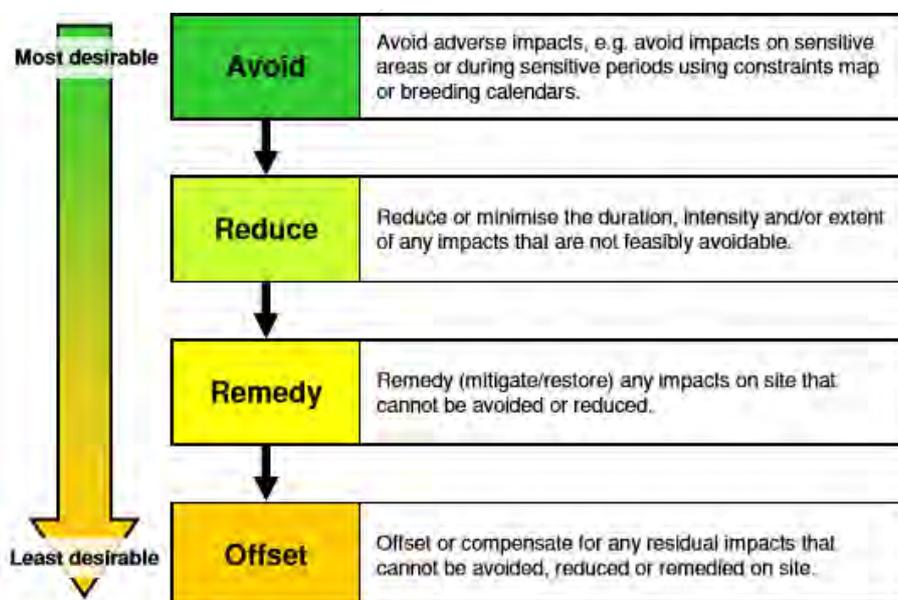
The BAPs contained within this document include a set of actions that together will help support the long-term conservation of the particular habitat or species of concern. The actions build on, but do not duplicate, the general biodiversity mitigation and compensation measures included within the Project EIA and associated Environmental and Social Management Plan (ESMP)<sup>3</sup>. Each BAP includes information on objectives, management measures, resources and monitoring to enable the Project to mitigate residual impacts and achieve no net loss.

The BAPs have been developed with input from a range of stakeholders, including government, external experts, local/international conservation organisations and project-affected communities. It also builds on good international practice as outlined in documents such as IFC Guidance Note 6 (IFC, 2012b), EBRD Guidance Note for PR6 (2014); the MFI Biodiversity Working Group’s “Good Practices for Biodiversity-Inclusive Impact Assessment and Management Planning” (2014) and the IPIECA (2005) guidance.

The BAP process has included a number of tasks starting with the original **scheme selection (including the extensive use of tunnelling) to avoid areas of known conservation importance and minimise severance effects.**

### 1.4 Application of the Mitigation Hierarchy

The ultimate **objective** of a BAP is to achieve **no net biodiversity loss or, if Critical Habitat is triggered, net biodiversity gain** as a result of the Project. To achieve this, the “Mitigation Hierarchy” is applied to potential impacts identified during the ESIA screening and planning process as shown in the figure below. Using this approach avoidance has been prioritised, followed by reduction and mitigation, with measurable offsets only applied as a last resort where residual impacts are unavoidable, or as an additional conservation measure.



<sup>3</sup> The ESMP itself will be implemented via Contractor-specific Management Plans, as outlined in the Project ESIA.

Project BAPs can include both short-term site-based mitigation measures linked to construction activities and mid to long-term biodiversity conservation actions. This BAP focuses on those actions which can have measurable outcomes during the life of the Project loan.

## 1.5 Associated Documents

This 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. The regulatory EIA has been further developed and enhanced to create the **Project Environmental and Social Impact Assessment (ESIA)** 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.
- **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.
- **Critical Habitat and Appropriate Assessment:** Undertaken to determine the potential for impacts on Critical Habitat, Priority Biodiversity Features or Designated or Internationally Recognised Sites to occur.
- **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.

## 1.6 Stakeholder Input

Stakeholder consultation is an important element of the development of a 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). This has included specific meetings with national conservation organisations including the following:

- Georgian Centre for Biodiversity Conservation and Research (NACRES).
- Caucasus Nature Fund (CNF).
- Iliia State University Georgian Centre for the conservation of Wildlife (regarding BMZ/KfW Support program for protected areas in the Caucasus).
- Agency for Protected Areas (especially regarding Emerald sites and proposed park extension).
- Sabuko (Georgian partner of Birdlife International).
- World Wildlife Fund (WWF)
- Georgian Eco-tourism Association
- EBRD and ADB
- CENN

## 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"> <li>• 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.</li> <li>• Enhance legal protection at the national level of critically endangered species and those species, which are strictly protected under international treaties and EU directives.</li> <li>• Provide a legal framework for accessibility of genetic resources and relative traditional knowledge and equitable sharing of benefits arising from their utilization.</li> <li>• provide for significant changes aimed at regulation of biological resource use, including hunting and fishery.</li> </ul>
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)<sup>4</sup>, 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 List<sup>5</sup>. 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).

<sup>4</sup> 44 vertebrate species are also included in the IUCN Red List as CR, EN or VU – see later

<sup>5</sup> <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 a loss in

*Kvesheti – Kobi Road Upgrade Biodiversity Action Plan*

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

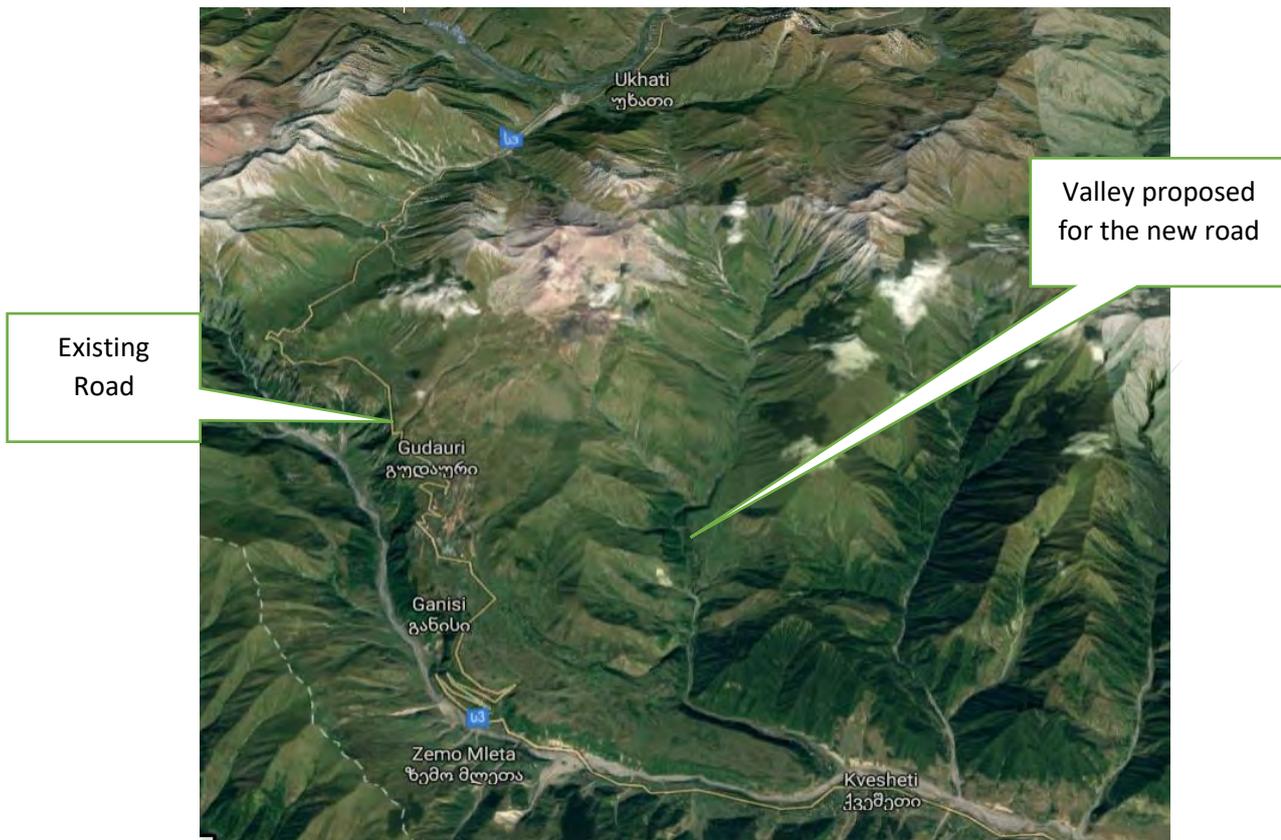
Georgia’s location means that it has an increasingly important role as a major transit country, and almost 2/3 of goods in Georgia are transported by road. Many of the roads are however poorly equipped to cope with the increasing volume of traffic and the Government of Georgia (GoG) has launched a program 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.

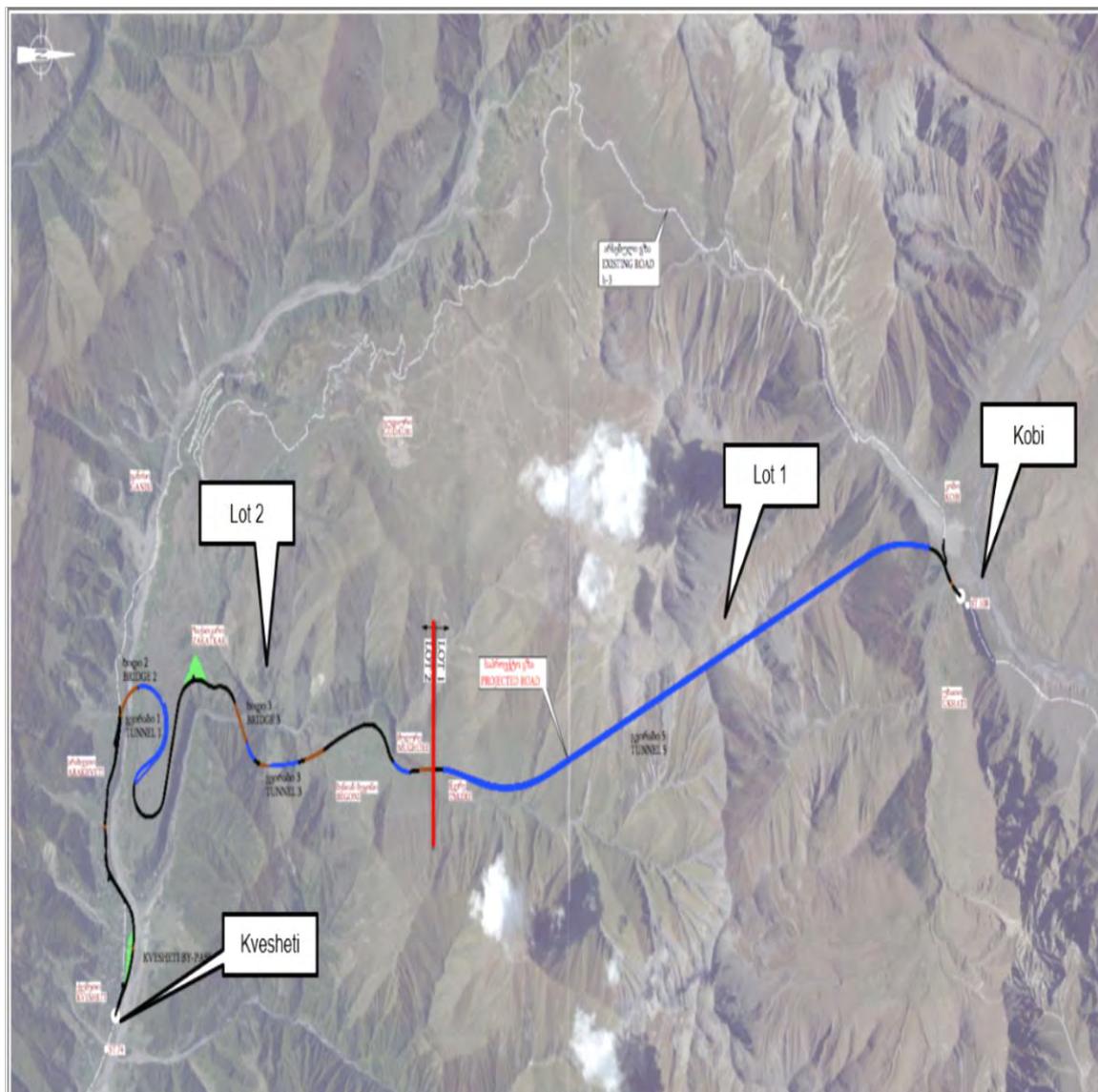


Given the winter constraints, and poor safety records of the road, the Georgian Roads Department is now considering the construction of a new section of road of around 22.7km in length to both bypass Kvesheti and avoid the Jvari pass (the “Project”). The new section of road would run through the Tereg 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 (i.e. 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 international EIA and this BAP 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 appended to the international EIA, and the results of all these surveys have been used.***

Georgia is currently aligning its traditional habitat classification system with that of the European Nature Information System (EUNIS)<sup>6</sup>. 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 as potentially present within the broader 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*. **The habitat is present in the wider Aol** and potential habitat had been identified near the Tunnel 5 northern portal. Although this has now been re-classified as Sub-alpine birch forest, some 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. Although the habitats recorded on the plateau near Zakatkari have now been re-classified as wet meadow they still support notable plant species and the scheme has been modified to avoid impacts to this habitat.

Three other “**natural**”<sup>7</sup> 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)** (now reclassified as *Alnus incana* riparian forest) These forests are present both within forested areas and as a narrow line along the rivers. A range of herbaceous species are found

<sup>6</sup> <https://eunis.eea.europa.eu/>

<sup>7</sup> 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.

including *Holcus lanatus*, *Paspalum paspaloides*, *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.

#### Natural Habitats in the Project Corridor

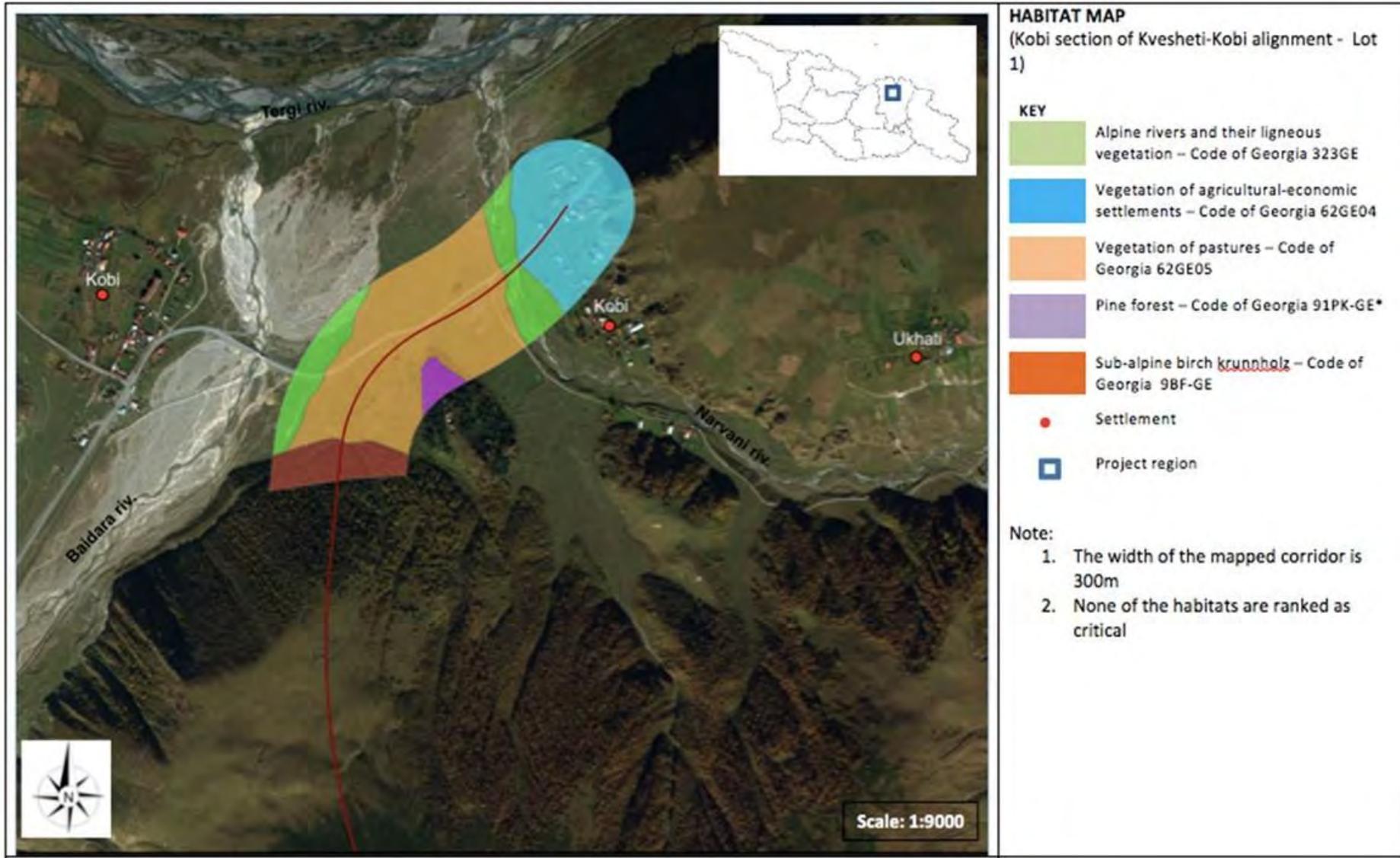
Habitat	Total in Project Aol	Lost to Main Scheme	Disposal sites	Where
Sub-alpine birch forest	2.5ha	>0.1ha	0.0ha	Tunnel 5 Northern Portal
Wet Meadow	0.7ha	0	0.0ha	Zakatkari plateau
Alpine rivers and their ligneous vegetation	56 ha	1.4ha	15.7ha	Tunnel 5 Both portals
Alluvial/riverine forests/	44.6ha	0.7ha	0ha	Both lots
Hornbeam forest ( <i>Carpinus betulus</i> )	22.4	0.3	0.8	Near Gorge crossings
<b>Total</b>	<b>126.2ha</b>	<b>2.5ha</b>	<b>16.5ha</b>	

*Kvesheti – Kobi Road Upgrade Biodiversity Action Plan*

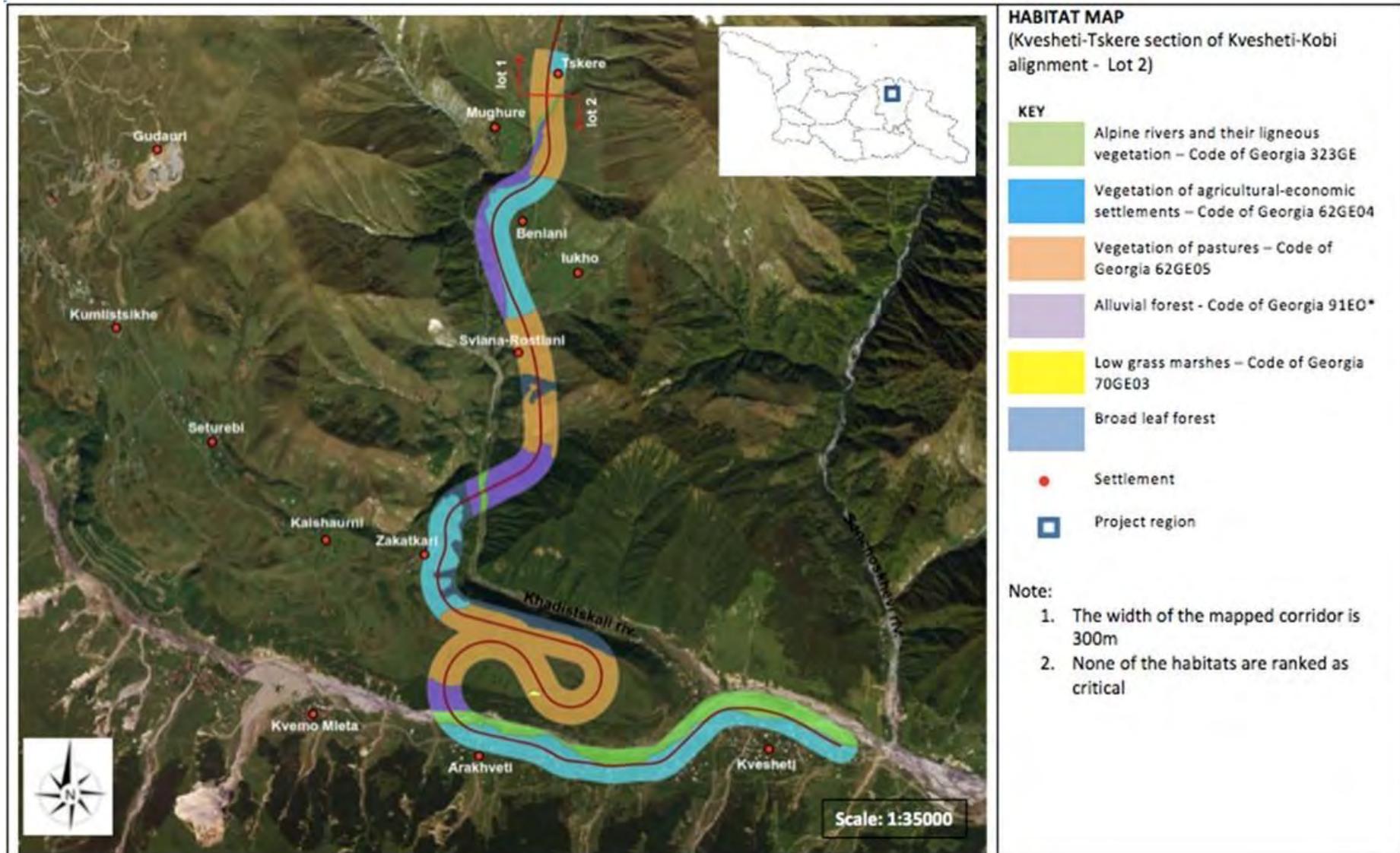
Overall, the main scheme (disposal sites not included) is expected to result in the direct loss of around **2.5 ha of natural habitat** and around 14ha of modified habitat. Spoil disposal sites will not include any areas of priority habitat and will be subject to further review by project regulators and lenders prior to development to enforce this. 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 this natural habitat to be affected (>87%) is alpine river habitat, which is generally very common in the area and is not considered to trigger PBF or CH requirements. All areas of natural habitat will be restored or recreated by the Project Contractors and no net loss is proposed. No valuable areas of sea buckthorn (see later) will be affected by the project. A habitat map of the affected areas is shown in the figures below.



### Habitat Map – Lot 1



### Habitat Map – Lot 2



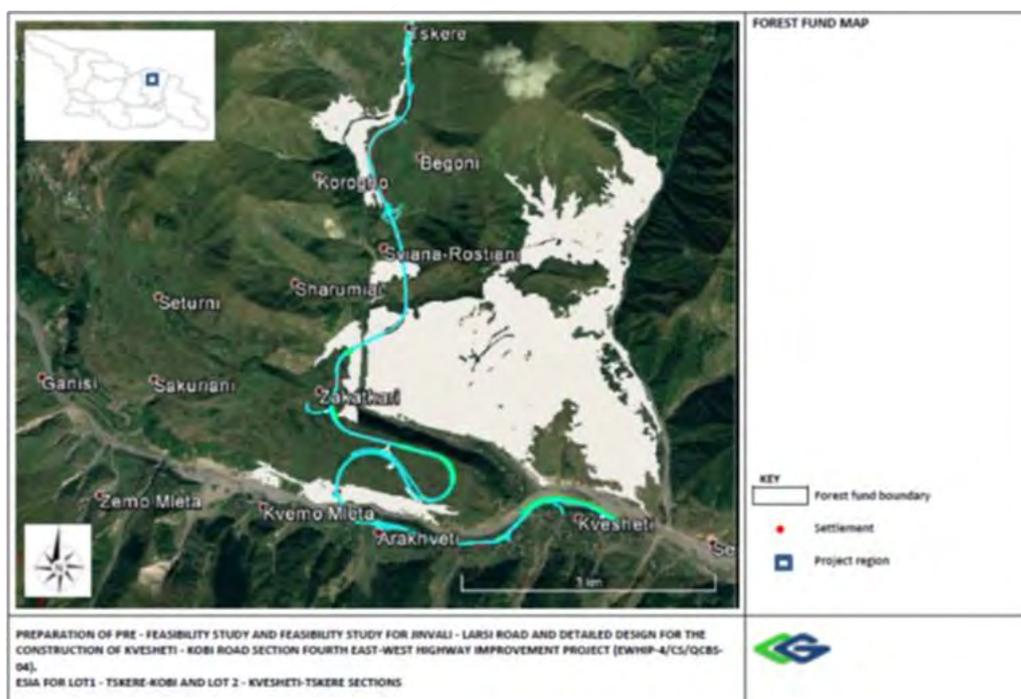
### 3.6 Forest Resources

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 Georgia<sup>8</sup> 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**



<sup>8</sup> 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		
	<b>Total</b>		<b>1127</b>	<b>29</b>	<b>73</b>	<b>5</b>	<b>1261</b>	<b>2139</b>	<b>146</b>	<b>244</b>	<b>24</b>	<b>17</b>	<b>34</b>	<b>104</b>	<b>4</b>	<b>16</b>

### 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 BAP IMPLEMENTATION PROCESS

### 4.1 Overview

As described earlier, the Project will avoid impacts to notable species and habitats by:

- Use of the **mitigation hierarchy** involving a sequential approach of impact avoidance, mitigation, restoration and finally offsetting if no other approach is effective.
- Design of the route to avoid sensitive habitats wherever practical - the scheme has sought to use already degraded habitats (e.g. existing roads) or habitats of low biodiversity value (e.g. overgrazed pasture) and the use of tunnels will also avoid many impacts.
- Use of GIP (Good International Practice) during construction works to further prevent or reduce impacts wherever practical. This includes avoidance measures such as seasonal timings of works (for example to avoid impacts to nesting birds or roosting bats as determined by the EcoW) as well as other generic mitigation measures as elaborated in the EIA.
- Application of species and habitat-specific Biodiversity Action Plans as outlined in Sections 5-9 of this document.

Together these are intended to ensure “no-net loss” or even “net gain” of biodiversity as a result of the proposed road development and operation. Implementation of these approaches will be based around two key roles, namely the:

- Owners Supervision Engineer (PMSC) International and National Environmental Specialists
- EPC contractors Ecological Clerks of Work.

The BAP will be managed and supervised by the PMCS. The PMCS will develop and implement a Biodiversity Monitoring and Evaluation Plan (BMEP) to ensure that the BAP is correctly implemented.

Actual BAP activities on the ground will be undertaken by the Contractor, either through physical works or completion of surveys and it is expected that the Works Contractor will sub-contract these specialist surveys to relevant universities, NGOs or specialised consultants.

### 4.2 Owners Supervision Engineer

The Owners Engineer (PMSC), assumed one for both Project Lots, is tasked with specific responsibilities to ensure compliance of civil works, with particular emphasis on the monitoring of implementation of Project EMPs through the Contractors Site Environmental Management Plans (SEMPs). The Engineer will retain the use of Environmental and Biodiversity Specialists, both national and international to ensure that the Contractor is compliant with his environmental obligations. An indicative team structure is provided in the ESIA.

#### **Engineer’s International Environmental and Biodiversity Specialist**

As part of his/her role, the International Environmental and Biodiversity Specialist will be responsible for preparing and implementing detailed environmental action plans. This will specifically include detailed biodiversity action plans and biodiversity monitoring checklists to be completed by the National Environmental Specialist (see below). He/she will prepare and manage the implementation of the Biodiversity Action Plan and Biodiversity Monitoring and Evaluation Plan (BMEP), and will organize any contracted organisations such as universities or NGOs in order to commission surveys to be completed for the BAP through the services of

specialists. The International Environmental and Biodiversity Specialist will also conduct environmental training and briefings to provide environmental awareness on ADB/EBRD safeguards and the government environmental requirements and standard operating procedures in conformity with project obligations and will ensure baseline monitoring and reporting of Contractor's compliance with contractual environmental (and biodiversity) mitigation measures during the construction phase. Further details are provided in the EIA.

### **Engineer's National Environmental Specialist**

The National Environmental Specialist will (i) review all documents and reports regarding the integration of environmental and biodiversity issues including contractor's environmental action plan, (ii) supervise the contractors' compliance to EMP, and (iii) prepare monthly compliance reports. The National Environmental Specialist shall be employed permanently over the duration of the construction period.

### **4.3 EPC Contractor**

The EPC Contractor for each Lot will be responsible for the preparation of the project Site Environmental Management Plans (SEMPs). These will be fully compliant with the Project EMPs (including this BAP) as well as the ESIA as a whole. The contractor ESMS and SEMPs will be submitted to Road Department within 30 days after commencement of works, and approved before start of the works. To do this, the contractor will require a team of Specialists including those described in detail below and outlined further in the ESIA.

#### **Environmental and Social Officer**

The EPC Environmental and Social Officer will implement and continually update the SEMP and oversee and report on the operation throughout the contract period. The Environmental and Social Officer will be the Contractors main focal point for all environmental, social, health and safety and cultural heritage issues associated with the Project and will lead the other team members listed below. The Environmental and Social Officer should be full-time member of staff on the Contractors roster and should be on site at least five days per week.

#### **Ecological Clerk of Works (ECoW)**

Construction through multiple habitat types provides challenges, especially around avoidance and minimization of impacts during works in sensitive sites (e.g. protected areas), sensitive habitats (including e.g. effective control of silt near water) and where protected or notable species may be present in the working corridor. The key roles of the EcoW are therefore to:

- Identify any areas of particular ecological sensitivity (e.g. with protected or notable habitats or species) on the route that may need to be avoided, moved (e.g. plants/amphibians) or disturbed later in the year (e.g. if birds are nesting there).
- Translate mitigation requirements written in the SEMP and its sub-plans (including relevant elements of the Biodiversity Action Management and Monitoring Plans) into practical measures on the ground
- Advise in a timely manner as to how best to address changeable and less predictable situations on the ground from an ecological perspective (e.g. should new species be encountered)
- Ensure that all staff are fully aware of the environmental sensitivities of the site and their responsibilities, as outlined in the management plans (e.g. via practical toolbox talks ahead of the construction) and ensure they are appropriately trained in the requirements of the BAP, BMP and BEMP.

- Take field notes and photographs to demonstrate compliance with the management plans

The EcoW will undertake pre-construction/enabling surveys a couple of weeks ahead of the work teams and produce hazard maps to show the location of particularly sensitive habitats and species that are to be avoided e.g. by changing timing of works, amendments to construction methods statements, etc. In addition, and to coordinate responses to ecological concerns, appropriate reporting mechanisms will be set up to allow issues to be raised and resolved in an efficient manner (eg through the project grievance mechanism). The EcoW will have at least 5 years of experience in the practical elements of protected species and habitats conservation (including handling of species that they may have to move) and recognitions; they should also have a working understanding of wider environmental issues and the construction/engineering process and will have a demonstrate knowledge of good international practices and Lenders biodiversity Safeguards (namely EBRD, ADB & IFC).

In summary: implementation of the BAP will be:

- Delivered under the Engineer's Scope by the International Environment and Biodiversity Specialist who will also prepare the BMEP<sup>9</sup> and monitor/guide implementation of BAP
- Supported by the ECoW and the EPC Contractor
- Further supported by specific experts (from NGOs/Universities etc.) employed by the Works Contractor with the oversight of the Engineer's International Environment and Biodiversity Specialist to complete bird/mammal/habitat etc. surveys

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<sup>9</sup> BMEP: Biodiversity Monitoring and Evaluation Programme

## 5 ACTION PLAN FOR NOTABLE HABITATS

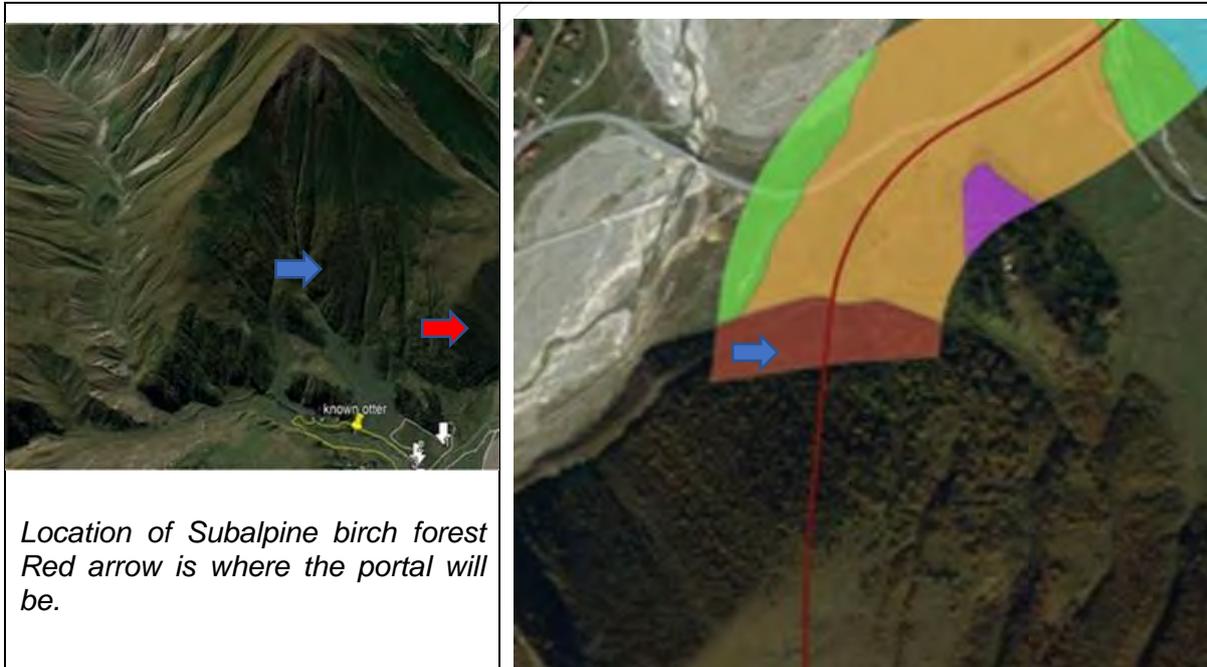
### 5.1 Action Plan for Sub-Alpine Birch Krummholz

#### Current Status

The proposed project will result in the direct loss of around 0.1 ha of sub-alpine birch forest habitat near the Tunnel 5 Northern Portal. This was originally identified as Subalpine Birch krummholz a Georgian National Priority Habitat which typically consists of forested areas of tall birch trees with closed canopies at between 1,800 and 2,300m above sea level (masl) usually with an understory of rhododendron. Whilst the habitat near the scheme has now been re-classified other areas of birch krummholz habitat are, however, found in the wider area and the Project will be designed to avoid them.



*Subalpine birch forest*



*Location of Subalpine birch forest  
Red arrow is where the portal will be.*

## Action Plan

	Action Plan for Sub-alpine birch krummholz			
Approach	Avoid	Reduce	Mitigate	Offset
Objectives	No net-loss in area (or quality) of this Priority habitat as a result of Project activities.			
Location	Whilst some 2.5ha of this subalpine birch forest is present within the broad project footprint near the Tunnel 5 Northern Portal (and the habitat is found across the north-facing slopes in this area) no sub-alpine krummholz is expected to be affected by the scheme..			
Potential Impacts	Whilst no Krummholz habitat is expected to be lost to the portal construction, care will be taken to avoid this and impacts from spoil disposal activities will be avoided by clearly marking any areas of krummholz to be protected.			
Summary of Approach	<p>The project will primarily avoid impacts to this habitat. Pre-clearance surveys will be carried out by the ECoW and will demarcate areas of protected krummholz.</p> <p>Where the 0.1ha of sub-alpine birch forest habitat will be lost to the tunnel portal, where feasible, the trees to be lost will be translocated (with their root systems intact) to adjacent areas within the project footprint. Additional habitat will also be created within the project footprint in these areas to supplement the trees moved. Planting of trees will be done on a 3 (new): 1 (old) ratio. Trees will be from local nurseries, suitably hardened and pest free. It is expected that 0.3-0.5ha of trees will need to be planted and the Project has confirmed that land for planting is available at the Northern Portal without affecting other assets (ecological or otherwise).</p>			
Monitoring	Any habitat that is translocated or recreated will be monitored throughout the EPC warranty period and over at least a 5-year period to ensure that it survives. Dead trees will be replaced on a like for like basis. Monitoring will be conducted by both the ECoW as well as the Engineer IES.			
Responsibility	Contractor ECoW to undertake pre-clearance surveys and supervise any translocation/restoration works to be undertaken as early as practical within the construction schedule. Engineer IEBS to agree timing and monitor contractor.			
Timing	Work to be carried out during relevant stages of Project construction. Monitoring of any habitat translocation/restoration will continue over a 5-year period to ensure its effectiveness. This work will start immediately as trees will require removal prior to tunnelling. So the established offset/translocation site can start to be monitored within year 1 of the project and continue on during the construction period into the defect liability period, enabling a 5 year post planting monitoring period to have been completed.			
Additional Information	<i>See Birch Forest and Rhododendron on North-Facing Slopes in Central Greater Caucasus (Maia Sh. Akhalkatsi, Plant Genetic Resources, Institute of Botany, Iliia State University)</i>			

Further detailed mapping will be undertaken by the Contractor Ecological Clerk of Works (ECoW) to ensure avoidance of this habitat prior to construction work in the Tunnel 5 northern portal area commencing. Any requirements for restoration/offset will be identified by the ECoW and IEBS and an appropriate restoration/offset plan developed and approved by the RD/EBRD/ADB before work commences. The plan will see ratios of 3:1 used for any offset or restoration with three times as much new habitat created as is lost, in line with the ESIA commitments. All restoration/offset areas will be located next to areas of existing habitat, without affecting other habitats or species of conservation importance. Maps of these areas will be generated to allow subsequent monitoring of mitigation effectiveness. The ECoW will also establish whether existing trees can be moved and if so supervise their cutting down to the root stock and extraction and replanting elsewhere to sucker (timber to be given to the ministry as needed per requirements for Forestry Fund land).

## 5.2 Action Plan for Low Grass Marshes and Wet Meadows

### Current Status

Low grass marshes (70GE03) is a Georgian National Priority Habitat found at up to 2300m asl in the lowlands and low zone of the mountains. Areas of low grass marshes were recorded in 2018 on the plateau near Zakatkari but have since been reclassified as wet meadows. The rare orchid *Dactylorhiza urveliana* has been recorded here and *Luzula/Juncus* (rushes) as well as *Rumex alpinus* and plants from the genus *Alchemilla*, *Cirsium*, *Carex*. Species of *Equisetum* (horsetails) were not recorded in 2019. The wetland areas also support a range of amphibians and reptiles, including marsh frogs and tessellated water snake. None of the plant or animal species recorded were IUCN or GRL CR, EN or VU.



Aerial Photograph of the Plateau with the proposed scheme super-imposed. Low grass marsh areas are found in some of the darker areas away from the plateau edges. Proposed spoil disposal sites will be managed to avoid such areas.

## Action Plan

	Action Plan for Low grass marshes			
Approach	Avoid	Reduce	Mitigate	Offset
Objectives	No net-loss in area (or quality) of this Priority habitat as a result of Project activities.			
Location	Whilst low grass marshes do not seem to be present, some 0.7ha of wet meadow habitat is present within the broad project footprint plateau near Zakatkari.			
Potential Impacts	This habitat is to be avoided and no impacts are expected. Pre-construction survey will stake out the areas of wet meadow/ marsh areas to ensure that they are avoided. To avoid indirect impacts from sediment run-off from the spoil sites, the ECoW and IES will ensure that drainage is well managed to protect areas of wetland eg through the use of sediment traps/ponds..			
Summary of Approach	Identification, detailed mapping and avoidance of this habitat will be managed by the Project Ecological Clerk of Works (ECoW) with the initial work to be undertaken prior to construction commencing. The primary approach is avoidance by clearly mapping and marking areas of habitat to be avoided during construction (including during soil disposal).			
Monitoring	Monitoring during construction to ensure habitats are not affected.			
Responsibility	Engineer to monitor contractor. Contractor ECoW to undertake pre-clearance surveys and ensure sediment management measures are in place.			
Timing	Work to be carried out during relevant stages of Project construction.			
Additional Information	N/A			

## 6 ACTION PLAN FOR ENDEMIC PLANT SPECIES

Within the broader Kazbegi region, over 1,000 species of vascular plants have been recorded, with around 28% of them endemic to the Caucasus. At least 5 of the 11 endemic genera have been recorded within the National Park, including *Agasyllis*, *Dolichorrhiza*, *Symphyloma*, *Trigonocaryum* and *Pseudovesicaria*. The ESIA field surveys near the northern portal of Tunnel 5 recorded small numbers of **five Caucasian endemic plants** in the grasslands and woodland edges near the proposed portal. None of these species are considered at risk on the IUCN Red List or the GRL, and all are widely found across the Caucasus and none are listed in the EU Habitats Directive.

These include the following:



*Gladiolus caucasicus*,



*Parnassia palustris* (Grass of Parnassus),



*Iris caucasica*,



*Ranunculus baidarae*



*Ligularia subsagittata*

A number of other endemic species may also occur within the Project footprint, although they have not been recorded to date. These are likely to include some of the following species which are widely found across the Caucasus. **Georgian Endemic Species** (*Arabisk azbekensis*, *Galanthus platyphillus*, *Heracleum ossethicum* *Lilium georgicum*, *Muscari pallens*); **Caucasian Endemic Species** (*Delphinium flexuosum*, *Delphinium speciosum*, *Campanula hypopolia*, *Campanula petrophilla*, *Campanula sosnowskyi*, *Dianthus caucaseus*, *Fritillaria latifolia*, *Fritillaria lutea*, *Gladiolus tenuis*, *Inula magnifica*, *Primula cordifolia*, *Primula darialica*, *Sobolewsikia caucasica*) and **Local Endemic Species** (*Heracleum roseum* var. *latilobum*)

Two exceptions to this are two Georgian Red List species namely Ossethian Cow-Parsnip: *Heracleum ossethicum* (grows on a substrate formed after avalanches, in upper montane and subalpine zones, between 1,800-2,400 m asl and has been recorded previously south of Kobi) and *Eritrichium caucasicum* may also be present within the Project Footprint. Whilst neither has been recorded to date, particular care will be paid to searching for these species and this action plan will be updated should they be found.

## Action Plan

Whilst no Critically Endangered or Endangered flora species (IUCN RL or Georgian RL) have been recorded from within the Project footprint, there is the potential for a number of such species to be affected by direct habitat loss, particularly near the northern portal. To ensure no net loss of such species, the following action plan is proposed. This will be update on completion of additional surveys after snowmelts in the spring of 2019.

Status	Action Plan for Endemic Plants			
Approach	Avoid	Reduce	Mitigate	Offset
Objectives	No net loss of endemic or otherwise notable plants within the Project footprint. Support of long-term conservation of notable plants in the Kazbegi region.			
Location	Endemic species will be present across the Project Aol. However, areas of focus have been identified around the Tunnel 5 portals, the potential spoil disposal sites and the proposed Lot 2 interchange.			
Potential Impacts	Impacts to notable plants would arise because of direct habitat loss during construction works. For some species, the plants will be retained in the seedbank when the earth is moved, but for others uprooting would lead to loss of the plant or plants.			
Summary of Approach	Additional field work (and mapping) is proposed in spring 2019 to improve Project understanding of types and locations of notable plants. Pre-clearance surveys by ECoW will be used to demarcate any areas with notable plants. Notable plants will be avoided during works to the extent practical. Notable plants which cannot be avoided will be translocated where practical to suitable locations within the nearby project footprint. The work will be the responsibility of the ECoW but will be overseen by the OE IES. Topsoil salvage and spreading will be undertaken in other adjacent/disturbed areas to promote growth from natural seedbank in line with other elements of the Project EMP.			
Monitoring	Any habitat or plants that are translocated will be monitored over a 3-year period to ensure that they survive. Dead vegetation will be replaced on a like for like basis.			
Responsibility	Commissioning of 2019 surveys and monitoring of contractor will be managed by the Engineer IES. Contractor (ECoW) is responsible for pre-clearance surveys and translocation works.			
Timing	The initial fieldwork will be carried out in spring and summer 2019 to allow time for effective translocation of any notable species should such work be required.			
Additional Information	"Caucasus Plant Initiative: A Regional Plant Conservation Strategy" ( <a href="http://www.mobot.org/MOBOT/Research/pdf/RedBook69mobot.pdf">www.mobot.org/MOBOT/Research/pdf/RedBook69mobot.pdf</a> )			

Further surveys for notable plants to be undertaken within the proposed project footprint prior to construction activities. These will focus on areas where major works are occurring (notably the proposed spoil disposal sites, the Tunnel 5 portals and the proposed interchange). Should any notable plants be found, the ECoW will identify the locations to avoid their disturbance where practical and will also prepare a report outlining the need (and plan) for any additional mitigation (translocation/restoration) to ensure no net loss of these species. Any such offset/restoration approach would be undertaken at a 3:1 ratio and the technical specifications will be approved by RD/EBRD/ADB before work commences. Should any IUCN or GRL CR, EN or VU species be present and likely to be affected by the Project footprint, the Project will work with NGOs and regulators to formulate and support a conservation strategy for those species in and around the Kazbegi National Park.

## 7 ACTION PLANS FOR NOTABLE BIRDS

### 7.1 Action Plan for Caucasian Black Grouse

#### Current Status

The Caucasian black grouse (*Tetrao mlokosiewiczii*) is an IUCN: NT but GRL: VU and IBA citation species. It is also a recognised “Restricted Range Species”. Birds are found in subalpine meadows and subalpine forests throughout the region, especially on north-facing slopes with Rhododendron and Juniper, as well as 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. These include *Betula litwinowii*, *Quercus macranthera*, *Fagus orientalis*, *Juniperus* and *Rosa spp.* Although the species has not been recorded within the Project Aol to date, it may be present in some years and around areas of birch forest above the Tunnel 5 northern portal. Given that the Mtskheta-Mtianeti Region supports around 25% of the Georgian population of this species (ie between 2000-3500 lekking males), and that most of these are within the Kazbegi National park, the Project has adopted a precautionary approach to this species and it is presumed to be present in suitable habitat unless information from the 2019 spring surveys indicate otherwise. The species is under threat from habitat fragmentation as well as increased hunting, grazing and wood cutting.



#### Action Plan

Status	Action Plan for Caucasian Black Grouse			
Approach	Avoid	Reduce	Mitigate	Offset
Objectives	No net impact on Black Grouse populations as a result of the Project. Confirmation of presence or absence of Black Grouse from the upper Khada valley, its adjacent mountain ridges and the Tunnel 5 northern portal. Enhanced conservation of grouse within the Kazbegi National Park.			
Location	Grouse may be present in and around the upper Khada Valley and the Lot 1 Northern Portal.			
Potential Impacts	The project will be some 200m underground where it overlaps with the high birch forest edges and no direct impacts are expected from the construction or operation of the scheme. The Project will, however, increase access into and around the upper Khada valley, and areas used by birds could be affected, including by hunting. Birds could also be present near the Lot 1 tunnel.			
Summary of Approach	Specific surveys will be undertaken for lekking grouse in 2019. These are to focus on the areas around the Tunnel 5 northern portal but also the higher reaches of the Khada valley. If these demonstrate Grouse are present further mitigation (eg seasonal construction constraints to avoid disturbance during the breeding season) will be developed and approved by RD/EBRD/ADB before work commences. This could include identification of potential opportunities during landscaping for planting of key Grouse winter food species (such as <i>Betula litwinowii</i> , <i>Quercus macranthera</i> , <i>Fagus orientalis</i> , <i>Juniperus</i> and <i>Rosa spp.</i> ).			
Monitoring	Monitoring regimes will be developed following the spring 2019 survey, but if Grouse are present will be undertaken for 5 years from the start of construction. This will include monitoring of any habitat created for this species.			
Responsibility	The Owners Engineer are responsible for resourcing and monitoring the work. Technical work to be contracted to an appropriate technical organisation or NGO.			

Timing	An initial rapid assessment will be undertaken in the spring of 2019. Further work will be developed subsequently.
Additional Information	Isfendiyarog̃ lu, S., Welch, G. & Ataol, M. 2007: The Caucasian black grouse Tetrao mlokosiewiczzi in Turkey: recent survey results and conservation recommendations. - Wildl. Biol. 13 (Suppl. 1): 13-20

## 7.2 Action Plan for Egyptian Vulture

### Current Status

The Egyptian Vulture (*Neophron percnopterus*) is the smallest European vulture. It is an IUCN EN, GRL Red List and EU Birds Directive Annex I species. In Georgia it is migratory, with birds heading south around September to overwinter in warmer areas and returning around March to breed. Some 235 pairs nest in the Caucasus with 100-140 pairs<sup>10</sup> recorded in Georgia recent years. The population appears, however, to have



suffered a rapid and extremely significant decline in Georgia in the last year and current estimates are that it may have reduced to 30-40 pairs across the country (Sabuko pers comm).

The vultures nest in cliffs, especially where sheltered caves or holes command wide views.<sup>11</sup> Pairs return to the same territory year after year and can often have more than one nest site within the territory (Kurtev et al., 2008). The nest, built by both sexes, consists of a light to bulky pile of branches (150 cm diameter, 20–70 cm high) often covered with thick layer of rubbish. Nests are usually solitary and often well dispersed, although new pairs are reported to be more likely to settle in areas close to other pairs from the same species. Nests are often reused in successive years.

The species is known to have bred in the National Park in recent years and at least one pair of birds are reported to have bred within the Project Aol. A site near the proposed Tunnel 1 southern portal is reported to have been used in some years (the exact location of this site not included here to reduce the risk of disturbance) and a second site in the Aol has also been used, but neither site was reported to be active in 2019.

First breeding is typically around 4–5 years old and clutch sizes are usually 2 eggs. Eggs are usually laid in late April and incubated over a 6-week period by both sexes. The young are cared for and fed by both parents in the nest and fledge after a 70–90 day period. Parents continue to feed the young for about 35 days and stop just before the winter migration.

The vulture forages in open terrains including grasslands, steppes, savannas, edge of the marshes and even land-fills and roadsides. It feeds mainly on dead animals and organic waste, but complements its diet with insects, small reptiles, frogs, young birds, eggs and ripe fruit. Foraging areas are often 10-15 km<sup>2</sup>.

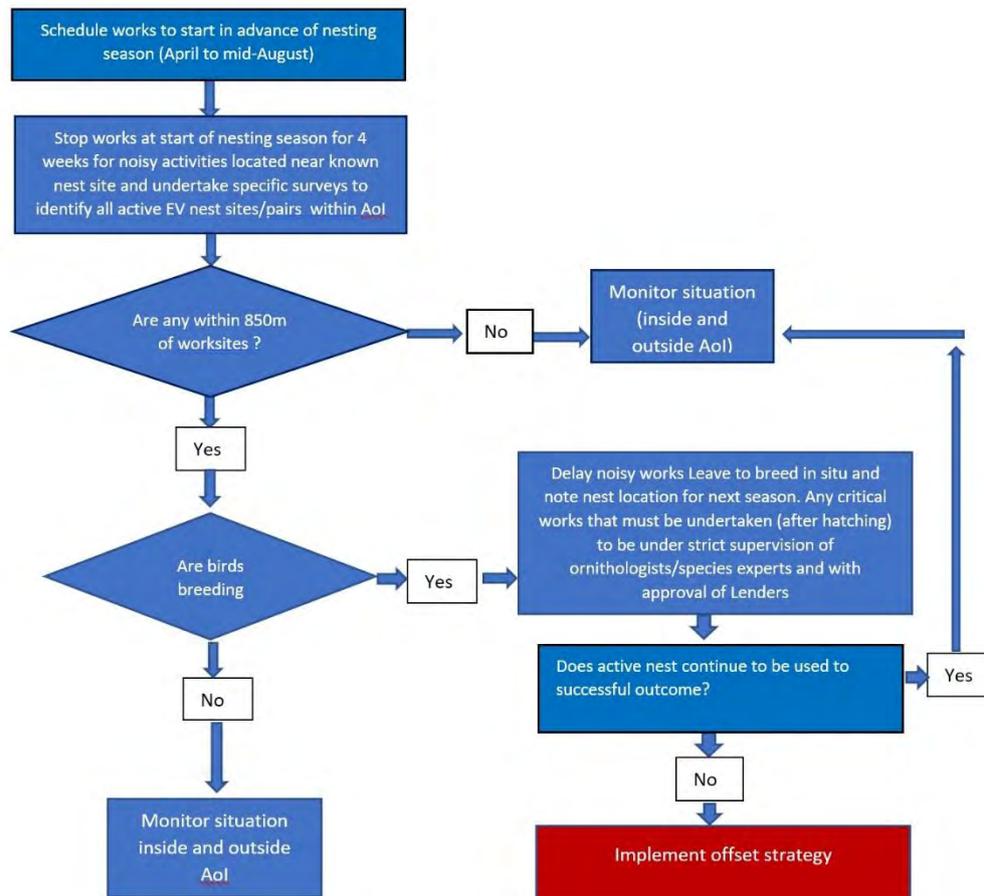
Current high adult mortality rates, and slow reproductive rates have seen Egyptian Vultures suffering a serious population decline globally. This appears to be primarily because of

<sup>10</sup> See BirdLife International (2017) European birds of conservation concern: populations, trends and national responsibilities Cambridge, UK

<sup>11</sup> A recent study in Greece indicated that only 29% of nests were on ledges (Valchos et al., 1998).. thathttp://old.lifeneophron.eu/files/docs/1471335966\_554.pdf

poisoning (often deliberate using poisoned baits) although reductions in suitable food sources and poor-quality foraging habitats are also a concern. The recent expansion of wind farms and of electricity grids has also increased the number of cases of death by collision.

The primary mitigation to be put in place will be impact avoidance. In conjunction with key stakeholders, the Project will, where feasible, identify the location of existing nest sites within the territory (starting 2019) and the following decision tree will then be followed.



Regardless of whether vultures are observed nesting near the Tunnel 1/southern portal in 2019 or elsewhere in the Project AoI, works will be scheduled to start in advance of the vulture nesting season (typically early-April to the end of August) to proactively encourage the birds to use a nest site away from the construction site. At the start of the nesting season specific surveys will be undertaken for nests and if nests are found mitigation will be applied as outlined below. In addition all works starting in early April for a period of four weeks will be carefully scheduled to avoid working in the close vicinity (350m) of the known nest site.

No breeding has been observed in 2019 and if nesting is not observed again in 2020, works will continue as normal following standard mitigation measures included in the Project Environmental Management Plans. If nesting is observed in 2020, project works will be scheduled to avoid noisy works within the vicinity of the nest at an appropriate distance (up to 850m) to be agreed with the regulators, lenders and key stakeholders (including key conservation organisations). This will be continued until such a time that nesting has ended (the young has fledged), usually August. During this period, some critical works may be

required to proceed. If this is the case, and only after hatching, the RD will seek guidance and approval from the Lenders and regulators on an agreed way forward and conditions, which will include as a minimum strict supervision by ornithologists/species experts.

If at any time, an active nest is abandoned following the start of construction, the Project will implement biodiversity offsets measures, based on the commitments below but to be developed further with input from national and international Egyptian Vulture experts and approved by the Lenders to ensure No Net Loss/Net Gain requirements are met.

In addition to potential impacts during construction, the fact one of the known nest sites will be approximately 200m from the tunnel portal means that the suitability of this nest site to remain viable during road operation is in doubt. Therefore, based on a precautionary perspective the Project will seek to carry out some offsetting activities, regardless of whether the birds are nesting or not at the time of construction. These are likely to include one or more of the following:

- **Conservation Awareness Raising.** In many areas vulture populations have suffered as a result of deliberate poisoning of birds. An awareness raising programme will be initiated within the Project AoI to address this.
- **Feeding Stations.** Studies have shown that food rather than nest site availability is often the limiting factor in the breeding success of Egyptian Vultures. The project will consider setting up a local 'vulture restaurant' away from the construction areas. This approach has been found to be successful in other areas and the approach will be discussed further with the IEBS/RD/OE/Lenders and other stakeholders.
- **Artificial Nest Sites.** Whilst birds may habituate to the construction activity as they have for the existing road, there is no guarantee of this and an assessment will be made as to whether the birds would benefit from the construction of an additional (artificial) nest site to be located over 850m from active works sites. .
- **Additional Conservation Actions.** The project in consultation with international/national bird experts will identify additional conservation actions to enhancing the broader understanding of Egyptian Vulture in Georgia. This may include scientific research, monitoring etc (eg help with satellite tracking, population mapping; and/or research into rapid population decline - see Stage 1 below) as well as consideration of broader support to the National Park, including for example introduction of bird friendly transmission lines/pylons within the AoI:

Should any offsets be required, they would be applied as follows:

**Stage 1 offset:** The project will liaise with an appropriate organisation to develop a detailed action plan including the options outlined above to support the long-term conservation of Egyptian vultures within the Kazbegi IBA (and if appropriate wider Georgia). This may include research on the use of the area by vultures, reproductive success and current threats; “guarding” of additional nest sites found within the AoI; awareness raising of the importance of the species through a 5-year campaign in the local and national media (newspapers, television and internet); consideration of development of artificial feeding or breeding sites in more secluded locations; These actions can be contracted to competent professionals or NGO experts and audited by independent qualified ecologists.

**Stage 2 offset:** Should it be required the Stage 1 offset will be continued by implementing the detailed action plan, and expanded until breeding resumes in the Project Aol or the population of the species in the IBA is restored.

It should be noted that the absence of a breeding pair or an unsuccessful breeding attempt may not be the result of project-related impacts but could rather be the result of natural mortality, predation, poaching etc. which as recently discussed with Sabuko (pers comm.) appears to have significantly impacted the national population in the last year. Given that the Project will likely make at least one nest site less favourable for future nesting (whether used now or not), the Project will proactively start to develop offsetting activities to aid conservation actions for the species. In addition, an adaptive offsetting strategy may also be required should be breeding occur and then fail at the site.

This strategy will be adopted based on the results of monitoring activities during construction and for a period of 5 years post-construction. Regular monitoring of Egyptian vulture presence and behaviour will be undertaken by an experienced ornithologist between 01 April and 30 September during the construction phase<sup>12</sup>. During this period 1-day observation sessions, twice a week, will determine whether or Egyptian vultures attempt to nest at the site (or any other within the Project Aol) upon return from migration. If the absence of a breeding pair or unsuccessful breeding occurs then stage 1 and stage 2 offsets would be triggered as shown in the following table:

Observation	Proposed Response
No <b>breeding pair attempts</b> to nest near the tunnel entrance (or other affected areas) at any stage during the construction period,	No offsets are proposed as this may be unlikely to be attributable to the Project.
Breeding is attempted but is <b>abandoned or fails once</b> during either construction or the first 5 years of operation,	First stage of offsetting will be initiated.
If <b>more than one breeding failure</b> occurs between the start of construction and the end of the fifth breeding season (operational phase)	First and second stage offsetting measures will be implemented
Species has continuous <b>breeding success</b> within the project Area of Influence during the first five years from the start of construction.	No offsetting would be needed as non-significant residual impacts will have been confirmed.

### Action Plan Summary

Status	Action Plan for Egyptian Vulture			
	Avoid	Reduce	Mitigate	Offset
Objectives	To maintain the local breeding population of Egyptian Vulture despite the construction and operation of the proposed Project. This will be measured by monitoring breeding success of the vultures in the Project Aol.			
Location	Vultures may be breeding in and around the Tunnel 1 Portal area as well as the wider Project Aol. They feed across the project Aol.			
Potential Impacts	The construction and operation of the proposed road may result in disturbance to an existing nest site near the Tunnel 1 south portal. Recent research on disturbance of Egyptian vulture nests has recorded adults being prevented from entering a nest to feed chicks when human activity occurred at an average distance of around 300m (and maximum distance of 600m) from			

<sup>12</sup> A contract with an independent ornithologist (to be approved by ADB/EBRD) will be required in the tender documents for construction

	the nest. Activity at an average distance of 850m from the nest was found not to cause disturbance <sup>13</sup> . Foraging birds are unlikely to be affected by the scheme.
Summary of Approach	The primary mitigation to be put in place will be impact avoidance. The decision tree above will be used to manage this. If required stage 1 and stage 2 offsets may need to be implemented, to be determined by monitoring. This may include feeding stations, awareness raising initiatives, artificial nests or others as outlined above and will be agreed with RD/lenders/key stakeholders.
Monitoring	Monitoring will be undertaken from Spring 2019 and for 5 years from the start of construction.
Responsibility	The Owners Engineer is responsible for resourcing and monitoring the work. Technical work to be contracted to an independent ornithologist with appropriate expertise (eg a technical organisation or NGO). Contractors to implement appropriate mitigation work during the construction of the Project.
Timing	Work will commence in the spring of 2019 and will continue over a 5 year period.
Additional Information	Numerous information is available on the Egyptian Vulture via the EU Project “The return of the Nephron” see <a href="http://lifeneophron.eu/">http://lifeneophron.eu/</a> Further information is available from Lexo Gavashelishvili of Georgia GCCW contributed to the 2008 EU “Species Action Plan for the Egyptian Vulture” and from the NGO Sabuko.

Based on the updated baseline results and the proposed mitigation approach above this approach should not result in any adverse impacts on Critical Habitat/Priority Biodiversity Features for Egyptian Vulture. As stated above, the project will, however, adopt an adaptive management approach to the species and will apply appropriate mitigation and or offsets should Egyptian Vulture be observed within the immediate project area, especially during construction.

### 7.3 Action Plan for Corncrake

#### Current Status

The Corncrake (*Crex crex*) is an IUCN LC but IBA qualifying species. It is not included in the GRL (the national population is estimated as between 10,000-50,000 males) but it does remain a high conservation priority species in significant parts of its range. A long- distance migrant, the species breeds in open or semi-open habitats, mainly meadows with tall grass. Significant populations are present in the Kazbegi valleys and hay meadows and the IBA citation records more than 20 breeding pairs within the IBA. The species was confirmed to be breeding near both Tskere and Kobi during the 2019 spring surveys. There is the potential for disturbance to breeding birds around both the



Begoni Plateau and the Tunnel 5 northern and southern portals and the species is already under threat from habitat fragmentation as well as increased hunting and grazing.

#### Action Plan

Status	<b>Action Plan for Corncrake</b>			
Approach	Avoid	Reduce	Mitigate	Offset

<sup>13</sup> See “Effect of human activities on Egyptian vulture breeding success” I. Zuberogoitia J. Zabala J. A. Martínez J. E. Martínez A. Azkona <https://zslpublications.onlinelibrary.wiley.com/doi/pdf/10.1111/j.1469-1795.2008.00184.x>

Objectives	No net loss of Corncrake populations as a result of the Project. To confirm the presence of Corncrake from key areas in and around the Tunnel 5 northern and southern portals and the Begoni Plateau. To support the development of a conservation strategy for this species in and around the Kazbegi National Park.
Location	The old hay meadows and damp grasslands that this species prefers occur mostly in and around the Tunnel 5 Portals and Begoni plateau. .
Potential Impacts	The Project is not expected to have a direct impact on existing corncrake habitat but disturbance could affect breeding and a precautionary approach has been adopted. It is especially important to understand if the bird uses any potential spoil disposal sites.
Summary of Approach	Following the specific surveys for corncrakes in 2019 to determine population abundance in the project area further technical specifications for the species will be developed and approved by Engineer/RD/EBRD/ADB before construction commences. This could include ensuring that existing farming regimes are optimal for Corncrake breeding or if necessary subsidizing farmers to create new suitable breeding habitat within the AoI to ensure the population is maintained.
Monitoring	Monitoring will be undertaken from Spring 2019 and will continue for 5 years from the start of construction.
Responsibility	The OE IEBS is responsible for resourcing and monitoring the work. Technical work to be contracted to an appropriate technical organisation or NGO.
Timing	Surveys will be undertaken in the spring and early summer over a 5 year period from the start of project construction.
Additional Information	Action plan for the Corncrake in Europe ( <a href="http://ec.europa.eu/environment/nature/conservation/wildbirds/action_plans/docs/crex_crex.pdf">http://ec.europa.eu/environment/nature/conservation/wildbirds/action_plans/docs/crex_crex.pdf</a> )

## 7.4 Action Plan for Migratory Raptors

### Current Status

The Khevi SPA is designated for migrating raptors and the “Kazbegi flyway” is recognized as an internationally important migratory flightpath with over 30,000 raptors recorded at peak migration times (mostly black kite and steppe buzzards). Migrating birds of prey such as eagles (*Aquila* spp.), harriers (*Circus* spp.) and Black Kite (*Milvus migrans*) are particularly common during spring migration (with more than 1,000 migrating raptors per day) in the vicinity of the Cross Pass and Sameba Church in Stepantsminda. Other species recorded on passage through the area include black storks and common and demoiselle cranes, whilst areas of woodland have been recorded as “excellent” for migrating passerines.



Recent field data (eg Autumn 2018 surveys) and local expert opinion indicates that most of these species pass through via the valleys of the Tergi and Tetri Aragvi Rivers (as the existing road) rather than through the Khada valley where the mountain ridge at its head (connecting Mt Sadzele (3307m) and Mt Narvani (3319m)) and creates a barrier to migration (see Autumn 2018 migratory report, ESIA Annex H). It is noted that the flyway is facing a number of threats including habitat loss and fragmentation such as that from uncontrolled development.

### Action Plan

Status	Action Plan for Migrating Raptors			
Approach	Avoid	Reduce	Mitigate	Offset
Objectives	To support the long-term conservation of species using the “Kazbegi flyway” through improving understanding of its importance, threats and required conservation actions.			
Location	In and around the Kazbegi flyway with a focus between Kvesheti and Kobi.			
Potential Impacts	The majority of birds using the flyway do not travel down the Project corridor, although they will pass the Tunnel 5 Northern Portal and there is the potential for temporary construction impacts. Operational lighting may also have an impact but is expected to be no more than with the existing road. Cumulative impacts may occur given the number of road schemes developed for the Caucasus. The Project has therefore taken a precautionary approach to understanding and addressing potential impacts from Scheme development.			
Summary of Approach	The work will provide a detailed assessment of the use of the project area and associated flyway by migrating bird species, notably raptors. A vantage point survey should be undertaken with at least 6 vantage points chosen that provide coverage across both the northern and southern parts of the scheme as well as the Jvari pass. These points should be safe and should ideally be replicable for both spring and autumn counts in future years. See below. Monitoring will be used to further determine the potential for impact and options for mitigation. The use of angled lights or bird friendly lighting will be considered given the importance of this major migratory pathway. ( <a href="https://www.researchgate.net/publication/260626775_Bird-Friendly_Light_Sources_Adapting_the_Spectral_Composition_of_Artificial_Lighting">https://www.researchgate.net/publication/260626775_Bird-Friendly_Light_Sources_Adapting_the_Spectral_Composition_of_Artificial_Lighting</a> ).			

Monitoring	Monitoring will be undertaken from Spring 2019 and if birds are found to be present will continue for 5 years from the start of construction.
Responsibility	OE IES is responsible for resourcing and monitoring the work. Technical work to be contracted to an appropriate technical organisation with expertise in this area.
Timing	The work will be a 5-year monitoring programme to be conducted twice a year during the spring and autumn migration periods. Spring migration counts will be done between the end of March and late May. Autumn migration counts will be done between mid-August to mid-October.
Additional Information	For further information contact appropriate NGOs such as Sabuko or Batumi Raptor Count.

Counts should be made at each vantage point on at regular occasions (at least 4 a month) and should last for at least 3 hours per count. Counts should use binoculars and spotting scopes and should run from one hour after sunrise until two hours before sunset (except for on days of poor weather when migration will be limited).

All stations should register every migrating bird or group of birds with the time of passage and their position relative to the station (including height). At low intensities individual birds should be counted, but when intensities become higher counts should be in multiples of 10. Birds should be identified to species level where practical and sexed and aged when possible. Care should be taken to identify potential double counts eg through regular radio /mobile phone communication if two stations are in operation simultaneously.

Whilst the focus should be on raptors, observations should also be made of other species including other soaring birds and groups of passerines. The approach should be reviewed after an initial six surveys and amended if needed.

Data from the surveys will be used to inform the management of the National Park and the broader area, as part of the Projects Additional Conservation Actions (see Section 9).

## 8 ACTION PLANS FOR NOTABLE MAMMALS

### 8.1 Action Plan for Caucasian Chamois

#### Current Status

The Chamois *Rubicapra rubicapra* is an IUCN: LC species but the Caucasian subspecies (ssp *caucasica*) is GRL: EN species. Similar to the Alpine chamois but somewhat smaller, it is found across both the Caucasus and the Lesser Caucasus. It is a KBA citation species and has been recorded from high alpine meadows and steep, rocky areas across much of the southern part of the KBA as well as the mountains to the south of the Project Aol (see map). This include sites in the Sakhizrebi area as well as the slopes of the Truso gorge and Sno valley to the NW and NE of the northern portal. Whilst not yet recorded within the Aol, it could be present in higher areas, although animals may have been displaced from these areas by hunting or pressure from Gudauri. This species range is beginning to fragment, and it is hunted heavily for food (and trophies) and poaching is probably the most significant cause of recently observed serious declines. Livestock grazing also results in competition for resources, especially with domestic sheep and goats. The species is also impacted by habitat loss and degradation preyed upon by wolves and lynxes. Human disturbance, particularly as a result of increased tourism and leisure activities in mountain areas, is also a problem. The figure below shows the “Mapped Distribution of Chamois and Tur in the Proposed Expanded National Park”. (Chamois; light orange, grey hatch areas: Tur, project Aol blue outline. Source: Kazbegi Feasibility Study)



## Action Plan

Status	Action Plan for Caucasian Chamois			
Approach	Avoid	Reduce	Mitigate	Offset
Objectives	To ensure no net loss to chamois by confirming their presence or absence from the areas in and around the upper Khada valley and its adjacent mountain ridges and if present working with NGOs and regulators to formulate and support a conservation strategy for this species in and around the Kazbegi National Park.			
Location	Fieldwork to be undertaken in and around the upper Khada Valley and to include camera traps along ridges and other migratory routes			
Potential Impacts	Chamois are not known to be present in the Project Aol. If they are the project could result in direct loss / fragmentation / disturbance of habitat or direct mortality from road traffic accidents. Such effects will be largely avoided though by the use of the tunnel for the majority of the Lot 1 works. However the project could increase access for hunters to the high mountain areas above the tunnel with associated induced and cumulative impacts.			
Summary of Approach	Iliia State University Institute of Ecology (Conservation and Ecology of Large Mammals team) has assessed the number and density of chamois in Kazbegi including a census from the air. Technical specifications for the project will be developed together with them and approved by RD/EBRD/ADB before work commences.			
Monitoring	Monitoring will be undertaken from 2019 and if animals are found to be present will continue for 5 years from the start of construction.			
Responsibility	The OE IES is responsible for resourcing and monitoring the work. Technical work to be contracted to an appropriate technical organisation.			
Timing	Initial assessment to be undertaken in the spring/summer of 2019. If Chamois are present further monitoring will be undertaken over a 5 year period from the start of project construction.			
Additional Information	"Holding research in the territory of Georgia for the purposes of counting and studying wildlife facilities and carrying out census in the territory of Georgia for the purposes of monitoring wildlife habitats", see <a href="http://iliauni.edu.ge/en/iliauni/institutebi-451/ekologiis-instituti-463/mimdinare-kvlevebi-491/msxvili-dzudzumwovrebis-ekologia-da-konservacia-640">http://iliauni.edu.ge/en/iliauni/institutebi-451/ekologiis-instituti-463/mimdinare-kvlevebi-491/msxvili-dzudzumwovrebis-ekologia-da-konservacia-640</a>			

## 8.2 Action Plan for Otters

### Current Status

The Eurasian Otter (*Lutra Lutra*) is an IUCN LC species but a GR L VU species. It is also a Habitats Directive Annex II species and a Kazbegi KBA criterion species. In Georgia the animal is represented by the subspecies *Lutra lutra meridionalis* which has an estimated population of some 400-600 individuals primarily in the central-eastern Caucasus. Discussions with national experts believe that this may reflect under-recording.

Otters are present in several relatively undisturbed and vegetated areas along the rivers and streams of the Project Aol. They are also likely to breed here, and will use holes in the river bank,



and will use holes in the river bank,

cavities among tree roots, piles of rock, wood or debris for this. Most otter activity is found in a narrow strip along the water’s edge but they may be found up to 1km away from water.

In the Project Aol evidence of otters has been found near the **Tergi, Narvana and Khada Rivers** (the latter below the cascade), but not alongside the existing road. Data from the autumn 2018 surveys<sup>14</sup> is summarised below:

Area	Findings
Northern Portal and Kobi Village	Evidence of otter found along the Tergi River (tracks) and Narvana river (spraints and anecdotal evidence). No evidence found along the Bidara River which suffers disturbance from the existing road.
Southern Portal and Tskere village	No evidence of otter activity in this area and the waterfall probably prevents fish from accessing the area.
Khada River Valley	Good otter habitat and evidence of otter activity (tracks and potential couches)
Confluence of Aragvi and Khada Rivers	No evidence of otter activity observed but anecdotal evidence of otters along the Khada River.



*Otter tracks in the Khada Gorge*

Based on this evidence, the Project is adopting a precautionary approach for this species and it is assumed that the species is also present in other areas with suitable bankside vegetation. This is especially so as otters have large home ranges and may travel over 20 kilometres.

Otters are highly territorial and territories can stretch for several kilometres dependent upon the availability of food. Territories of males tend to be larger than those of females and may overlap with those of several females. Otters use droppings (spraints) to mark their home ranges which are often left on in-stream boulders, bridge footings and grass tussocks. **If any spraints are found they should be tested for DNA to determine how many otters are present within the area.** Otters also use resting sites (couches) and underground denning sites (holts) which maybe **up to 1km** from the nearest water. An individual otter may utilise a number of holts, which are generally located in natural crevices, or the roots of trees growing along river and lake banks. and they may use burrows made by other animals. Other resting

<sup>14</sup> Work led by Sasha Bukhnikashvili and fieldwork led by Nugzar Surguladze.

sites are also used, frequently in dense vegetation and may be associated with frequently used runs and slides into the water.

Otters are vulnerable to removal of bank side vegetation, and persecution due to perceived depredation on fish. Numbers in Georgia have reportedly been in decline following a decline in wild fish stocks and habitat destruction (e.g. removal of bank side vegetation. They can also be at risk from pollution from organochlorines, polychlorinated biphenyls and mercury Fish typically makes up over 80% of their diet, but may be supplemented with aquatic insects, reptiles, amphibians, birds, small mammals, and crustaceans.

### Action Plan

Status	Action Plan for Otters			
Approach	Avoid	Reduce	Mitigate	Offset
Objectives	To ensure no net loss of otters by avoiding project impacts to known otter locations, improving understanding of the local otter population (size and distribution) and working with local NGOs and regulators to raise awareness and develop an otter conservation plan for this species.			
Location	River habitats in Project Aol, notably the Khada and Naravana Rivers			
Potential Impacts	Otters are known to be present within the Project corridor and are known to be vulnerable to a range of impacts within and around their river habitats. This includes removal of bankside vegetation, and disturbance. Further information is provided in detail in the section below.			
Summary of Approach	Work will involve a mixture of additional surveys, implementation of mitigation as outlined below and in the EIA, additional habitat creation and awareness raising.			
Monitoring	The seasonal monitoring is proposed for five years after construction commences to confirm whether the mitigation measures have been effective or if any alterations and/or enhancements are necessary.			
Responsibility	OE IEBS responsible for resourcing and monitoring the work. Technical work to be contracted to an appropriate technical organisation.			
Timing	The initial work will be undertaken in 2019. Further monitoring will be undertaken over a 5-year period from the start of project construction.			
Additional Information	There is considerable literature available on road scheme mitigation for otters.			

### Potential Project Impacts and Mitigation

#### Construction Impacts

Road construction can have a number of potential impacts on otters include:

- **Disturbance:** Given the secretive nature of otters (especially near holts and couches) they are very sensitive to disturbance. Impacts are particularly severe during the breeding season when the cubs may remain in the holt for up to 10 weeks.
- **Accidents:** Otters are nocturnal but also inquisitive animals. They may be attracted at night onto construction sites and can become trapped in pits, piping or other equipment.
- **Water Pollution** Water pollution can affect both otters and their food supply, eg through increased sediment loads or accidental spillages which can have both acute and chronic effects. Hydrocarbons spills can also affect the thermo-regulation qualities of otter's coats.
- **Disruption of home ranges.** Severance or disturbance of an otter's home range can cause it to relocate, placing it in direct competition with other otters. Otters are capable of inflicting serious and potentially fatal injuries on each other during disputes over territory.

The primary mitigation proposed is to **avoid** impacts to otters where practical and a range of specific requirements are included within the project EMP. These include proposals regarding:

- **Minimising works in or near rivers and streams** and damage to river and stream banks. If mature trees along riverbanks need to be removed, the root systems will be retained where practical to provide potential holt sites.
- **Locating activities away from known otter habitat**, including siting of works compounds, spoil storage and disposal, construction of embankments, access roads, and building of bridges and culverts.
- **Provision of safe commuting routes.** As otters will continue to try and use commuting routes, where otter commuting routes cannot be avoided, fencing will be used to guide otter to safe routes through working areas. 30m buffers will be left from watercourses where practical to avoid affecting otter commuting routes.
- **Pre-clearance surveys** will be undertaken for otters immediately before work commences in or near a watercourse to confirm absence of holts or other resting features. If such features are found, works will be timed to minimize impacts and appropriately timed screening will be put in place to exclude otter from working areas by erecting temporary otter proof fencing.
- **Specific surveys of all watercourses** will be undertaken within 100m of the alignment (both upstream and downstream) for signs of otters including holts and couches. If any otter lying-up sites are found, mitigation will be adjusted as required. **If breeding sites are found all works in that area will need to be suspended until the cubs have left.**
- **Awareness Raising.** Contractors will be provided with an overview of otter ecology prior to works commencing. Any holts and couches identified will be informed to contractors in confidence to ensure that they are not accidentally disturbed and marked so that contractors must not enter.
- **Avoiding night works** (one hour after sunset to one hour before sunrise) where the scheme comes within 30m of a holt/couch or watercourse in order to prevent disturbance to otter and their routines.
- If **lighting** is used it will be shone away from the river during construction at dusk or in the morning. If needed in the river it should use shrouding to ensure that not all the river is lit up and passage along it is still possible in unlit locations.
- **Retention of safe access.** During construction of bridges and other structures near watercourses, one side of the river or stream being bridged will be retained intact for as long as possible to provide safe access, and the area around the water course to be disturbed will be minimised by the provision of temporary barriers and safe working areas.

- **Use of underpasses.** Temporary or permanent otter underpasses will be provided if they are found to be required (eg for site access and haul roads) with a minimum internal diameter of 600mm.
- **Specific Protection for Holts and Couches** If a holt or couch is discovered during construction, an exclusion zone of 30m will be established and all works within it suspended. If an occupied breeding site is found, it may lead to the cessation of work for up to 10 weeks until cubs are mobile and able to leave the area.
- **Avoidance of Water Pollution.** Impacts associated with water pollution will be avoided and mitigated using good construction practices as outlined within the ESIA and associated EMP.



#### Operational Impacts

During road operations, otters could be subject to the following impacts:

- **Disturbance** from traffic noise and road lighting. Whilst otter may become accustomed to these impacts over time they could abandon any holts or couches in the immediate vicinity of the scheme.
- **Direct mortality** of otters from drowning in culverts or road traffic accidents. As nocturnal animals they can also be particularly susceptible to night time accidents.
- **Severance of commuting routes and home ranges.** Roads can divide otter home ranges, leading them to either abandon parts or make frequent road crossings, with associated risk of accident.
- **Impacts from water pollution**
- Increased access to otter habitat, increasing risks of **illegal hunting**.

To address these issues a range of proposed mitigation has been included within the scheme design. This includes the following:

- **Appropriate and timely habitat restoration.** This will include planting of appropriate trees along riverbanks and encouraging dense scrub nearby, as well as fencing off of overgrazed areas near watercourses to encourage vegetation regrowth. Potential disturbance will also be partially mitigated by planting of natural screens in areas used by otters to reduce noise and light disturbance.
- **Use of sensitive lighting near watercourses.** Lighting will be reduced where practical where the operational scheme crosses or runs parallel to watercourses.

- **Construction of watercourse crossings to enable safe passage of otters** (eg Narvana River). Bridges or buried structures will have sufficient space between the abutments and the watercourse to enable otter to pass safely during high water levels. Provision will be made for otters to gain access to the water at such structures and ledges will be incorporated in the bridge design as appropriate. Examples of such structures are shown in the Figures..



*Illustrations of suitable ledges for fauna crossing*



*Illustrations of effective connections from ledges to the natural river bank*

### **Additional Surveys.**

Otter activity varies according to the season, and further surveys will be undertaken in early summer 2019 when water levels have receded a little and wet mud is exposed so paw prints can be seen more easily. Surveys will involve walkovers along the affected rivers and will be done by a suitably experienced surveyor. Evidence to be looked for will include spraints, tracks, feeding remains, otter slides, holts and couches.

### **Additional Habitat Creation:**

It is possible to build artificial holts to attract otters to use certain areas. Artificial holts can be built to resemble natural holts, with a resting compartment and multiple entrances, which may be particularly important if natural bank side vegetation has been removed. The Project will consider the creation of artificial holts should this be required to ensure no net loss of conservation status of this species.



### 8.3 Action Plan for Bats

#### Current Status

All bat species in Georgia are legally protected under the framework of the Convention on Conservation of Migratory Species of Wild Animals (CMS), Annex IV of the Habitats Directive and the associated Agreement on the Conservation of Populations of European Bats (EUROBATS). Despite their protected status, the national bat populations downward trends in due to habitat fragmentation, intensification of agriculture, and cave disturbance.

To date the following species have been recorded in and around the project Aol:

Location /date	Recorded Species
Around Kobi village (2004)	Brown long-eared bat ( <i>Plecotus auritus</i> ) (Bukhnikashvili 2004).
Narvana Valley nr Kobi (2019)	Lesser Noctule ( <i>Nyctalus leisleri</i> ); Giant Noctule ( <i>Nyctalus lasiopterus</i> ) <i>Myotis</i> sp.
Plateau near Zakatari and Kaishauri nr lake (2019)	Common pipistrelle ( <i>Pipistrellus pipistrellus</i> ); Serotine Bat ( <i>Eptesicus serotinus</i> ); Noctule ( <i>Nyctalus noctule</i> ); Daubentons bat ( <i>Myotis daubentoniid</i> )
Along the River Khadistskali near Bedona village, (2019)	Common pipstrelle ( <i>Pipistrellus pipistrellus</i> ); Lesser Noctule ( <i>Nyctalus leisler</i> ) <i>Myotis</i> sp.

A range of other species may well be present within the Aol given the range of habitats present. Whilst no recorded species are on the National Red List, four that are known or potentially present are considered notable namely:

- The **Giant Noctule *Nyctalus lasiopterus*** (IUCN VU) which forages over mixed and deciduous forest and wooded river valleys. It is highly dependent on mature forest colonies which 40 year-old trees and any mature tree removal can be a threat. It feeds mostly on moths and beetles but may also take small songbirds and will fly at heights of up to several hundred meters to do this. Migrant, summer roosts are in hollow trees and bat-boxes, and occasionally in buildings. Trees and rock crevices may also be used as hibernacula in winter. Threats include loss of mature woodland, particularly the loss of old trees.
- **Greater Horseshoe Bat *Rhinolophus ferrumequinum*** (IUCN LC but Habitats Directive Annex II) which forages in deciduous woodland (particularly early in the year) shrubland and summer-grazed pasture (particularly late in the summer). Feeds on beetles, moths and other insects at low level and flies up to 3 km from the roost each night. Summer roosts are located in warm natural and artificial underground sites and they will use caves all year, as well as buildings for some summer maternity colonies. In winter it hibernates in cold underground sites (usually large caves).
- **Lesser Horseshoe Bat *Rhinolophus hipposideros*** (IUCN LC but Habitats Directive Annex II) which forages close to the ground within and along the edges of broadleaf deciduous woodland (primary foraging habitat), but also in riparian vegetation and shrubland areas, although open areas are avoided. Feeds on midges, moths and craneflies. Summer roosts (breeding colonies) are found in natural and artificial underground sites and in winter it hibernates in underground sites (including cellars, small caves and burrows).
- **Lesser Mouse-eared Myotis *Myotis blythi*** (IUCN LC but Habitats Directive Annex II) which forages in scrub and grassland habitats, including farmland and gardens. Maternity colonies are usually found in underground habitats such as caves and mines, and sometimes in buildings. Hibernates in winter in underground sites.

## Action Plan

Status	Action Plan for Bats			
Approach	Avoid	Reduce	Mitigate	Offset
Objectives	To ensure no net loss of bats by avoiding project impacts to known bat roosts, nurseries and hibernaculae, improving understanding of the local bat population (size and distribution) and working with local NGOs and regulators to support local bat conservation.			
Location	Project Aol, especially in and around the Narvana Valley near Kobi, the River Khadistskali, close to the village of Tskere and on the plateau around the village of Zakatari.			
Potential Impacts	Bats are known to be vulnerable to a range of impacts from road construction and operation. This includes loss of roosting, hibernating and nursery sites as well as disturbance to flyway and feeding areas. Further information is provided in the section below.			
Summary of Approach	Work will involve a combination of additional studies, avoidance of bat habitat (as detailed, in the EIA and below) and installation of bat boxes if needed within appropriate habitat (numbers to be based on the results of preconstruction surveys). If the project is found to bisect a known bat commuting route, the design will be changed where practical, eg to raise the height of planting so that crossings are above traffic or through the use of bat “guards” to encourage bats to fly under bridges. In addition, any data obtained on bats will be shared with appropriate research/conservation organisations and regulatory bodies and used to inform regional conservation management strategies.			
Monitoring	Seasonal monitoring is proposed for five years after construction commences to confirm whether the mitigation measures have been effective or if any alterations and/or enhancements are necessary.			
Responsibility	OE EIBS responsible for resourcing and monitoring the work. Technical work to be contracted to an appropriate technical organisation.			
Timing	The initial work will be undertaken in the summer of 2019. Further monitoring will be undertaken over a 5-year period from the start of project construction.			
Additional Information	There is considerable literature available on road scheme mitigation for bats (eg. see <a href="http://www.bats.org.uk">www.bats.org.uk</a> )			

## Potential Project Impacts and Mitigation

### Construction Impacts

Road construction can affect local bat populations through a range of impacts including habitat loss, disturbance and direct mortality. The Project Construction Environmental Management Plan includes a range of construction mitigation measures which are to be implemented under the direction of the Ecological Clerk of Works to minimize such impacts to bats. These include the following:

- Assuming that any potentially suitable nursery, hibernating or roosting sites (caves, houses, mature trees, rock fissures, etc.) within the Project area are important for bats unless cleared by the Project Ecological Clerk of Works. This includes any tree over 100mm in diameter which must be checked by the ECoW for the potential of roosting bats prior to removal. If bats are found, the roost will be left undisturbed until vacated by bats.
- All felled trees with potential to support bats (i.e. with suitable cavities) are to be left in situ on the ground for 24 hours to allow any bats to move.
- Where practical avoid felling trees between April-August.
- Non-UV sources of lighting will be used at working sites, deposits and permanent facilities to avoid attracting nocturnal insects and the bats that feed on them.

### Operational Impacts

Operational effects of road schemes on bats are often species-specific, with larger, higher and faster-flying species, adapted to foraging in the open, generally less affected than smaller, slower flying, woodland adapted species which tend to commute along linear features such as woodland edges. These linear features provide protection from weather and predators, are sources of insect prey, and provide conspicuous acoustic and visual landmarks for orientation. **Smaller bat species include both the Rhinolophus and some Myotis species.** Other general impacts of road schemes on bats are shown in the table below:

Issue	Effect
<b>Habitat Loss</b>	Removal of trees and buildings can affect potential or actual bat roosts. Removal of trees, hedges, scrub, water bodies and grassland also reduces available foraging habitat <sup>15</sup> .
<b>The Barrier Effect</b>	Roads are potential barriers to flight between roosts and foraging sites and between summer, mating and winter roosts. Bats have been shown to make major detours (with associated energy costs) to avoid roads or to find appropriate crossing points. This can also deny bats access to parts of their habitat which can reduce home range size and quality and restrict migration. Roads may act as barriers because they interrupt existing linear flight lines, because some species are reluctant to cross open ground, because some species avoid lit areas (road and vehicle lights) and, at least initially, because they represent sudden changes in the bats' familiar landscape. Roads may also fragment habitat, decreasing its area and quality. Impacts are however species specific. For example studies have shown that Bechstein's bats ( <i>Myotis bechsteinii</i> ) will avoid crossing roads, whilst barbastelle bats, <i>Barbastella barbastellus</i> will fly over quiet roads and <i>Nyctalus</i> species will cross busy roads at heights above 20 m. Others will also use underpasses, if strategically located.
<b>Direct Mortality</b>	Bats that attempt to cross roads risk collision, and hotspots for mortality have been found where there is favourable habitat for bats and flyways cross roads. Although agile and manoeuvrable in flight, most bat species fly at low speeds (< 20 km/h) and many fly close to the ground (0-4 m) particularly when crossing open spaces. These behavioural traits make bats highly vulnerable to moving vehicles when either foraging along roads or when attempting to cross roads on commuting flights. Being small, bats can probably be pulled easily into the slipstream of passing vehicles.
<b>Light</b>	Lighting tends to deter many bat species, especially woodland-adapted species such as <i>Rhinolophus</i> , <i>Myotis</i> and <i>Plecotus</i> , from approaching roads and probably exacerbates the barrier effect. Both high-pressure sodium and white LED light deter woodland-adapted species, even at low intensity. <sup>16</sup> As light intensity drops rapidly away from the source, effects of isolated sources are not likely to be far reaching, but large arrays of high intensity lights will have a significant effect. Light can also attract some bat species, in particular open-air foragers such as <i>Nyctalus</i> and generalists like <i>Pipistrellus</i> , since short wavelength light attracts insect prey, concentrating them around lights and increasing bat foraging efficiency. This may, however, also put them at greater risk of collision with traffic.
<b>Noise</b>	Most insectivorous bats rely on echolocation calls to orientate, detect prey and communicate. Some also locate and capture prey by listening for sounds they generate. (e.g. wing movements or mating calls). Traffic noise may mask such sounds and reduce the feeding efficiency of certain bats (eg <i>Myotis myotis</i> ). Vehicle noise may also exacerbate the barrier effect, although noise effects are unlikely beyond 60m away.
<b>Cumulative effects</b>	Most of the factors discussed above are also cumulative. The effects of each individually need not therefore be great for the combination to have a profound effect on a bat population. Full effects, however, may not be seen for several decades and this has important implications for monitoring the effects of roads and assessing the effectiveness of mitigation. Data <sup>17</sup> indicates that the decline in diversity and abundance of bats may extend to distances of over 1.5 km from a motorway.

<sup>15</sup> Road surfaces alone removes some 7 ha of habitat for every 10 km of 7 m wide, two-lane, single carriageway road. Roadside hard shoulders, verges, junctions, service areas and other structures remove additional potential habitat.

<sup>16</sup> (Stone et al. 2009, 2012).

<sup>17</sup> Berthinussen & Altringham (2012a, 2013)

Operational mitigation included within the project design for bats includes commitments to use down lighters where practical (especially given the very undeveloped nature of the project area), install a minimum of 100 bat boxes at appropriate locations and adapt planting regimes near known bat commuter routes to reduce risk to bats.



## 9 BIODIVERSITY MONITORING AND EVALUATION PROGRAMME AND ADDITIONAL CONSERVATION ACTIONS

### 9.1 Aim and Objectives

A **Biodiversity Monitoring and Evaluation Programme (BMEP)** will be designed and implemented to confirm that this BAP has both:

- i) been implemented by the responsible parties as expected
- ii) achieved the desired conservation outcomes

The monitoring will also seek to confirm that no unexpected impacts are occurring to notable species and habitats as a result of the project (including associated cumulative or induced impacts) for which an “adaptive management” approach may be required. The Engineer’s International Environment and Biodiversity Specialist will be responsible for writing and implementing the BMEP, which will build on the tasks previously outlined.

In addition, given that the Project will take place in close proximity to a protected area, and within an area of designated international conservation importance, EBRD PR6 requires that the project implement a series of programmes to promote and enhance the conservation objectives of the affected protected areas. Such **additional conservation actions (ACAs)** are to focus on those species/habitats associated with the protected areas. This includes those species for which species-specific action plans have been developed but also a number of other species including large carnivores (see Annex B) and several species of birds of prey which for which the National Park is important but which are not expected to be affected by the Project (see CHA for details).

The biggest constraint currently limiting the effective management of the extended National Park is a lack of baseline data on the use of areas within and around the Park by notable species, and the location of notable habitats. As a result, this Project will expand the BMEP to cover a slightly broader geographic area than the areas directly affected by the Project and will also share relevant information obtained with the National Parks Authority (NPA) to support the overall understanding of and management design for the protected areas. As part of this approach the data collection processes will be designed to enable effective geo-referencing of information to help the NPA to develop and maintain an appropriate GIS for the Park. The proposed approach will also help consolidate the results of the individual monitoring and survey tasks.

The BMP and ACAs will be the responsibility of the Engineer’s International Environment and Biodiversity Specialist (reporting to the Roads Department) but elements of it may be tendered out to suitable external organisation(s). As part of the BMEP the Project will monitor the nature, extent, quality and spatial configuration of notable habitats and species within both the direct Project Aol, and the wider area. Rapid and cost-effective habitat monitoring approaches (eg remote sensing) will be implemented to enable initial baseline monitoring and allow any significant changes in the biodiversity of the Project Aol to be detected and an “adaptive management” approach to the required conservation outcomes to be implemented should this be required. The studies will focus on the key biodiversity elements discussed in this BAP and associated sources of threats (including the species for which the NP and KBA are designated) rather than trends in local biodiversity *per se*.

It will also specifically seek to support conservation measures to be implemented by the National Parks Authority (NPA) by providing additional data that can help them to:

- Prepare a baseline habitat map for the Expanded National Park Area;
- Detect any significant changes in the nature, extent, quality and spatial configuration of the habitats and species present and identify the reasons for them
- Develop and implement measures to mitigate for any significant changes, in consultation with specialists, local communities and other stakeholders.

## 9.2 Monitoring Indicators

The BMEP/ACAs will include monitoring targeted at the following levels:

- **Regional/Landscape Level** to monitor changes in the **extent** and **spatial arrangement** of key natural habitat types. This ‘landscape structure’ analysis (the composition and spatial configuration of vegetation patches within an area) will be used to assess/predict biodiversity at ecosystem and species levels.
- **Species/Population Level** these will seek to provide further information on species distribution, population size and demographics for BAP and notable species. Indicators will be developed in consultation with local experts as part of this BAP.

## 9.3 Monitoring Methodologies

Monitoring will involve a combination of:

- Linking to **existing recording systems** such as “Observado”, “ebird”, “inaturalist” to allow incorporation of data from other sources.
- **Remote Sensing:** to determine overall habitat types and use by notable species. This should link with the work already done under the BMZ/KfW project “Support Programme for Protected Areas in the Caucasus – Georgia” to enable the IES to use a GIS based system for recording of species records to build up a picture of what is where.
- **Habitat Ground Truthing.** To be undertaken as needed based on the remotely sensed data and using sample transects, with a focus on ecotones (i.e. transitional areas). Habitat type will be recorded in the field using the standard EU classification.
- **Habitat Quality** Dominant plant species will be recorded at sample sites, along with species listed on the IUCN and Georgia red lists, and endemic species. Non-native and invasive species will be also recorded. The relative abundance will be recorded for example using the DAFOR scale (D=dominant, A=abundant, F=frequent, O=occasional, R=rare). Plant species will be identified in the field or subsequently using detailed photographs or samples collected in the field. Habitat types and their boundaries will be confirmed or defined in the field using the preliminary habitat classification prepared by interpretation of satellite imagery. The actual habitat areas will be calculated in GIS after field surveys;
- **Environmental disturbance:** e.g. data will be collected on artificial barriers, pollution, overgrazing, timber extraction, trampling, drainage, burning and fishing. Associated

management recommendation will also be collected: e.g. reducing grazing level, reducing fishing pressure, invasive species control.

- **Fauna populations.** Monitoring methodologies will be developed in conjunction with key specialists. Given the difficulty of sighting threatened mammals in the wild, secondary indicators such as field signs will be used and camera traps and live traps (for small mammals) where appropriate. For reptiles, the use of artificial refuge is to be considered as this method will collect more objective data on the population size, demographics and species distribution.

### 9.4 Monitoring Timescale and Reporting

The habitat classification and map developed for the BMZ/KfW project “Support Programme for Protected Areas in the Caucasus- Georgia” (or an equivalent) will be used as the basis for the work. If required, new high-resolution satellite imagery may be obtained to support the preparation of the baseline habitat classification/map and analysis. The field ground- truthing for habitats and monitoring of habitat condition, along with any relevant socio-economic/ ecosystem services surveys will start in 2019 and will be continued annually for 5 years.

An annual report will be prepared to include all sets of data, analysis, conclusions and recommendations for management interventions. A final report including a more detailed analysis of trends will be prepared in 2024.

In other words, the monitoring will continue up until the end of the defect liability period. At that point, the Engineer’s International Environment and Biodiversity Specialist will make an assessment of the situation and provide recommendations if necessary.

In terms of seasonal monitoring, an indicative schedule is provided in the Figure below:

	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec
Notable Plants (inc endemics)												
Caucasian Black Grouse (Lekking)												
Egyptian Vulture (breeding)												
Corncrake (playback)												
Migratory Raptors												
Caucasian Chamois												
Otters												
Bats												

### 9.5 Evaluation

This BAP and its monitoring, including that outlined above will be periodically evaluated to determine its effectiveness in meeting its objectives and identifying any necessary remediation. The findings of the monitoring programme will be evaluated every year with the Project Lenders and the outcomes used to adapt the management and ongoing mitigation measures. Management interventions will need to be identified when there is a negative trend in the areas of natural habitat and/or the connectivity of the habitats. The threshold for interventions will be when the area of any natural habitat has decreased by more than 5%. The outcome of the evaluation and any management interventions required will be fed to the relevant managers and land owners.

## 9.6 Dissemination

This BMEP will contribute directly and significantly to the achievement of the National Biodiversity Strategy and Action Plan (NBSAP) for Georgia including its objectives of developing a biodiversity monitoring system and an active and integrated biodiversity database to ensure sustainable use and conservation of biological resources. The habitat map and GIS database will be provided to the regional and national monitoring systems for this purpose.

A number of government agencies are likely to be interested in the data and outcomes from this monitoring and will be consulted on the results to enable local authorities in the region to use this information in planning. In addition, the habitat information and GIS database will provide the starting point for research projects to be undertaken by academic institutions and NGOs in the region.

## 9.7 Resources

The International Environment and Biodiversity Specialist will prepare the full terms of reference (ToR) for the BMEP/ACAs and will start implementation in 2019. It is intended that implementation of the BMEP/ACAs will also receive additional local capacity and resources from other bodies.

Staff resources required to implement this plan will be assessed at the completion of the BMEP/ACAs ToR. At this stage they are expected to include appropriate resources for:

- Habitat ground truthing and quality assessment,
- Analysis of habitat field data and reporting,
- Any relevant socio-economic and ecosystem services surveys,
- Analysis of socio-economic and ecosystem services data and reporting,
- GIS analysis (interpretation of satellite imagery, habitat classification, calculation of landscape areas and landscape indices).

The equipment needed to implement this plan should be available from the specialists to be engaged but is likely to include: fieldwork equipment: cameras, GPS, binocular, and computer with relevant GIS software.

Costs of much of the work should be covered mainly by the International Environment and Biodiversity Specialist and by the Works Contractor, although a financial estimation will be carried out when the BMEP is fully developed. This will include: staff cost for fieldwork, data analysis (including GIS) and reporting, cost of equipment (or hire) including maintenance, software licence, satellite imagery purchase, training and capacity building etc.

Involvement/engagement of local communities will be considered in the BMEP because:

- the plan will be more sustainable if communities are involved;
- local communities have useful information on the relationships between threats and effects;
- stakeholder involvement can contribute to the development of a sense of ownership of the resource management regime and responsibility for biodiversity health.

The BMEP/ACAs will need to be approved by the ADB and EBRD.



## ANNEX A: KEY NATURAL HABITATS TO BE PROTECTED THROUGH NO NET LOSS

### Hornbeam Forest:

Hornbeam forest (*Carpinus betulus*) Forest (91CB-GE) is widely distributed in Georgia and thrives on fertile, well-drained soils. Around 0.3 ha of Hornbeam forest within the Project area will be directly affected by the proposed road (mostly near the bridge crossings of the Lot 2 road). A further 0.8ha could be affected by the proposed Lot 2 spoil disposal sites, although this will be avoided where practical under the guidance of the ECoW (and also for engineering reasons). During the woodland surveys single individuals of three GRL Vulnerable species were recorded within broader woodland areas near the proposed road, namely: *Quercus macranthera* (high mountain oak), *Ulmus minor* Miller (Small elm), and *Ulmus glabra* (Bare elm). Subsequent studies as part of the detailed forest fund inventory has since confirmed that these species will be affected during the works, but the ECoW should specifically seek and record the locations of any of these species to ensure that they are protected.

### River Habitats

All major valleys within the region support “braided” rivers with seasonal flows heavily influenced by snowmelt. The most important of these are the Tetri (or “White”) Aragvi which runs parallel to Kvesheti and Arakveti (where the road will cross it at the southern end of Lot 2); the Tergi (or Terek) River which runs adjacent to Tunnel 5 northern portal and ultimately drains to the Caspian Sea and the Baidara River which runs alongside the existing road and joins the Terek near the northern portal.

The smaller Khadistskali River runs parallel to the Project through the Khada valley (Lot 2 and the main project route) to join the Aragvi at Kvesheti and is known to support otters. The Narvana River, which is crossed by the Project at the northern portal where it joins the Terak, is also a smaller river and is known to support otters.

Freshwater habitats at the Project site are in better condition than many others in lower regions, and this is demonstrated by the range of invertebrates recorded in the ESIA studies, as well as their role as feeding/breeding grounds for migratory fish (see ESIA for details) and the presence of otters that feed on them. They do, however, still suffer from untreated sewage from local communities.

The rivers are generally bordered with the habitat classified as “**Alpine rivers and their ligneous vegetation (323 GE)**”. The composition of this habitat varies with location but typically includes areas of relatively thick undergrowth which can completely disappear when flooded and then revive again. In sandier areas (eg in the Khadistkali valley) areas of shrub and “crook-stem” forest here include hawthorn (*Crataegus kyrtostyla*), oriental hornbeam (*Carpinus orientalis*), and Jerusalem thorn (*Paliurus spina-christi*).



**Alpine rivers habitats at Kvesheti**

Around Kvesheti, and although the area is degraded by human activities (including dumping of domestic waste) the sandy and stone substrate supports shrubs of Tamarisk (*Tamarix sp*) and Willow (*Salix arbuscula*). Other 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 and Juncus sp*), Horsetails (*Equisetum*), and clover species (*Trifolium sp.*).



**Alpine River habitat along the Tergi River**

On the sandy banks along the Baidara and Tergi Rivers (and near Kobi) the habitats the vegetation includes a mix of annual and perennial grasses and dicotyledonous plants and occasional bushes of *Crataegus*, *Rosa canina*, *Salix arbuscula*, *Rhododendron flavum*, *Salic caprea* and *Paliurus spina-christi*.



**Alpine River Habitat along the River Baidara**

Overall some **72ha** (16% of the total) of Alpine River habitat is present within the Project Aol of which around **1.4ha** are expected to be permanently lost to the scheme and a further **16ha** could be affected by the proposed northern disposal area (although this location is not yet agreed). The contractor will be required to reinstate any areas affected by such spoil disposal otherwise to ensure 'no net loss' of this natural habitat. This habitat reflects over 85% of the natural habitat expected to be affected by the Project, although it is a habitat that is generally common in the area. It is not considered either CH or a PBF *per se* except for in areas where it supports notable species such as otter.

Areas of Alluvial forest with Alder (*Alnus glutinosa*) & ash (*Fraxinus excelsior*) (91E0 \*) are also present as a narrow line along the Khadistkali River. Around 45 ha of this habitat was identified within the whole Project Aol, but it is not considered CH or PBF (except in the context of other species as above). Only around 0.7 ha are expected to be directly impacted by the scheme.

The Project will not have any in-river activities and impacts on these habitats will be mitigated under the guidance of the ECoW through avoidance and footprint minimisation as far as practical. Where this cannot be achieved all habitats will be pre-cleared to ensure no notable species are affected and additional mitigation will be implemented under the supervision of the ECoW as per the notable species action plans included in this document.

### Sea Buckthorn Habitats

Habitats dominated by Sea Buckthorn (*Hippophae rhamnoides*) bushes are found in the upper Terek basin and the Tergi valley near Stephantsminda. They may also be present within the Aol, although have not been recorded there to date. Sea buckthorn itself is not considered a notable species, but the bushes near Stephantsminda provide important cover for key species such as corncrake and otter (see relevant action plans) and the berries are considered a critical winter food source for two KBA citation and GRL VU (but IUCN LC) species namely:



*Kvesheti – Kobi Road Biodiversity Action Plan*

- Great rosefinch *Carpodacus rubicilla*
- Gueldenstaedt's (white winged) redstart *Phoenicurus erythrogaster*

These species are both found as unique small & isolated populations, separated from their “main” ranges in the Himalayas, and the conservation of the species’ wintering grounds (and the berries on which they feed) is considered of regional conservation importance. No areas of Sea Buckthorn are to be adversely affected by the construction or operation of the scheme. Should any areas be identified nearby they will be mapped and excluded from development works (eg areas potentially proposed for spoil disposal). Opportunities for enhancement of this habitat will also be explored.



Typical Sea Buckthorn Habitat (not from Georgia)

## ANNEX B KEY FAUNA FOR WHICH ADDITIONAL DATA SHOULD BE RECORDED AS PART OF THE BEMP/ACAS

### Large Carnivores

The Project will continue to collect and share information on the presence of large carnivores which may be present within the Project Aol but which are either not CH/PBF trigger species, or are not present with sufficient regularity to trigger CH/PBF, or are not expected to be subject to any significant impacts from the Project. These include **Brown Bear** *Ursus arctos* (IUCN: LC GRL: EN); **Eurasian Lynx** *Lynx lynx* (IUCN: LC GRL: CR and Georgian “Special Concern” species) and Grey Wolf (*Canis lupus*) (IUCN: LC; Not GRL; HD: II, IV). The following summarises the current status and threats to these species:

- **Brown Bear** Recorded from the Aol, and a KBA trigger species, local villagers have reported occasional traces of bear near cattle barns and around the mountain birch forests of the northern portal and tracks were recorded during the Spring 2019 surveys in the Aragvi valley. This species is not thought to breed within the Aol and given its non-territoriality and ability to travel huge distances seasonally, it is not considered at risk of significant residual impacts from the project. Currently, DNA analyses and studies in bear population genetics are going on at Ilia State University.
- **Eurasian Lynx** IUCN range maps indicate it may be present in the broader area and locals speak about a cat seen in the middle flow of the Narvani River some 5-6 years ago that may have been a lynx. However, it is not considered a regular use of the Aol and there are no known breeding areas nearby. Given the large distances travelled by this solitary species (home ranges are typically > 120 km<sup>2</sup> for males and 80 to 500 km<sup>2</sup> for females it is not considered at risk of significant residual impacts from the project. It is however considered critically endangered at a national level and is under threat from poaching, persecution, and habitat fragmentation.
- **Grey Wolf.** This species is found in a wide range of habitats across Georgia and is not considered locally endangered. It is, however, a priority EU carnivore species and populations are declining across the broader region. Local residents report that in winter and early spring wolves are seen in the study area and that every year there are cases of wolves attacking the cattle. The species is under threat from habitat fragmentation, hunting, disturbance and risk of accidents and poisoning and persecution for perceived predation on livestock.

Whilst significant residual impacts are not expected to these species (especially as much of the Project is in tunnel) there is the potential for some impacts arising from:

- Direct loss/fragmentation/disturbance of feeding habitat
- Direct mortality arising from road traffic accidents
- Increased persecution as a result of access for hunters to high mountain areas.

The following construction mitigation is therefore included within the Project ESMP:

- Awareness rising of workers (eg via tool box talks) regarding the potential presence of large carnivores in the area, including advice on the correct actions to taken should they be encountered, and highlighting the need for good housekeeping (i.e. no litter, food stored appropriately).

- Notification of the Ecological Clerk of Works should any large carnivores be encountered or suspected to be nearby, who will issue a “stop work” order and agree an appropriate course of action.

In addition to the above, the Project proposes to implement a number of additional voluntary actions to support ongoing FFI/NACRES/CNF activities to i) map and monitor the use of the National Park area by these species and ii) to create management plans for supporting these species in the National Park, including development of suitable safeguarding measures. These will be developed as part of the BMEP. This will include sharing data from any camera traps installed as part of the chamois studies with FFI/NACRES/CNF.

### Further information

Fauna and Flora International (FFI) has worked on the conservation of carnivores in Georgia since 2004 ([www.fauna-flora.org](http://www.fauna-flora.org)). This includes work with Georgian Centre for Biodiversity Conservation and Research (NACRES) on the EU-funded **Georgian Carnivore Conservation Project** which seeks to address threats to large carnivores by improving law enforcement, biological monitoring and raising awareness<sup>18</sup>.

### Kazbegi Birch Mouse

The Kazbegi Birch Mouse (*Sicista kazbegica*) is an IUCN EN and GRL VU species. It is endemic to the Kazbegi region and is a KBA designation species. It is found in mixed forest (1,500-2,300 masl) and subalpine meadows with tall grass across the area where it is supposed to be locally common. Little is really known about the species, but it is reported to spend much of the day in shallow burrows, and eats insects, fruits and seeds. Its habitats are reported to be threatened by over-grazing amongst other issues.

Whilst populations of small mammals can become genetically separated as a result of habitat fragmentation due to road schemes, no areas of tall grass or mixed forest are expected to be disrupted by the Scheme. As a result, no significant impacts are expected from either construction or operation and no mitigation other than standard good international construction practice (as outlined in the EMP) is proposed.

No specific Action Plan is required for this species. However, the Project will consider working with NACRES and Ilia State University to support some mid to long-term studies into the status and conservation requirements of this species.

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<sup>18</sup> For example FFI and NACRES have worked with shepherds to improve stock protection and to mitigate the loss of livestock to wild predators.



**SUPPLEMENTARY ECOLOGICAL SURVEYS  
KVESHETI – KOBI ROAD SECTION  
SPRING 2019**



DRAFT VERSION

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JULY 2019

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## Executive Summary

This report summarises the results of the Spring Biodiversity surveys that were undertaken to collect baseline data and inform the Biodiversity Action Plans (BAPs) for the proposed Kvesheti to Kobi Road Upgrade Project in Georgia. The surveys were conducted as a follow-on from the Autumn 2018 surveys in order to capture seasonal variations, in accordance with the requirements for Category A projects under the EBRD's E&S Policy (2014), EBRD's Performance Requirements, ADB's Safeguard Policy Statement (2009) and other local, national and regional requirements.

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 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. The Project also 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 and could affect species of national and international conservation importance. The surveys were undertaken to help further identify such areas and species in greater detail, to get a better understanding of their prevalence, behaviour, population and the likely impacts the Project will have on them.

Where any such impacts have been identified the Project is 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. This is 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 and is reported through the separate CHA and BAP documents.

To inform these biodiversity action plans and collect baseline data, initial biodiversity surveys were undertaken in Autumn 2018. The Spring surveys were organised as a follow-on to these previous surveys and to capture seasonal variation in baseline data. The following specific field surveys have been conducted:

- Natural habitat and endemic plants
- Spring Bird Migration Surveys
- Breeding bird surveys (notably raptors, blackgrouse, snowcock and corncrake)
- Otter breeding survey
- Bat surveys

## 1. Introduction

### 1.1. Document overview

This report summarizes the findings of a series of supplementary ecological surveys undertaken in spring/summer 2019 for the proposed Kvesheti-Kobi road development. These surveys complement and build upon the surveys undertaken in 2018 which included both general ecological surveys (undertaken by Gamma Consulting) in Spring 2018 to meet national regulatory Environmental Impact Assessment (EIA) requirements, and specific surveys undertaken in autumn 2018 (by DG Consulting) for migratory birds, otters and bats. This report provides the results of specific additional surveys undertaken in Spring 2019 with regards to the following:

- Notable habitats (including habitats at the northern portal, wet grassland and sea buckthorn).
- Spring bird migrations
- Notable breeding birds, specifically corncrake, birds of prey (including Egyptian Vulture) and black grouse.
- Otters and bats

The work builds on the baseline conditions described in the international ESIA, which was completed in 2019 and should be read alongside its Annexes (including the autumn survey results)

### 1.2. Project Overview

The existing Military Road runs between Georgia and Russia and includes a stretch of some 35km between the towns of Kvesheti and Kobi. It is often closed in winter where it crosses the Great Caucasus ridge over the Jvari Pass at a height of 2,395 m. The initial 7km section of the existing road from Kvesheti runs alongside the Tetri Aragvi river before climbing steeply in a zig-zag through the Gudauri ski area for around 15 km. It then crosses the Jvari Pass for around 10 km before descending to cross the tributary streams of the Térek near Kobi (on 60m and 42 m long bridges).

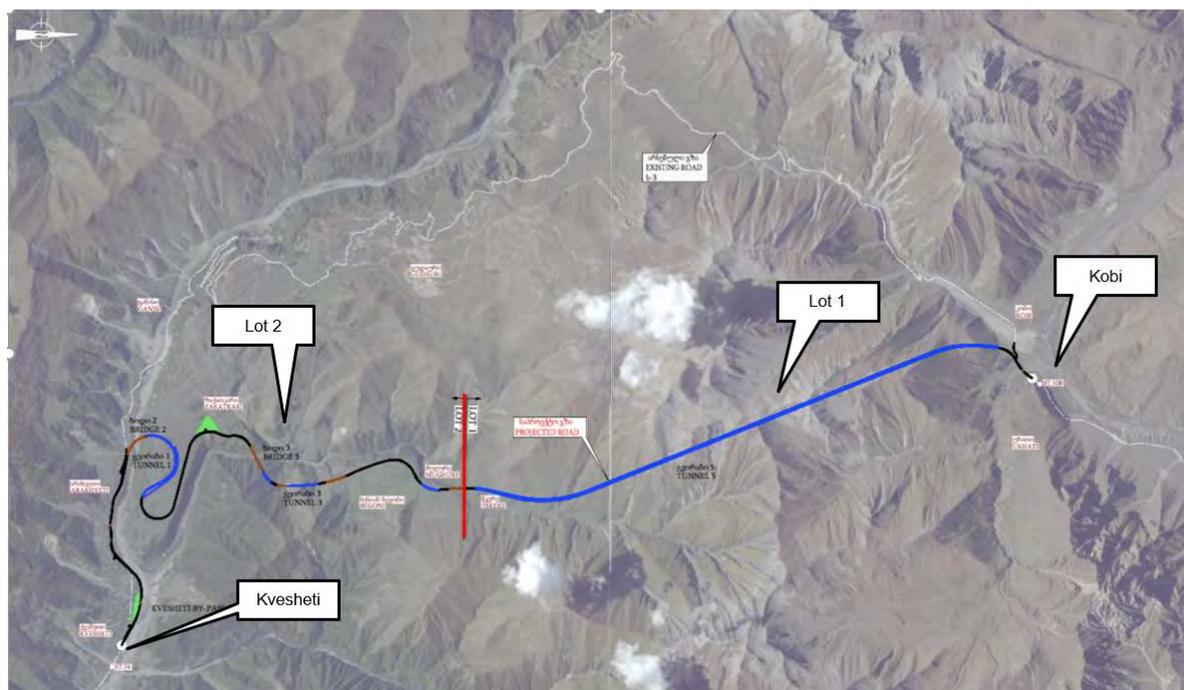


Figure 1.2.1 General location of proposed road

A new section of road is proposed that will bypass Kvesheti (on the river side) before climbing to the plateau near Zakatkari village in a series of gentle curves. It will then pass through the Khada valley to Tskere where it will enter the southern portal of an 8km long tunnel. Exiting from the north tunnel portal the road has a final 0.9 km stretch to Kobi where it joins the existing road. The proposed new road will be around 24 km in total length and will require 8 bridges (1 existing bridge and 7 new bridges) as well as the 8 km long tunnel. The route shown above (**Error! Reference source not found.**) indicates tunnels in blue colour and the road sections in black; with the northern tunnel portal on the far right of the picture.

### **1.3. Specialists Involved**

The work has been undertaken by the following team of specialists:

- Bird surveys: Gia Edisherashvili (with support from Ilia Mirotadze, Vepkhvia Maglakelidze)
- Bat surveys: Ioseb Natradze (with field support)
- Otter Surveys: Sasha Bukhnikashvili (with field support from Nugzar Surguladze and Giorgi Sheklashvili)
- Overall coordination: David Girgvliani

### **1.4. Approach, Timing and Constraints**

All work was carried out between April and June 2019. The approaches adopted and implications of seasonal and timing (and other) constraints are outlined under each of the sections below.

### **1.5. Layout of the report**

The remainder of this report is arranged as follows:

- Section 2: Notable Habitats
- Section 3: Migratory Birds
- Section 4: Breeding Birds
- Section 5: Otters
- Section 6 Bats

## 2. Vegetation Studies

### 2.1. Objectives of the study

Following the initial 2018 field surveys, supplementary habitat surveys were required to:

- i. confirm the composition and status of key habitats identified within the project corridor ;
- ii. update habitats affected following changes to project design (especially regarding the Gadauri Access Road and proposed Spoil Disposal Sites).; and
- iii. map the status of potentially important habitats including those along the river valleys.

With regards to key habitats within the corridor, the fieldwork focussed on the following habitats for which the overall extent and status within the AoI was to be confirmed, and areas for supplementary habitat creation identified, if required.

Habitat	Description
<b>Sub-Alpine Birch Krummholz</b>	(Georgia code 9BF-GE, EUNIS code G1.12 Boreo-Alpine Riparian Galleries). Some 2.5ha of this habitat were reported in the initial Gamma Survey near the Tunnel 5 northern portal with 0.1 ha expected to be affected by the proposed Scheme. The habitat typically supports a mix of elfin birch and mountain ash, together with Caucasian evergreen rhododendron ( <i>Rhododendron caucasicum</i> ) and other evergreen shrubs.
<b>Low Grass Marshes:</b>	(Georgia code 70GE03, EUNIS code D4.1) The habitat was recorded in the initial Gamma survey on the plateau near Zakatkari, and may also be present in other areas along the route. The habitats support species of <i>Equisetum</i> (horsetails) and <i>Luzula/Juncus</i> (rushes) as well as other plants such as <i>Rumex alpinus</i> .
<b>Sea Buckthorn (Hippophae rhamnoidesis).</b>	This is generally found along the river corridors to the north of the Project and is of local importance for wintering birds, notably great rosefinch and white winged redstart.
<b>Wetland habitat (Kobi)</b>	A number of wetland areas are present at the northern end of the scheme that may be affected including by the proposed spoil disposal schemes.
<b>Wet woodland</b>	Riverine <i>Fraxinus - Alnus</i> woodland is recorded along rivers that are intermittently flooded. Areas needed mapping and status reviewed.

**Table 2.1.1. Focus habitats for the surveys**

Surveys were also needed for notable plants. The 2018 field surveys had recorded small numbers of five Caucasian endemic plants in the grasslands and woodland edges near the proposed northern portal of the Lot 1 Tunnel. Data from the National Park also indicates that other endemic species may occur within the Project footprint including:

- Georgian Endemic Species;
- Caucasian Endemic Species and
- Local Endemic Species.

The likelihood of such species being present both at the northern portal and within the broader Project AoI needed to be determined. Mapping of any areas considered likely to support such notable species was also needed. This is due to be undertaken in the summer surveys.

## 2.2. Approach and Methodology

Transect walkover surveys were carried out along with detailed mapping and description of habitat status. Representative parcels of habitats were surveyed in greater detail to identify any presence of endemic, protected or otherwise notable flora and maps developed to show these locations. The field surveys were undertaken during the first week of June (after the snowmelt). The work was led by Nino Davitashvili supported by Ilia Mirotadze.

Whilst the survey included the whole corridor of the proposed road section (excluding the sections, where tunnels will be constructed) special attention was paid to the following:

- Area near the Northern Portal of the main tunnel near the Kobi settlement (N1),
- Plateau near Zakatkari (where the seasonal wetland areas are located) (N4),
- Kvesheti area, where the riparian vegetation is present (N8),
- Khada Valley area (N7),
- Begoni area (N6) and
- Village Tskere area (N5).

The survey locations are provided in the adjacent Figure 2.2.1. Photos of the main habitats and notable species encountered are provided in the Annex.

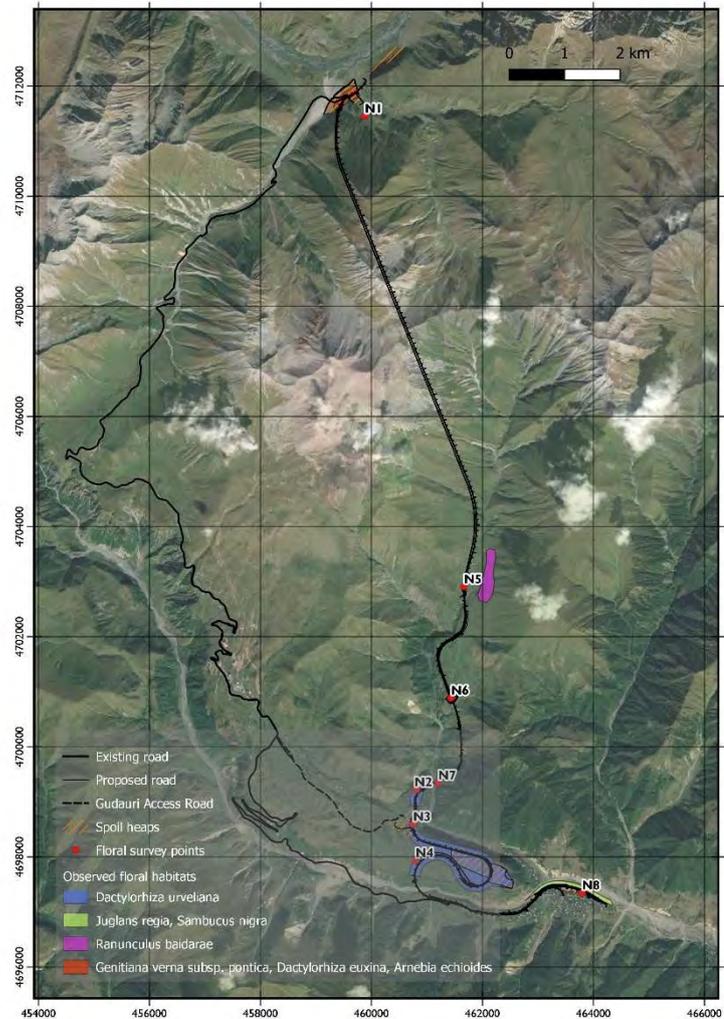


Figure 2.2.1 Location of the detailed survey lots

## 2.3. Survey Results

The project area is situated in upper mountain belt at altitudes from 1300 above mean sea level (amsl) to 2000 (amsl). Habitats present include areas of forest belt vegetation, subalpine forests, subalpine shrubs, subalpine tall herbaceous meadows, Alpine belt and scree vegetation. Habitats and species recorded are shown in the Table below, whilst a discussion on the findings follows.

**Table 2.3.1. Summary of the Field Survey Results**

Plot	Location	Description	Species
N 1	Adjacent to Kobi Settlement	Alpine meadow and subalpine forest as well as ruderal area.	<b>Alpine meadow</b> is composed mainly from Alchemilla sp and Trifolium sp. Accompanied species are Gentiana cruciata, Gentiana verna subsp. pontica, Primula algida, Astragalus sp., Ranunculus brachylobus, Lotus corniculatus, Plantago lanceolata, Anemone speciosa, Anemone fasciculate, Arnebia echioides, Dactylorhiza euxina. <b>Subalpine forest</b> is composed by Betula litwinowii, Pinus sylvestris, Salix caprea.
N2	Upper (northern) part Zakatkari	Main habitats are wet meadow and Subalpine forest.	<b>Wet meadow</b> is composed by the dominance of Carex sp., Trifolium sp., Alchemilla sp. Dactylorhiza urveliana. Accompanied species are Polygala alpicola, Plantago lanceolata. <b>Subalpine forest:</b> Quercus petraea subsp. iberica, Acer trautwetteri, Carpinus betulus, Pyrus caucasica, Frangula alnus, Betula litwinowii, Populus tremula, Sorbus aucuparia. <b>On slopes</b> Rhododendron luteum is abundant.
N3	Lower part Zakatkari	Forest and wet meadow as above..	<b>Wet meadow</b> is mostly composed by Carex sp, Trifolium sp. Plantago lanceolata. Other plants such as Ranunculus brachylobus is abundant together with Dactylorhiza urveliana. Nasturtium officinalis is also present. This species appears on very wet places and indicates presence of standing water. <b>Subalpine Forest</b> On slopes forest is developed where following tree species are present: Quercus petraea subsp iberica, Betula litwinowii, Populus tremula, Prunus avium, Prunus divaricate, Malus orientalis, Sorbus aucuparia, Salix caprea, Pyrus caucasica. Rhododendron luteum is abundant, Berberis vulgaris occurs only scarcely
N4	Plateau near Zakatkari	Former broadleaved forest, but significantly degraded. Remaining habitats include patches of forest and secondary wet meadows.	<b>Broadleaved Forest</b> Forest patches are composed by Pyrus caucasica, Crataegus microphylla, Salix caprea, Quercus petraea subsp. iberica, Frangula alnus, Cornus mas, Berberis vulgaris, Frangula alnus, Prunus mahaleb, Malus orientalis. Rosa sp. Pyrus caucasica is widely distributed forming together with Rhododendron luteum scrubs <b>Secondary meadow</b> is dominated by Trifolium ambiguum, Plantago lanceolata, Carex sp., Dactylorhiza urveliana. Ranunculus brachylobus. The invasive exotic plant Chaenomeles japonica was found flowering here with 4-5 individuals spread in the plateau <sup>1</sup> . <b>Degraded forest</b> is developed on Zakatkari Plateau dominated mostly by secondary wet meadow and shrubs of Pyrus caucasica and Rhododendron luteum. Small patches of forest are also present. Because of degraded habitat Chaenomeles japonica can grow and flower here.
N5	Meadows adjacent to Tskere.	abandoned agriculture land and alpine meadow.	<b>Alpine meadow:</b> Alchemilla sp, Trifolium sp, Plantago lanceolata. Endemic species Ranunculus baidare occurs here. Dactylorhiza urveliana occurs scarcely. Small patches of tree species is also possible to find where Pyrus caucasica and Fraxinus excelsior are present.
N6	Near to Begoni Village	Grazed subalpine meadow	<b>Subalpine Meadow</b> - Dominance of Alchemilla sp and Trifolium sp. Shrubs of Rhododendron luteum and Rosa sp. are also present here. Accompanied species of meadows are Plantago lanceolata, Bellis perennis.

<sup>1</sup> Chaenomeles japonica is widely utilized as an ornamental plant both in west and east Georgia. *Chaenomeles japonica* is a dwarf shrub (0.6–1.2 m) which occurs in central and south Japan at elevations from 100–2100 m on hillsides, and on riverbanks and lakeshores (Weber 1964). Plant can stand frosts up to -30°C.

N7	Khada Valey (middle section)	Mixed broadleaved forest. Riparian Forest	<b>Mixed broadleaved forest.</b> Not possible to study forest in detail because of inaccessibility of the slope. Literature indicates that the forest is composed by <i>Quercus petraea</i> subsp. <i>Iberica</i> , <i>Carpinus betulus</i> , <i>Fraxinus excelsior</i> . <b>Riparian Forest</b> River Khada floodplain forest is dominated by <i>Alnus incana</i>
N 8	Kvesheti spoil disposal site	Banks of Aragvi river with tree species on the slope.	<b>Riparian – broadleaved forest Trees</b> include <i>Juglans regia</i> , <i>Alnus incana</i> , <i>Sambucus nigra</i> , <i>Salix</i> sp, <i>Lonicera caucasica</i> , <i>Prunus mahaleb</i> , <i>Cornus sanguinea</i> , <i>Crataegus microphylla</i> . From herb layer <i>Equisetum arvense</i> is distributed.

## 2.4. Discussion of Results

### Sub-Alpine birch forest near to Northern portal of main Tunnel

During the 2018 study, the birch woodland near to the Kobi settlement in the northern most point of the project area was classified as Sub-Alpine Birch Krummholz Habitat (Georgia code 9BF-GE, EUNIS code G1.12 Boreo-Alpine Riparian Galleries). This is a notable habitat in Georgia. During the June 2019 studies, representative plots across the habitat were surveyed as reported in the table above. Based on the survey results, the habitat has been **re-classified as subalpine birch forest and not subalpine birch krummholz**. According to EUNIS classification both of these forests fall into the category of subalpine forest with the code G1.12. Whilst neither of these two habitats is legally protected nationally or internationally, both vegetation types are considered rare in the Caucasus region and have the same level of sensitivity. Subalpine birch krumholz usually occurs on steep slopes together with *Rhododendron caucasicum* shrubs and the trees are usually impacted by snow, resulting in a crooked stem. At the northern portal site the birch stems are not bent, and *Rhododendron caucasicum* is absent. Subalpine birch forest is commonly found along the Tergi river valley, and there are many areas suitable for habitat replacement.

It should be noted that the habitat of the slope at the site of the northern portal is not uniform. The top of the mountain is covered with shrubs of *Rhododendron caucasicum* whilst the lower part of the same slope is covered with the subalpine Birch forest. *Rhododendron caucasicum* shrub is important habitat for Black Grouse (discussed in detail further in the document).

Fig. 2.4.1 provides a typical view of the habitat described in the Northern Portal.



**Figure 2.4.1 View of the northern portal area**

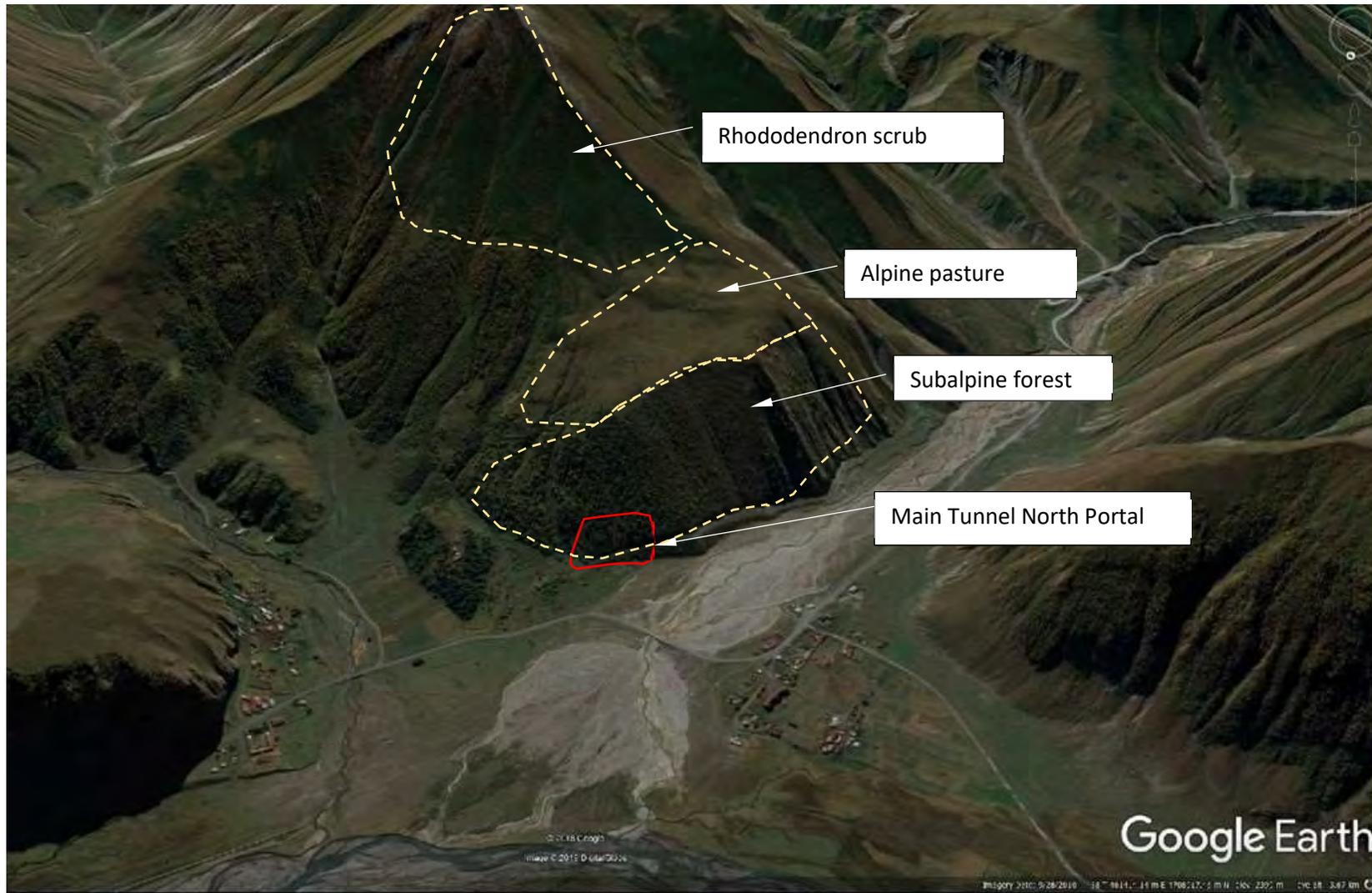


Figure 2.4.2 Satellite view of Northern Portal area with indication of different type habitats

### Wet meadow on the plateau near Zakatkari

The 2018 EIA identified the presence of Low Grass Marshes (Georgia code 70GE03, Eunis Code D4.1) a nationally notable habitat recorded within natural depressions on the plateau area near Zakatkari Village. The survey area included almost all territory in the plateau where the proposed road will be located. During the June 2019 surveys specific attention was paid to these depressions. The survey found that they had been misclassified and they should be **reclassified as wet meadow habitat** given their seasonal character. Species present included the common nitrophilous *Rumex alpinus* (especially where cattle had trampled the meadow) but no horsetails (*Equisetum* sp.) were recorded. The habitat should still, however, be considered as sensitive because of the confirmed presence of orchid *Dactylorhiza urveliana*. This species considered to be rare in the Caucasus region. Other herbaceous plants were mostly of common species. The status of wet meadows and the plants present in the habitat should be checked later in the year when other plants are flowering and therefore can be assessed.



**Figure 2.4.3 The *Dactylorhiza urveliana* in the Wet meadow habitat**

Although reclassified, this wet meadow habitat is still considered sensitive and important from a biodiversity point of view. Whilst the project corridor mostly avoids such habitats, the spoil disposal activities must be carefully managed to avoid impacts on these sensitive zones (and also impacts on the *Dactylorhiza urveliana* orchids) and careful and timely pre-construction surveys will be critical.

Several other habitats were also present on the plateau including fragments of degraded broadleaved forest and shrubs of *Pyrus caucasica*, *Rhododendron luteum* and *Rosa* sp. The introduced exotic *Chaenomeles japonica* was also recorded. Special attention should be paid to this plant, which can be invasive in nature, and care must be taken to prevent uncontrolled development and expansion of this species. The effectiveness of planned mitigation measures should be monitored during the construction and defect liability period of the project.

### Near the Gudauri Access Road

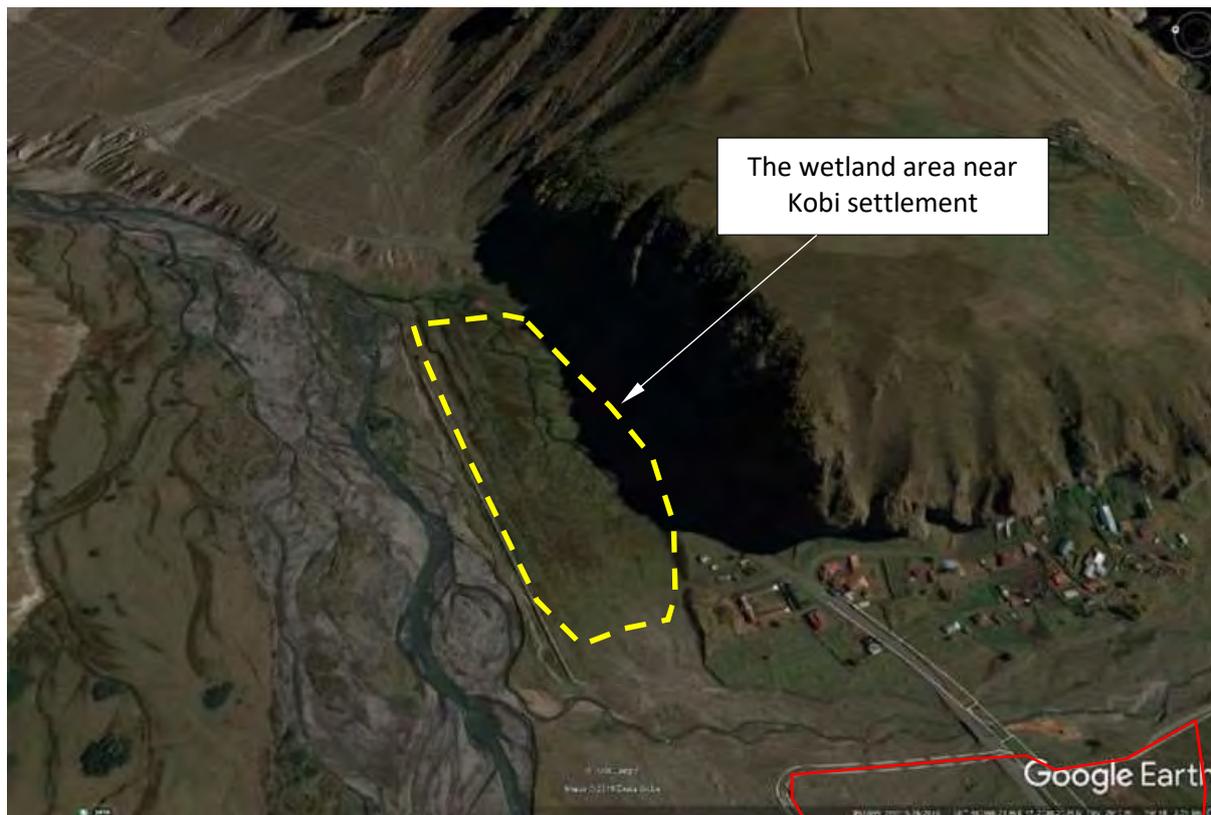
The Gudauri Access Road which will pass between the proposed road and the existing road was also surveyed. Additional areas of seasonal wet meadow habitat were found here and it is considered important that specific care is paid to these habitats.

### Sea Buckthorn Habitat (*Hippophae rhamnoides*)

Sea Buckthorn Habitat is considered important to overwintering birds, and whilst none was recorded in the 2018 surveys, the 2019 sought to confirm this. During the surveys it was confirmed that this species is not present in the study area (including near to the Kobi settlement) but rather occurs in the Tergi river valley some 5-6 km north of the project area at altitudes are significantly below 2000 amsl.

### Wetland habitat near Kobi

A wetland area is present near to the Kobi settlement at the bottom of Ukhati Plateau between the cliffs and the river Tergi where a number of springs appear at the bottom of the mountain slope. The boundaries of the wetland area are indicated on the Figure 2.4.4.



**Figure 2.4.4 Wetland area near to the Kobi settlement.**

**NB: Revised proposed spoil heap locations are shown in red. A previous site in the wetland area is no longer considered suitable**

The wetland area is in the protection Zone for mineral and spring water sources used for the bottling at Kobi Mineral water plant (located some 2 km away) and as such will not be affected by the proposed spoil disposal works.

### Riverine Alnus woodland.

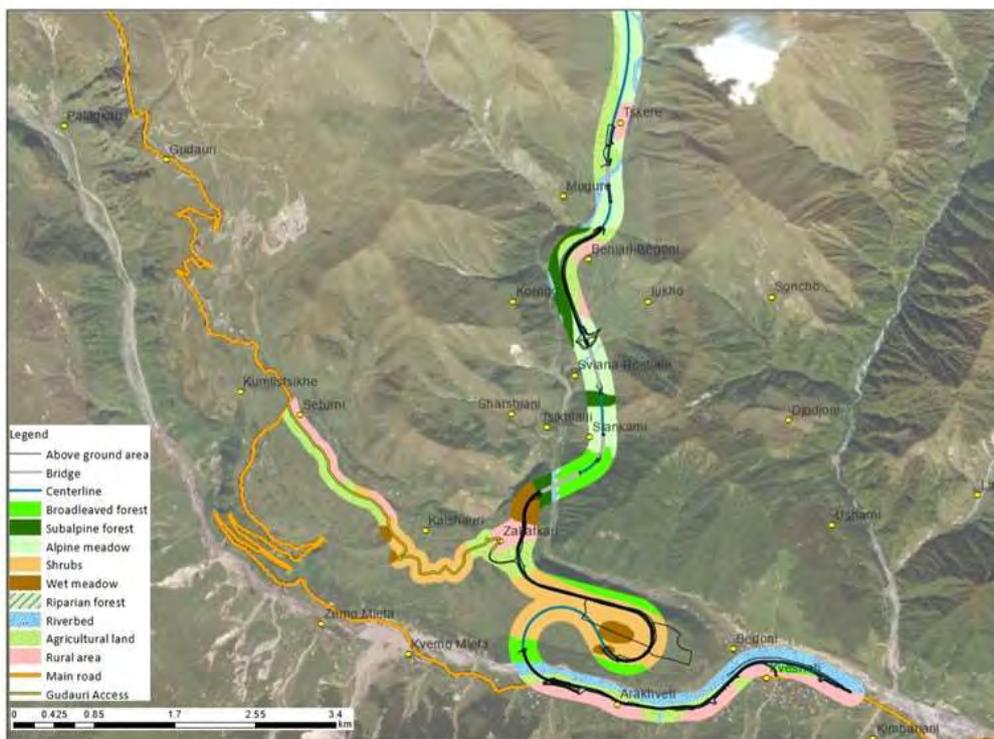
Specific surveys were undertaken to assess the presence of this habitat along the Khada, Aragvi and Tergi rivers. No such habitat was recorded, although *Alnus incana riparian forest* was common. The project is not expected to have any direct impacts on this riparian forest habitat except for in the River Khada valley, where the bridge construction is planned. Whilst the access roads to the bridge construction areas can impact the riparian forest here, the impact zone will be of small size, because the valley is V shape and the riparian forest belt is very narrow. In addition access to the bridge

construction site will be arranged from the mountain slopes and not from the very steep riverbank.

Habitats identified within the project corridor (main road and Gudauri access road) are shown on Figure 2.4.6 and Figure 2.4.6 below:



**Figure 2.4.5 Habitats recorded within the 300m corridor of the proposed road (northern section)**



**Figure 2.4.6 Habitats recorded within the 300 meter corridors of the proposed road (southern section) and Gudauri access road**

The EUNIS habitat codes corresponding to those habitats identified within the survey are presented in Table 2.4.1 below.

**Table 2.4.1. EUNIS codes of habitats presented within the survey area**

Recorded habitat	EUNIS Code No.	EUNIS Code Name
Subalpine forest	G1.12.	Boreo-alpine riparian galleries
Alpine meadow	E4.3.	Acid alpine and subalpine grassland
Wet meadow	E5.	Woodland fringes and clearings and tall forb stands
Shrubs	F3.11.	Medio-European rich-soil thickets
Broadleaved forest	G1.A1.	Oak - ash - hornbeam woodland on eutrophic and mesotrophic soils
Riparian forest	G1.12.	Boreo-alpine riparian galleries

### Rare and Endemic species

The Caucasus are well known for their high Biodiversity and rich flora, and a number of rare and/or endemic species can be encountered. During the surveys, a number of such species were recorded within the corridor, as shown in Table 2.4.2 below and marked on the habitat maps. Additional rare or protected species may also be present in the project corridor and further preclearance surveys will be needed to address this.

**Table 2.4.2. List of rare and endemic species**

Latin name	English name	Conservation status
<i>Dactylorhiza euxina</i>	<u>Dactylorhiza</u>	Rare plant
<i>Dactylorhiza urveliana</i>	Dactylorhiza	Rare plant
<i>Juglans regia</i>	Walnut	Red data list
<i>Sambucus nigra</i>	Black Elderberry	Rare plant
<i>Ranunculus baidare</i>	Buttercup	Endemic of Georgia
<i>Arnebia echioides</i>	Arnebia	Rare plant
<i>Gentiana verna subsp. Pontica</i>	Gentian	Rare plant, endemic of western Asia

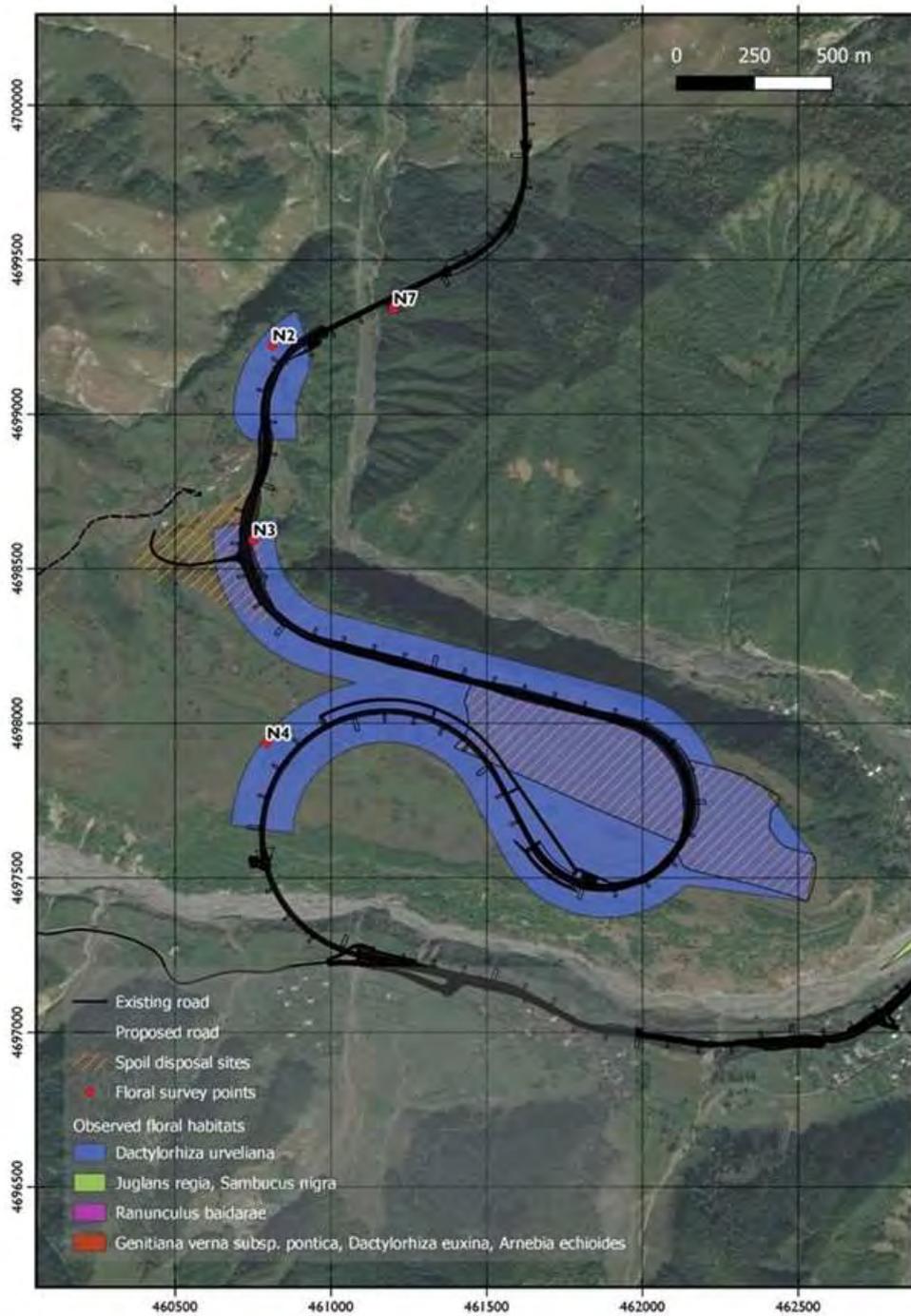
Whilst IBAT data indicates that *Heracleum osseticum* and *Eritrichium caucasicum* may also be present in the wider area, the surveys were undertaken during the spring time, when neither species are typically visible. Specific surveys for these plants should be undertaken in the Summer season.

In general the following were noted as potentially important areas for rare and endemic species:

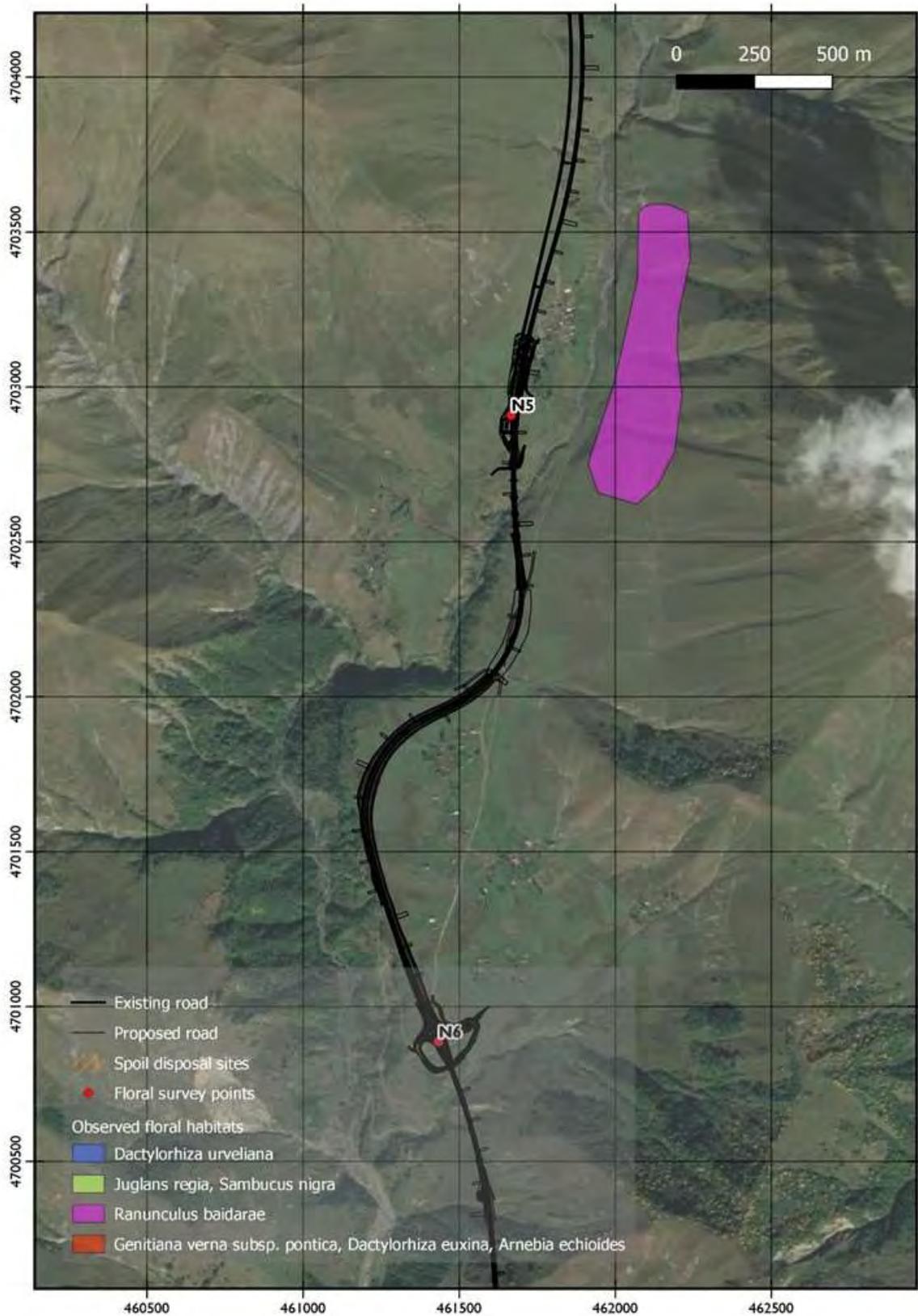
- The Aragvi River gorge near to Kvesheti village (potential spoil disposal area) where the Georgian red list and rare species (Walnut and Black Elderberry) were identified within the project footprint (Figure 2.4.7).
- The Plateau near to the Zakatkari village, where the presence of *Dactylorhiza urveliana* was confirmed (Figure 2.4.8).
- The Kobi area adjacent to the North Portal where *Arnebia echioides* and *Gentiana verna subsp. Pontica* are present (Figure 2.4.10).



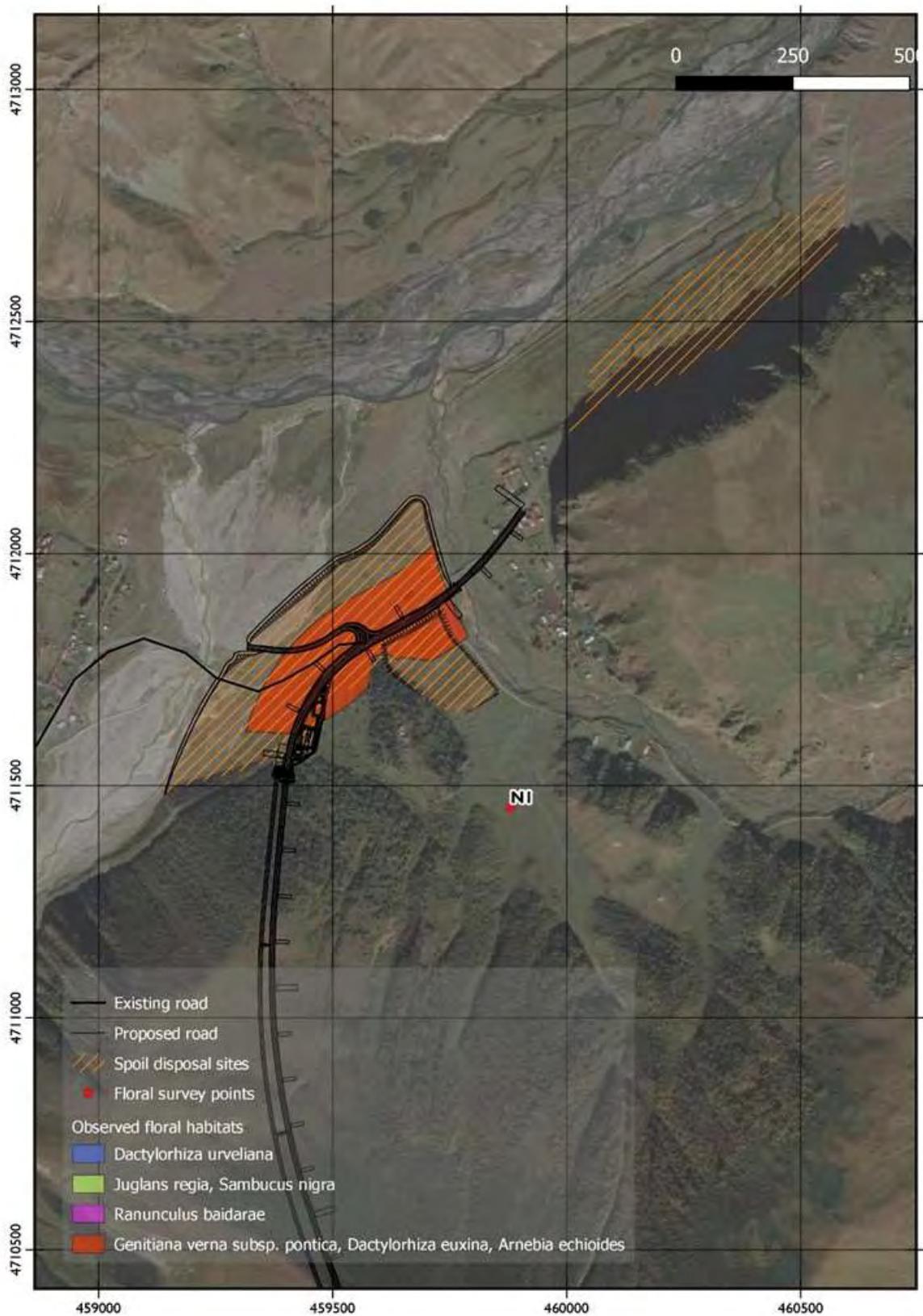
**Figure 2.4.7** Locations where extra care is needed as rare and endemic species could be present along proposed road corridor (1)



**Figure 2.4.8** Locations where extra case is needed as rare and endemic species could be present along proposed road corridor (2)



**Figure 2.4.9** Locations where extra care must be taken as rare and endemic species could be present along the proposed road corridor (3)



**Figure 2.4.10 Locations where extra care must be taken as rare and endemic species could be present along the proposed road corridor (4)**

### 3. Spring Migratory Bird Studies

#### 3.1. Background information

The Caucasus is recognised as an important spring /autumn flyway and key migratory routes through the mountains. Passes here tend to form bottlenecks, where large numbers of birds fly over a relatively small area of land. The Jvari Pass through which the existing road passes is recognised as one such bottleneck while a range of raptors, water birds and passerines uses the associated Kazbegi flyway. At peak migration times over 30,000 raptors a day have been recorded (mostly Black Kite and Buzzards) from key localities such as Stepantsminda within this flyway (data from ebird and observado). Most of these are, however, reported to pass the mountains via the Jvari Pass rather than the proposed Project corridor, as the mountains in the latter create a barrier to easy migration.

Migrating birds of prey, such as Eagles (*Aquila spp.*), Harriers (*Circus spp.*) and Black Kites (*Milvus migrans*), are particularly common during spring migration with more than 1,000 migrating raptors per day recorded in the vicinity of the Cross Pass and Sameba Church in Stepantsminda. Other species recorded on passage through the area include black storks and common and demoiselle cranes, whilst areas of woodland have been recorded as excellent for migrating passerines. Species commonly encountered include European Honey-buzzards, Black Kites, Lesser Spotted, Greater Spotted, Steppe and Booted Eagles, Marsh, Montagu's and Pallid Harriers passing from their breeding grounds in Eastern Europe and West Siberia, to wintering grounds across Africa. The importance of this flyway has been one of the reasons for the designation of the Kazbegi IBA (see ESIA for details).

#### **Batumi Raptor Count Data**

There are no regular surveys of migrants within the Kazbegi region, and it appears that none have been undertaken before this in the spring season (see autumn survey results for autumn BRC data).

#### **Trektellen Bird Count Data**

Annual maximum counts are also recorded by Trektellen, which is also used by BRC to record their data. Although data is available up to 2017, the most recent data from Kazbegi is from 2015<sup>2</sup> (see autumn survey results) and no spring counts at all are recorded.

#### **2018 Autumn Bird Survey Results**

Autumn migratory bird survey was carried out between 28 September and 06 October 2018. The summary of recorded bird species is presented in the tables below. Migratory bird activity was low overall, possibly because the autumn weather was particularly cold. The most common migratory birds recorded were common buzzards which were seen flying over the Ukhati plateau (to the north of the northern portal) searching for food as well as resting on the power transmission lines before flying south towards the Bidara river gorge and the Jvari crossing. Few birds were recorded following the Narvana river south-east direction towards the Khada Gorge.

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<sup>2</sup> [www.trektellen.org/site/yeartotals/1333/2015/-2](http://www.trektellen.org/site/yeartotals/1333/2015/-2)

**Table 3.1.1. Birds of Prey Recorded**

Species	Latin name	VP1 North Portal	VP2 South Portal	VP 3 N of Zakatkari	VP4 S of Zakatkari	VP 5 Tergi Valley	VP 6 Jvari Pass
<b>Birds of Prey</b>							
<b>Common Buzzard</b>	<b><i>Buteo buteo</i></b>	<b>23</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>12</b>	<b>1</b>
Griffon Vulture	<i>Gyps fulvus</i>	3				2	
Golden Eagle	<i>Aquila chrysaetos</i>	3	3			1	
Short-toed-Eagle	<i>Circaetus gallicus</i>	1					
Common Kestrel	<i>Falco tinnunculus</i>	1					1
Harrier	<i>Circus sp.</i>	1					
Sparrowhawk	<i>Accipiter nisus</i>	2	2				
Goshawk	<i>Accipiter gentilis</i>	2					
Lammergeier	<i>Gypaetus barbatus</i>	1	1			3	4
Peregrine Falcon	<i>Falco peregrinus</i>					1	

**Table 3.1.2. Other Species (>10 recorded at any one time)**

Species	Latin name	VP1 North Portal	VP2 South Portal	VP 3 N of Zakatkari	VP4 S of Zakatkari	VP 5 Tergi Valley	VP 6 Jvari Pass
<b>Other Species</b>							
Crag Martin	<i>Ptyonoprogne rupestris</i>	50+					
Water Pipit	<i>Anthus spinoletta</i>	50+	40+	Few	30+	30+	100+
Mistle Thrush	<i>Turdus viscivorus</i>	30+					
Goldfinch	<i>Carduelis carduelis</i>						10+
Red-billed Chough	<i>Pyrrhonorax pyrrhonorax</i>	60				Few	15+
Warblers	<i>Phylloscopus sp. sp.</i>	Few			10+		
Jay	<i>Garrulus glandarius</i>		1	1	3	10-12	
Tree Pipit	<i>Anthus trivialis</i>				20+		
Rock Dove	<i>Columba livia</i>					20+	
Twite	<i>Carduelis flavirostris</i>						25-30

### 3.2. Spring Survey Approach and Methodology

#### Methodology

The Spring survey sought to follow the Autumn 2018 survey process which used six vantage points to provide coverage of migrating birds across both the northern and southern parts of the scheme, as well as the Jvari pass (as a control). The vantage points were chosen to provide views across the:

- i) The **Aragvi River Gorge**, up which the existing road passes and which represents the Kazbegi flyway in general (i.e provides a control)
- ii) The specific **Khada Gorge and Valley**, up which the new road is proposed to pass up to Tskere village which is the point of the southern portal of the proposed new road.
- iii) The north side of Caucasus ridge, where the northern Portal is located close to the Tergi river at the **confluence of the Tergi and Bidara rivers and the Narvana river** on the right tributary of the Tergi.

Whilst the 2019 spring migration survey originally proposed to visit the same vantage points along the Khada and Tergi valleys. However, in the end the location of three vantage points needed to be moved as follows:

- VP3 was moved west , closer to Tskere village, due to better accessibility.
- VP4 was moved to the south, closer to Kvesheti village. This position was better to observe Khada valley, Aragvi valley and Zakatkari plateau at the same time.
- VP6, the former location was not suitable as this place is actively used for paragliding.

Despite these modifications, the vantage points cover the same areas as the original surveys. Furthermore, the same names have been used to help in the assessment of the results as shown in the map below and described in Table 3.2.1.

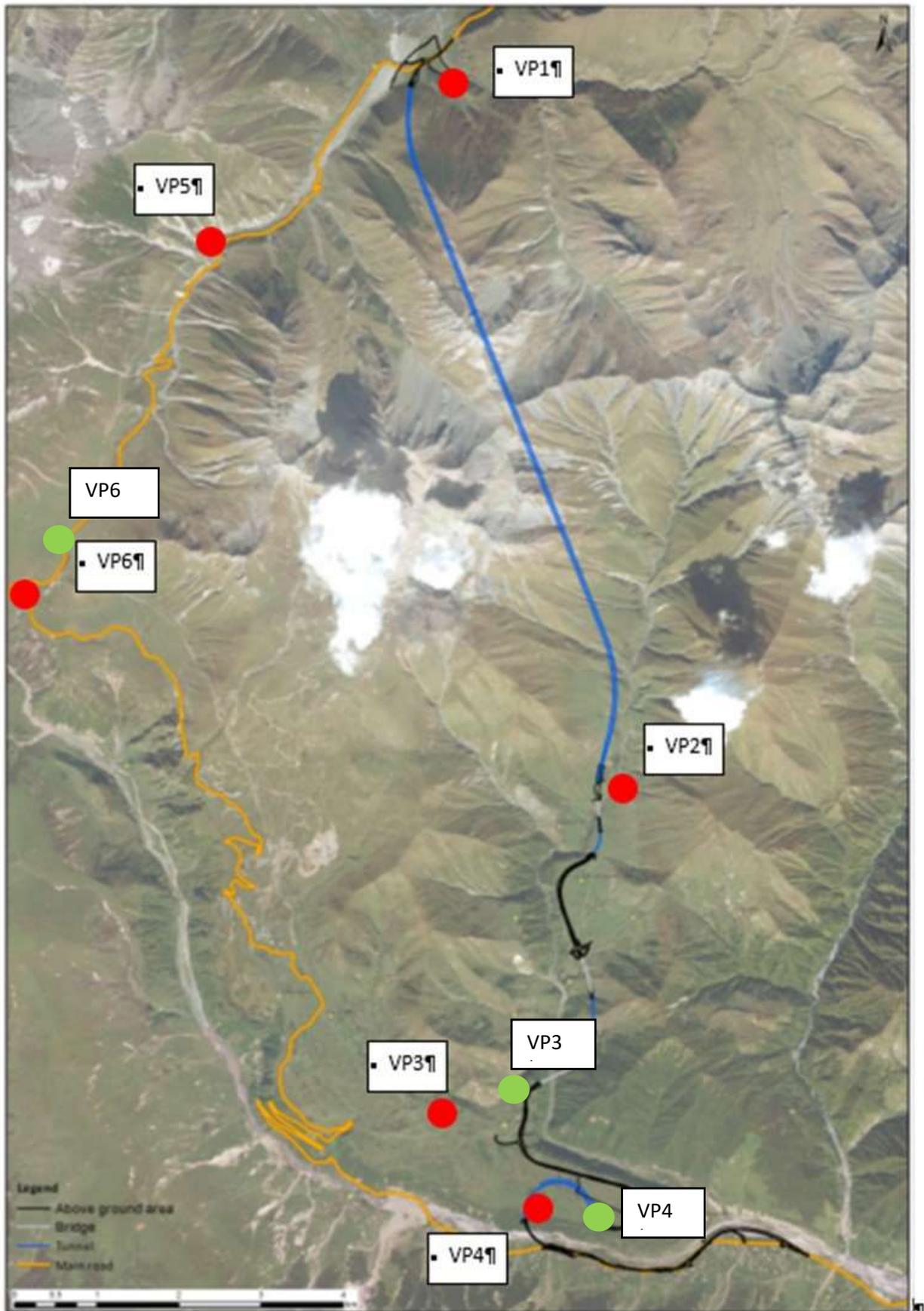


Figure 3.2.1 The Location of Vantage Points from the Autumn 2018 surveys (red dot) and Spring 2019 surveys (green dot)

**Table 3.2.1. Description of Vantage points**

<b>V. Point</b>	<b>Description of Vantage Point</b>
<b>Northern Portal VP1</b>	(Northern Portal) - The vantage point is located on the top of the mountain, at the same height as the Ukhati Plateau across the River Narvani. It covers views over the River Tergi valley (from the north towards the Jvari cross and the River Bidara), the River Narvani and upstream to the north-west of the River Tergi. This point is also important for spotting resident bird species, as it allows observations of the mountains to the west and also nearby cliffs, which support potential raptor nesting habitat.
<b>Southern Portal VP2</b>	(Khada valley, near southern tunnel portal). Vantage point covers the upstream section of the Khada river valley and allows views of migratory birds flying over the Saddleback range to Kobi settlement, local birds at Tskere village and birds flying up the valley. It also looks towards the Zakatkari village located to the south.
<b>North from Zakatkari VP3</b>	Vantage point enables the observation of birds flying over the plateau and also provides visibility towards the upper part of the Khada river (to Tskere village) and partial visibility of Aragvi river gorge.
<b>South from Zakatkari VP4</b>	Vantage point is located in the Aragvi river gorge and enables the recording of migratory birds flying to the north, and splits them in three main groups: 1) those following the Aragvi river valley; 2) those flying uphill to the Zakatkari Plateau towards Gudauri Resort; and 3) those following Khada river valley in a narrow gorge up to the Project corridor towards Tskere village
<b>Travertines VP5</b>	Vantage point located in the Bidara River Valley observing the birds crossing the Jvari pass over the Greater Caucasus.
<b>Jvari Pass (Gudauri) VP6</b>	Vantage point allows the monitoring team to capture views from the high mountainous point to the Aragvi River Valley and towards the route crossing the Greater Caucasus.

Counts were made at each vantage point on four occasions during the April-May migrations with observations at each point lasting for three hours. Counts used binoculars and spotting scopes and were not made on days of poor weather when migration and visibility was limited. At low intensities individual birds were counted and with higher counts, birds were recorded in multiples of 10. Two people were involved in each observation session. Surveys were undertaken at the following times:

- The initial field survey was implemented on the 16<sup>th</sup> April. However, only 2 vantage points near the southern portal could be accessed. None of the vantage points near the northern portal were accessible due to poor weather conditions and late snow.
- The next survey was carried out between the 17<sup>th</sup> and 21<sup>st</sup> of April, 2019 as weather had improved. Surveys were conducted at 3 vantage points. There were a total of 4 days spent in the field in April.
- The following round of surveys was carried out between the 4<sup>th</sup> and 10<sup>th</sup> of May, 2019, with 3 days in the field in total. All vantage points were visited.
- A final survey was conducted at the end of May 2019 which also aimed to survey resident birds (see Breeding Birds section).

The surveys were led by Gia Edisherashvili (ornithologist) and Vepkhvia Maglakelidze (field assistant).

### Survey limitations

As described above, the initial surveys were conducted between 16th and 21st April, 2019. Weather conditions were unfavourable and this, combined with heavy road traffic, made observations difficult. No surveys were conducted on the 18<sup>th</sup> of April due to bad weather. In the end only three vantage points were visited, namely VP2, VP3 and VP4 as the road over Jvari Pass was closed. The second round of Spring surveys were conducted between the 4th and 10th of May, 2019. This time, all observation sessions planned were conducted on all vantage points.



**Figure 3.2.2 Images identifying unfavourable weather conditions**

### 3.3. Survey results

A summary of the total numbers of bird species recorded at each vantage point is provided below.

**Table 3.3.1. Numbers of all birds of prey recorded at each vantage point during both surveys**

English name	Scientific name	VP1	VP2	VP3	VP4	VP5	VP6
Steppe Eagle	<i>Aquila nipalensis</i>		20	3			
Booted Eagle	<i>Aquila pennata</i>		14				
Black Kite	<i>Milvus migrans</i>	4	33	50+	250-350		
Pallid Harrier	<i>Circus macrourus</i>	3	3	1	1		
Common Buzzard	<i>Buteo buteo</i>	34	33	73	70+		7
Eurasian Sparrowhawk	<i>Accipiter nisus</i>		1	1			
Northern Goshawk	<i>Accipiter gentilis</i>		2				
Eurasian Hobby	<i>Falco Subbuteo</i>		2				
Lammergeier	<i>Gypaetus barbatus</i>	2	4			1	1
Common Kestrel	<i>Falco tinnunculus</i>		2	1			1
Levant Sparrowhawk	<i>Accipiter brevipes</i>		1				
European Honey-buzzard	<i>Pernis apivorus</i>	36	2		6		7
European Roller	<i>Coracias garrulus</i>		1				
Eurasian Griffon	<i>Gyps fulvus</i>	7		1			
Long-legged Buzzard	<i>Buteo rufinus</i>			2			
Harrier sp.	<i>Circus sp.</i>			1			
Peregrine Falcon	<i>Falco peregrinus</i>						1
Golden Eagle	<i>Aquila chrysaetos</i>	3					2

**Table 3.3.2. Other bird species recorded at each vantage point during both surveys**

English name	Scientific name	VP1	VP2	VP3	VP4	VP5	VP6
Purple Heron	<i>Ardea purpurea</i>		8				
Barn Swallow	<i>Hirundo rustica</i>		Flock (5-7)		70+		
Water Pipit	<i>Anthus spinoletta</i>	Dozens	Dozens	Dozens		Several	Dozens
Eurasian Blackbird	<i>Turdus merula</i>		-	Several			
Black Redstart	<i>Phoenicurus ochrurus</i>		Several	Several			
Common Raven	<i>Corvus corax</i>		-				
Chaffinch	<i>Fringilla coelebs</i>		-				
Northern Wheatear	<i>Oenanthe Oenanthe</i>	Several	Several	Several	Several		Several
European Roller	<i>Coracias garrulus</i>		1				
Wood Lark	<i>Lullula arborea</i>		1				
Common Chiffchaff	<i>Phylloscopus collybita</i>	3	2				
Garganey	<i>Anas querquedula</i>		2				
Black-necked Grebe	<i>Podiceps nigricollis</i>		2				
Grey Heron	<i>Ardea cinereal</i>		2				
Red-backed Shrike	<i>Lanius collurio</i>		3				
Grey Wagtail	<i>Motacilla cinereal</i>			Several			
Red-billed Chough	<i>Pyrrhocorax pyrrhocorax</i>			51			3
Great Snipe	<i>Gallinago media</i>			1			
Common Swift	<i>Apus apus</i>			Several	4		
Rook	<i>Corvus frugilegus</i>			4			
Alpine Swift	<i>Apus melba</i>				20-25		40+
White Wagtail	<i>Motacilla alba</i>	Several			Several		
Horned Lark	<i>Eremophila alpestris</i>						20+
Whinchat	<i>Saxicola rubetra</i>						Several
Ring Ouzel	<i>Turdus torquatus</i>	Several				Several	
Rock Pigeon	<i>Columba livia</i>					7	
Eurasian Crag-Martin	<i>Ptyonoprogne rupestris</i>	Dozens					
Common Sandpiper	<i>Actitis hypoleucos</i>	10					

In total some 45 bird species were recorded during the surveys including 4 Georgian Red List Vulnerable species and 6 bird species protected by AEWa convention.

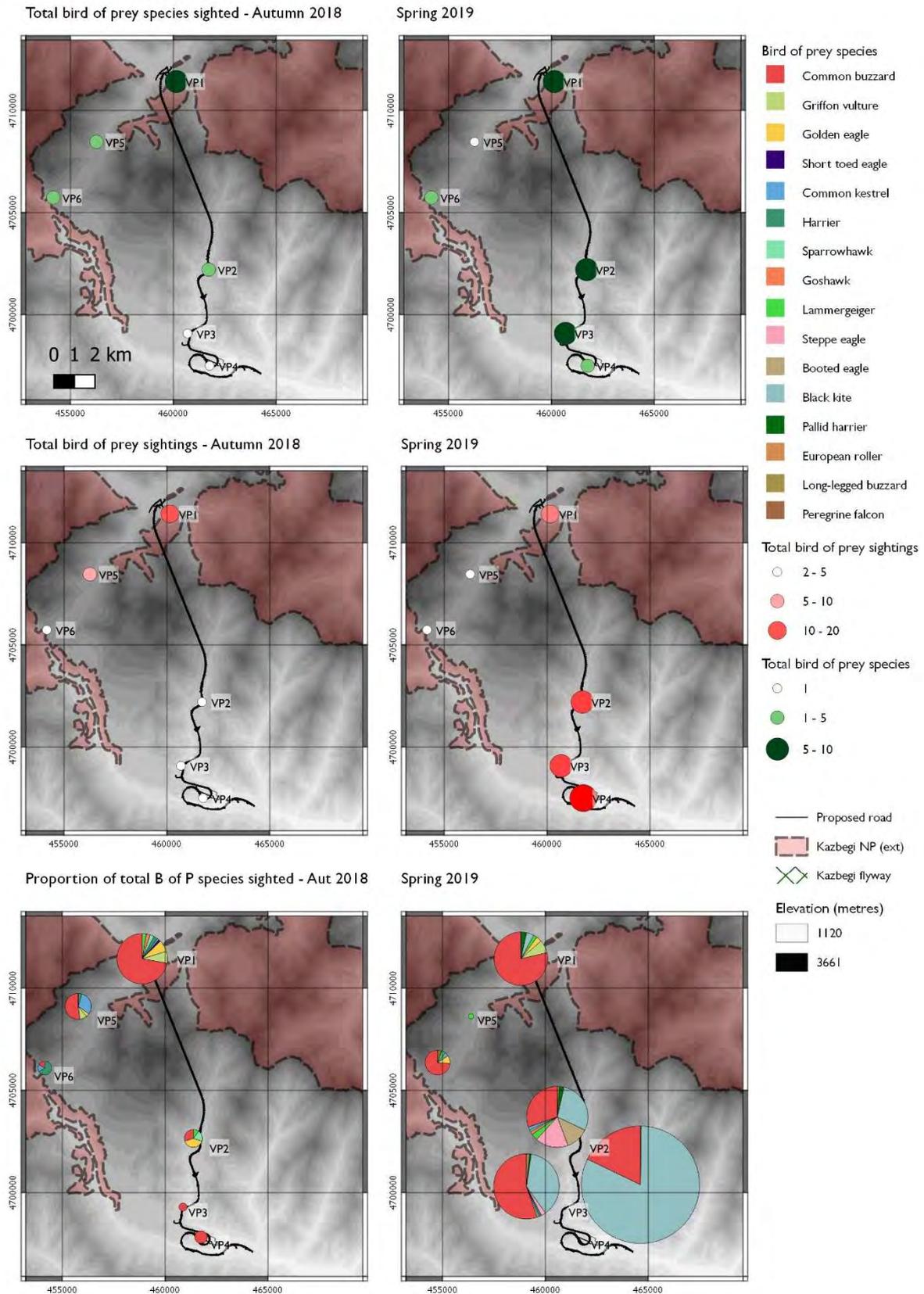
**Table 3.3.3. The list of protected species and protection status**

GRL Species	AEWA Species
<ul style="list-style-type: none"> <li>Lammergeier (8 records),</li> <li>Eurasian Griffon (8 records),</li> <li>Long-legged Buzzard (2 records)</li> <li>Golden Eagle (5 records).</li> </ul>	<ul style="list-style-type: none"> <li>Purple Heron (8 individuals),</li> <li>Garganey (2 individuals),</li> <li>Black-necked Grebe (2 individuals),</li> <li>Grey Heron (2 individuals),</li> <li>Great Snipe (1 individuals)</li> <li>Common Sandpiper (10 individuals).</li> </ul>

The following points were noted:

- Of the GRL VU species only the Long-legged Buzzard is a migrating bird. The other three are resident species within the survey area.
- Of the AEWA species five species are migrating species and only the Common Sandpiper nests within the survey area.
- Common Buzzards were recorded at all vantage points. The total number of recorded individuals amounted to 172. This species uses the area for nesting.

- As for Eurasian Hobby, only two individuals were recorded near Seturebi Village adjacent to the Gudauri access road.



**Figure 3.3.2 Bird of prey sightings at vantage points in Autumn 2018 and Spring 2019 surveys**

### 3.4. Conclusions

Unstable weather, very late snow, strong winds and rains disturbed the migration season during spring 2019 significantly. As a result, only relatively low numbers of migratory birds were recorded during the survey periods, although others may have passed over in larger numbers during brief weather windows that were not observed. Indeed, based on experience, the number of recorded birds probably represents only about 10-15% of the birds involved in spring migration and further surveys are needed to continue to build a picture of migration in the area.

Despite this, the numbers and distribution of birds amongst the different migratory corridors is considered to be representative of the situation during migration overall. In particular it was observed that for most species, the high mountains create a significant barrier so the birds follow the valleys and passes where the mountains are lowest, with only some birds passing over the high mountains at times of good weather.

Figure 3.4.1 below shows the main routes of migration followed by the majority of birds. Overall for the Booted Eagle, Black Kite, Honey Buzzard, Common Buzzard and majority of others the results indicate that:

- The vast majority of birds follow the Aragvi valley until near to Gudauri from which point they follow the Jvari pass to the north direction.
- A small number of birds follow the Khada valley to the plateau at Zakatkari Village. Here the flocks split again, with most passing up the plateau and following one of the gorges towards the Tergi valley. Only a very small number of the birds continue to follow Khada valley and cross the Caucasus at high altitudes over the mountains.

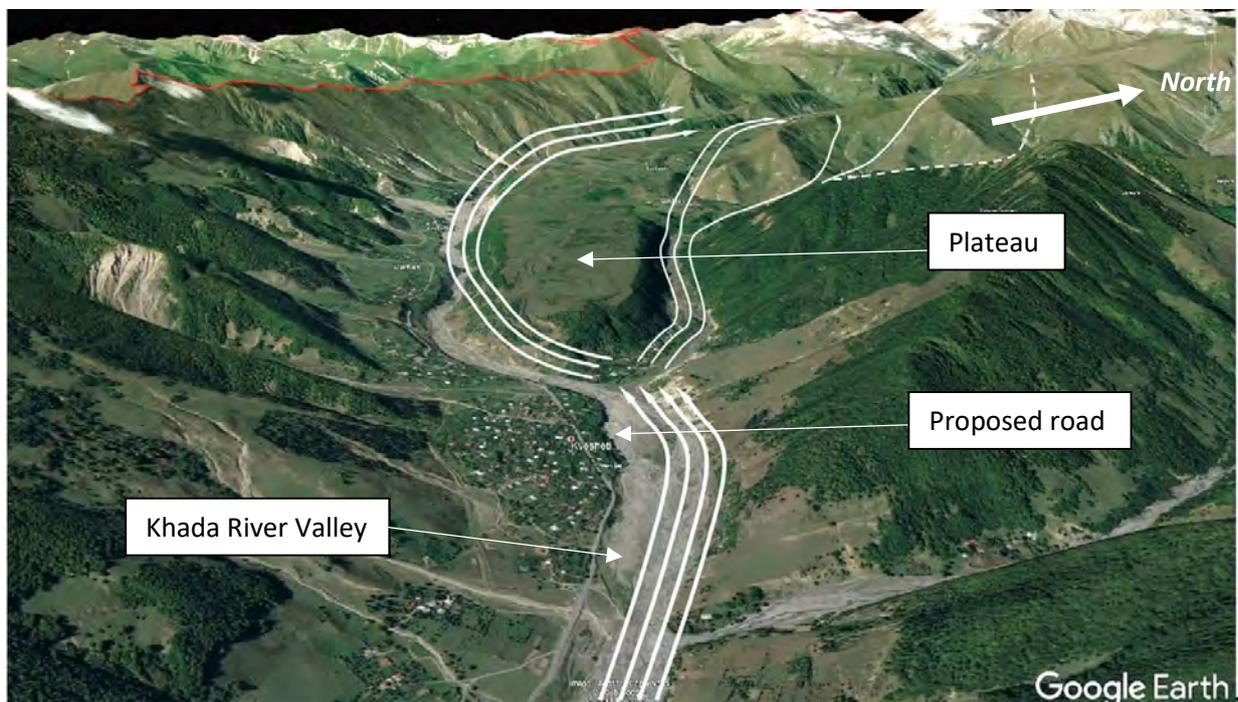
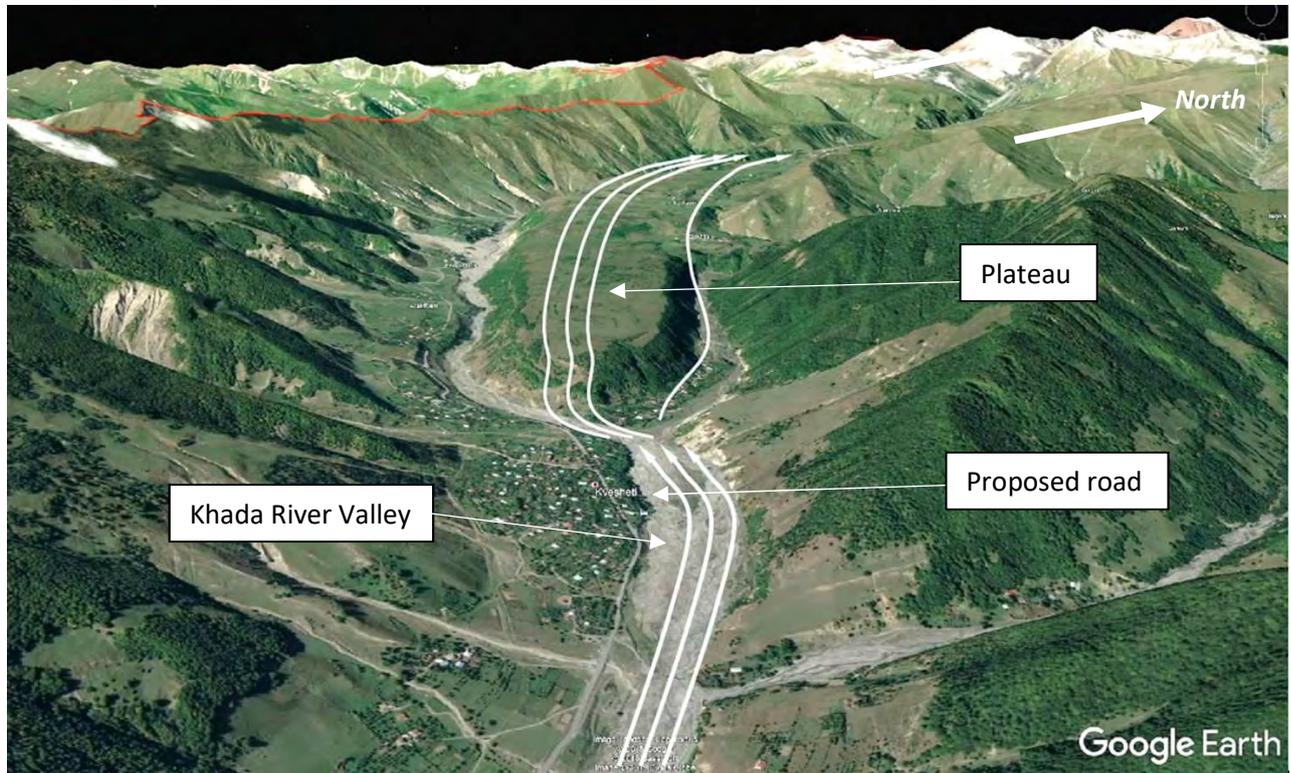


Figure 3.4.1 The main migration routes during the Spring migration

For Steppe Eagles the approach observed seems to be different. Flocks from the Aragvi valley were seen to fly towards the cliffs leading onto the Plateau rather than continuing along the valley. The majority of birds then flew up and over the plateau before continuing over it towards Jvari cross, whilst a smaller number followed the Khada river gorge to the north (see Figure 3.4.2 below).



**Figure 3.4.2 The spring Migratory routes for Steppe Eagle**

### 3.5. Consistency between autumn and spring surveys

Bird surveys were carried out at the same vantage points during autumn and spring. Both surveys confirmed that four raptor species protected by the Georgian Red List are resident within the survey area. These species are: Lammergeier, Eurasian Griffon, Long-legged Buzzard and Golden Eagle. The most numerous species recorded during the autumn survey was Common Buzzard, while during the spring survey Black Kites were recorded in the highest numbers. Common Buzzards were second on the list. This could be explained by the fact that in autumn Black Kites had already migrated before the survey was conducted.

The study results show that the majority of flocks follow the Aragvi valley and continue to fly in the valley until the Jvari path is reached near to Gudauri, after which they follow the pass northwards. A small number of birds follow the Khada valley and at the Zakatkari Village area encounter the plateau. Here flocks split again, the majority climbs up to the plateau and follow one of the gorges towards the Tergi valley. A small number of birds continue to follow Khada valley and cross the Caucasus at high altitudes over the mountains.

## 4. Breeding Bird Surveys

### 4.1. Background

In addition to the migration surveys, specific surveys were also undertaken for resident breeding birds. Whilst weather conditions during the surveys meant that many species were found to be breeding late, specific attention was paid to the following species which were seen to be of special concern:

**Table 4.1.1. The list of species of special concern in the project area**

Species	Details
<b>Lammergeier (<i>Gypaetus barbatus</i>)</b>	Georgian Red List: Vulnerable. This species is characterized with seasonal vertical movements and has been recorded at both higher altitudes and in the lower parts of the gorges. The species breeds along the mountain slopes, and 3-4 nests have been recorded in the National Park. It has not, however, been recorded breeding within the immediate surroundings of the project affected area. As with previous surveys however, individuals were observed from all vantage points and it can be assumed that this bird uses the whole project area as a hunting ground.
<b>Eurasian Griffon (<i>Gyps fulvus</i>)</b>	Georgian Red List: Vulnerable. A resident species with a colony of 7-9 pairs recorded from the mountains near the northern portal of the tunnel, close to Kobi. The species actively uses the project area for foraging.
<b>Golden Eagle (<i>Aquila chrysaetos</i>)</b>	Georgian Red List: Vulnerable. Resident within the survey area, this species is rarer than the Lammergeier or Eurasian Griffon. Three pairs are believed to reside within the project area and/or its surroundings. In 2014 a nest was recorded in the canyon of the River Tetri Aragvi, near the vantage point in Gudauri. Due to the bad weather condition it was not possible to confirm the presence of the nest during these surveys.
<b>Common Buzzard (<i>Buteo buteo</i>)</b>	A migratory species that does not have high local conservation status. There are however, records of three nesting pairs present in the area (2 at the northern end and one near the southern portal).
<b>Eurasian Hobby (<i>Falco subbuteo</i>)</b>	A migrating bird species but previously recorded nesting near the southern portal of the tunnel (in the forest adjacent to the River Khada).
<b>Egyptian vulture (<i>Neophron percnopterus</i>)</b>	Known from the study area with one nest definitely recorded on the cliffs across the Aragvi River Gorge
<b>Caucasian Grouse (<i>Tetrao mlokosiewiczi</i>)</b>	Possibly present above the northern portal of the main tunnel near to the Kobi settlement, although no breeding specifically recorded.
<b>Corncrake (<i>Crex crex</i>)</b>	A migratory species for which the population of has been dramatically reducing during recent years. Recorded as nesting near both the northern and southern tunnel portals, including the wet meadows present in Zakatkari and Kobi areas. The wet meadows south of Tskere near the River Khada are considered of particular importance due to the presence of a high population (5-8 pairs were recorded within a kilometre of transect distance).

### 4.2. Survey Approach and Methodology

Survey approach and methodologies varied with species, and are outlined further in section 4.3. These surveys were conducted at the end of May 2019. Surveys were led by Gia Edisherashvili (ornithologist) and Vepkhvia Maglakelidze (field assistant).

### 4.3. Survey Results

#### 4.3.1. Egyptian Vulture (*Neophron percnopterus*).

##### Background

Egyptian Vultures have been recorded across the project AoI and are known to have bred in the past near the proposed Tunnel 1 southern portal as well as elsewhere in the wider Project AoI. The vultures nest in cliffs, especially where sheltered caves or holes command wide views, and typically return to the same territory year after year. The nest, built by both sexes, consists of a light to bulky pile of branches (150 cm diameter, 20–70 cm high) often covered with a thick layer of rubbish. Nests are usually solitary and often well dispersed, although new pairs are reported to be more likely to settle in areas close to other pairs from the same species. Nests are often reused in successive years. The breeding period is typically from early April until the end of July.

##### Approach and results

Whilst Egyptian vultures were recorded in spring 2018 by Gamma, none were recorded during the surveys conducted during autumn 2018. **Spring 2019 surveys also did not identify any Egyptian Vultures from any of the vantage points.** Neither survey recorded any active nests. The field team visited the place where Sabuko had recorded an Egyptian Vulture nest. However, the nest appeared to have been abandoned.



Figure 4.3.1 The possible nest of Egyptian Vulture – now abandoned

#### 4.3.2. **Caucasian Black Grouse (*Tetrao mlokosiewiczzi*) & Snowcock (*Tetraogallus caucasicus*).**

##### **Background**

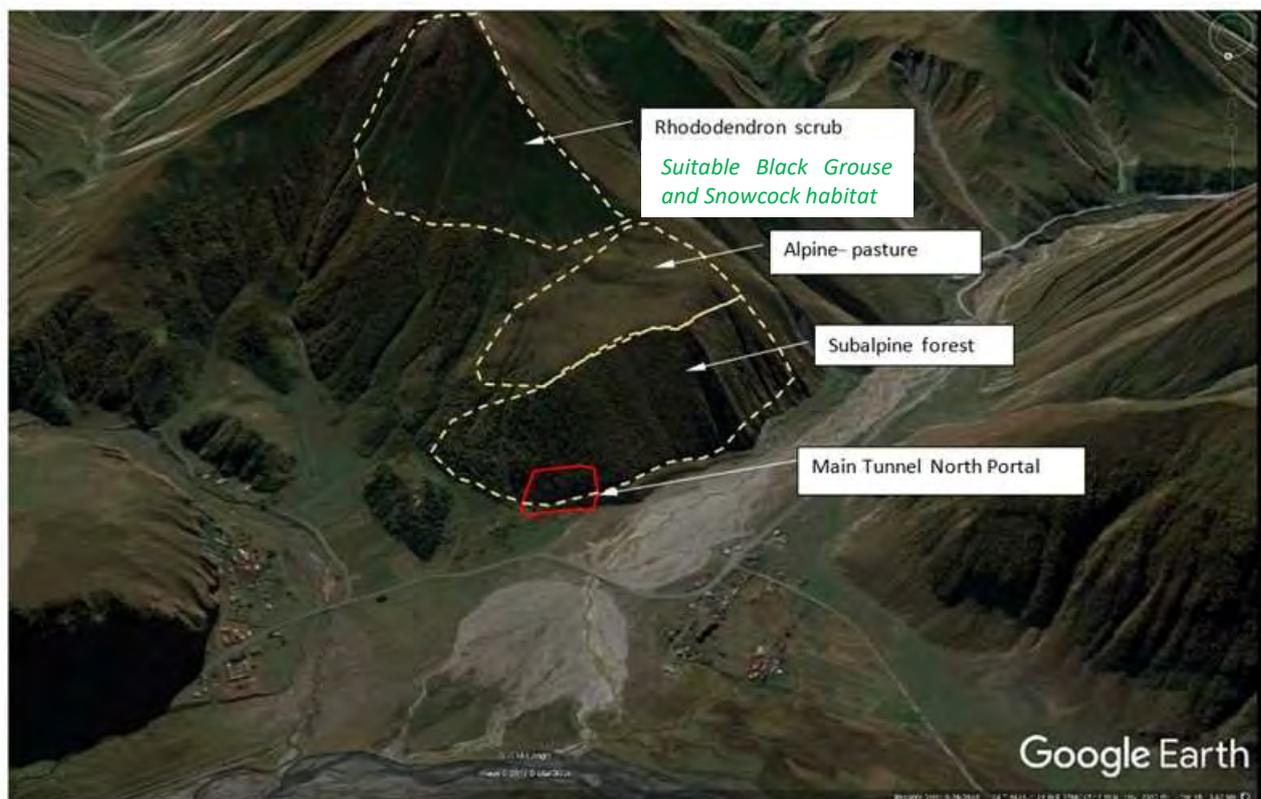
Caucasian Grouse are typically found in subalpine meadows and subalpine forests throughout the region, especially on north-facing slopes with Rhododendron and Juniper, as well as on the edge of birch forest in spring and winter at elevations of 1,300-3,000m. Meadows used for hay production may also be important for breeding birds. The sites are typically found above the timber line not far from winter food resources. Snowcocks are generally found in higher areas and may be present in the mountains at the head of the Khada valley.

##### **Approach**

Specific surveys were undertaken of potentially suitable habitats within the Aol including potential breeding areas near the Lot 1 northern tunnel near Kobi. Breeding bird surveys aimed to identify lekking birds in the project impact area. Specific surveys were also undertaken to confirm the suitability of habitats within and around the Aol for breeding snowcocks. Due to high snow cover, these surveys were undertaken about 2weeks later than planned, in late May.

##### **Results**

As recorded by the habitat survey (see earlier) the lower part of the mountain slope near the proposed northern portal is covered by sub-alpine birch forest, and rhododendron is absent. Above this there is a flat terrace of around 300m wide with meadow habitat. Higher still, there is a steep slope up to the watershed (see Figure 2.4.2.) with rhododendron scrub, a likely habitat for the target species. The distance between the northern portal and rhododendron scrub is around 800 metres. While the difference between the altitudes of these two places is 300 meters. The survey found that suitable Grouse and Snowcock habitat is confined to areas above the rhododendron scrub with the meadow acting as a barrier to movement to lower habitats. The project is therefore not expected to directly affect any habitats, which are considered important for Black Grouse and Snowcock. Indirect impact can extend to the top of mountain, but it is not likely that will cause any issues for the birds.



**Figure 4.3.2 Suitable Black Grouse and Snowcock habitat**

### 4.3.3. **Corncrake (*Crex crex*)**

#### **Background**

Significant populations of corncrake are known to be present within the Kazbegi valleys where old hay meadows and damp grasslands form important breeding habitats (the IBA citation records more than 20 breeding pairs present). Potential corncrake habitat is present in a number of areas including meadows near Tskere and on the Plateau and the fields near the Kobi settlements.

#### **Approach**

Specific surveys were implemented to confirm the presence of Corncrake from the Project AoI and especially from these key areas. These were based on calling at Kobi area and near the Tskere settlement. The playback technique was used to identify the presence of birds. The walkover survey was focused on Corncrake. Attention was made to identify the other breeding bird species in the area as well however no other birds were recorded during the survey.

Whilst transect routes were selected for the surveys based on satellite imagery, alternative transects were needed close to Tskere village due to the presence of a number of deep gorges which were impossible to cross on foot. Instead the new transects were located on the left bank of the river Khada where the habitats are mostly abandoned hay lands and agricultural parcels. The locations of transects are shown in Figure 4.3.3.

#### **Results**

Corncrake presence at Tskere was confirmed with birds identified very close to the survey team route. Five to seven pairs were recorded at this survey area. Suitable breeding habitat here was found to extend for a few kilometres either side of the Khada River. A similar situation was observed at Kobi, where transects were selected in the agricultural and hay land with a total length of 2 km. Two to three pairs were recorded during the walkover survey near Kobi settlement. The habitats useful for Corncrakes need special attention during the construction of the road.



Figure 4.3.3 Transects for identifying the presence of breeding birds in the Project area

#### 4.3.4. **Breeding raptors**

Specific surveys were undertaken to look for breeding raptors, notably Lammergeier (*Gypaetus barbatus*), Eurasian Griffon (*Gyps fulvus*) and Golden Eagle (*Aquila chrysaetos*) from the spring migration vantage points and walkover surveys. These three species are protected by the Georgian Red List and are resident in the wider area. No nests of these species were recorded during the surveys (and indeed they typically nest at the higher altitudes) but all species were recorded using the area as hunting and feeding grounds.

#### 4.4. **Conclusions**

Overall the breeding bird survey confirmed the presence of corncrake within the Aol but found no evidence of active breeding of Egyptian Vulture, Black Grouse or Snowcock. Further work will, however, continue as part of the on-going biodiversity work for the project.

## 5. Otter and Bear Surveys

### 5.1. Background

Otter (*Lutra Lutra*) is a GRL VU and Habitats Directive Annex II and IV species. The national population in Georgia has been estimated at around 400 individuals, and whilst this may be under-reporting, numbers are also reported to have been in decline following local loss of wild fish stocks and habitat destruction. The species is also vulnerable to removal of bank side vegetation, and persecution due to perceived depredation on fish. Walkover surveys of the rivers and streams in the vicinity of the proposed project were conducted in autumn 2018. During these surveys the following results were recorded:

Area	Findings
1: Northern Portal and Kobi Village	Evidence of otter found along the Tergi River (tracks) and Narvana river (spraints and anecdotal evidence). No evidence found along the Bidara River, which suffers as a result of disturbance from the existing road.
2: Southern Portal and Tskere village	No evidence of otter activity in this area and the waterfall probably prevents fish from accessing the area.
3: Khada River Valley	Good otter habitat and evidence of otter activity (tracks and potential couches)
4: Confluence of Aragvi and Khada Rivers	No evidence of otter activity observed but anecdotal evidence of otters is present along the Khada River.

**Table 5.1.1. Summary of the Otter and Bear Field Survey Results**

### 5.2. Survey Approach

Further surveys for evidence of otter activity were undertaken within the Project Aol over the period of 19-21 June 2019 after the snowmelt had subsided. The work involved the same four areas as the autumn 2018 surveys, except the area at the southern portal (Tskere Village), where no evidence of otter was found previously.

The sites were the following:

- the northern portal of the tunnel near to Narvana and Bidara confluence to the Tergi river;
- Bridge crossings on the Khada river; and
- confluence of Khada and Aragvi rivers

These areas are shown as the blue lines in the figures below.

**Figure 5.2.1 The survey area for identification of otter**

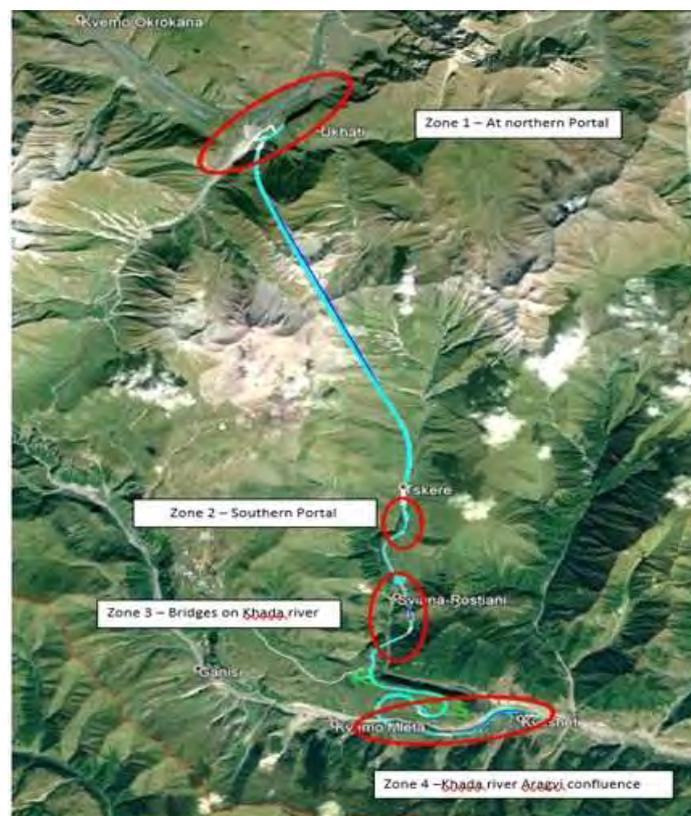


Figure 4.1.3 The survey area for identification of the otter presences zones

The walkover survey was conducted along the target rivers falling in the Project impact zone. The main purpose of the site survey was identification of otter presence within the area and confirmation of the 2018 survey results. The main indicators of otter presence will be faeces, footprints, feeding leftovers, otter slides, holts (underground dens) and couches (above ground sites where otters rest during the day).

The fieldwork was undertaken by Giorgi Sheklashvili (zoologist) Ioseb Natradze (Zoologist) and Vepkhvia Maglakelidze (field assistant). Alexander Bukhnikashvili was involved in planning of the field works and evaluation of final results.

The weather conditions were poor during the fieldwork; periodic strong showers impacted upon the ability to identify evidence on the stones and sand along the riverbanks. River water levels were also high due to rainy conditions, which negatively influenced the effectiveness of the survey, however the results can be considered reliable.



Figure 5.2.2 Locations of Survey Area (part 1)

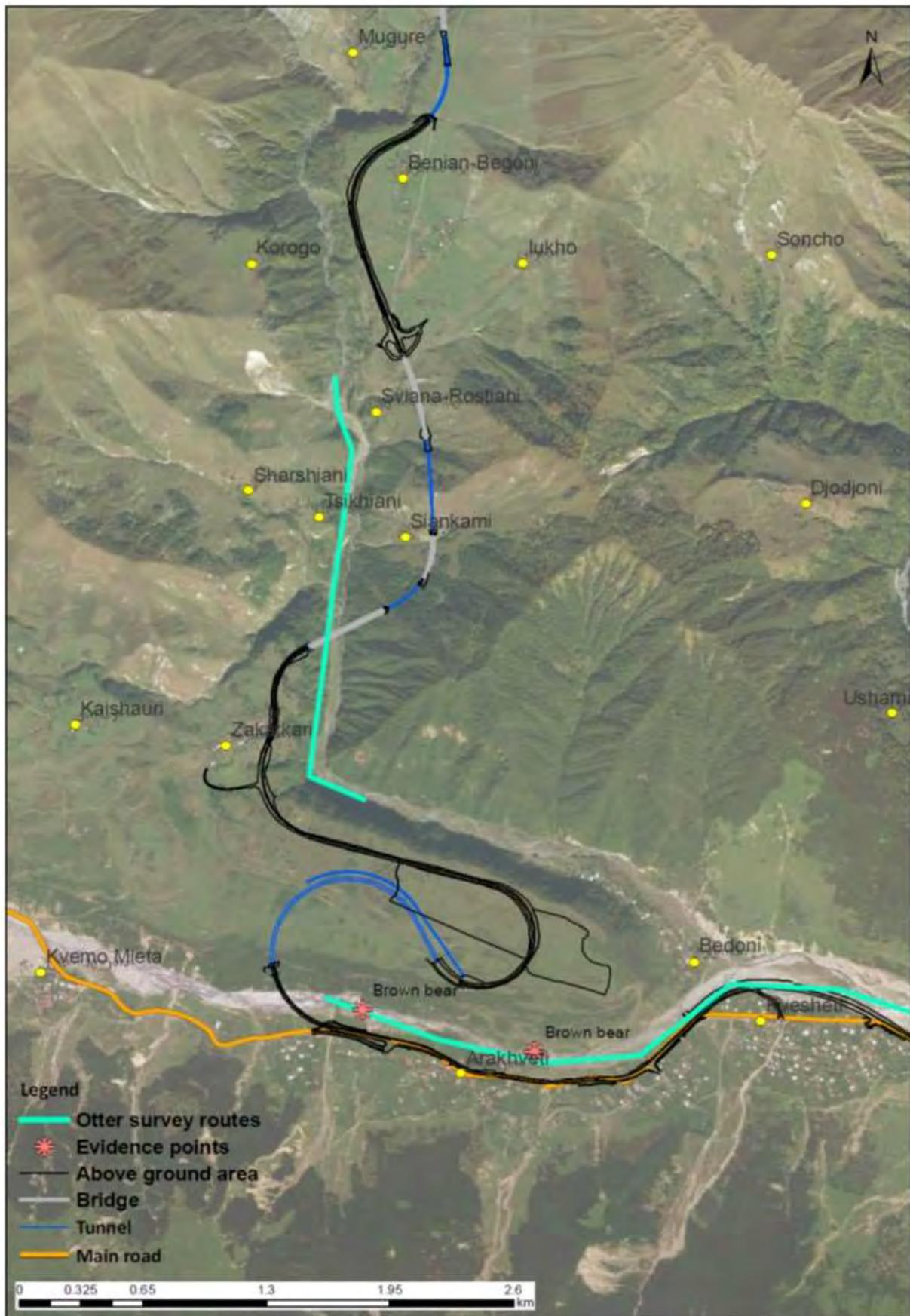


Figure 5.2.3 Locations of Survey Area (part 2)

### 5.3. Survey Limitations

The following limitations applied to the otter survey:

- Whilst surveys were timed to avoid snowmelt, the weather was unseasonably wet and the rain meant that water levels were still high
- There were disturbances as a result of the Lomisoba celebration of June 19

### 5.4. Results and Conclusions

The survey along the River Aragvi was carried out on 19<sup>th</sup> June 2019. The survey was conducted along the river bank from the Kvesheti Village upstream in Aragvi river gorge for approximately three kilometres. The riverbank is composed of gravel material with coarse sand, and in some sections fine sand, and large boulders. In this section, when the river water level rises, the vegetation is in close proximity to the water.

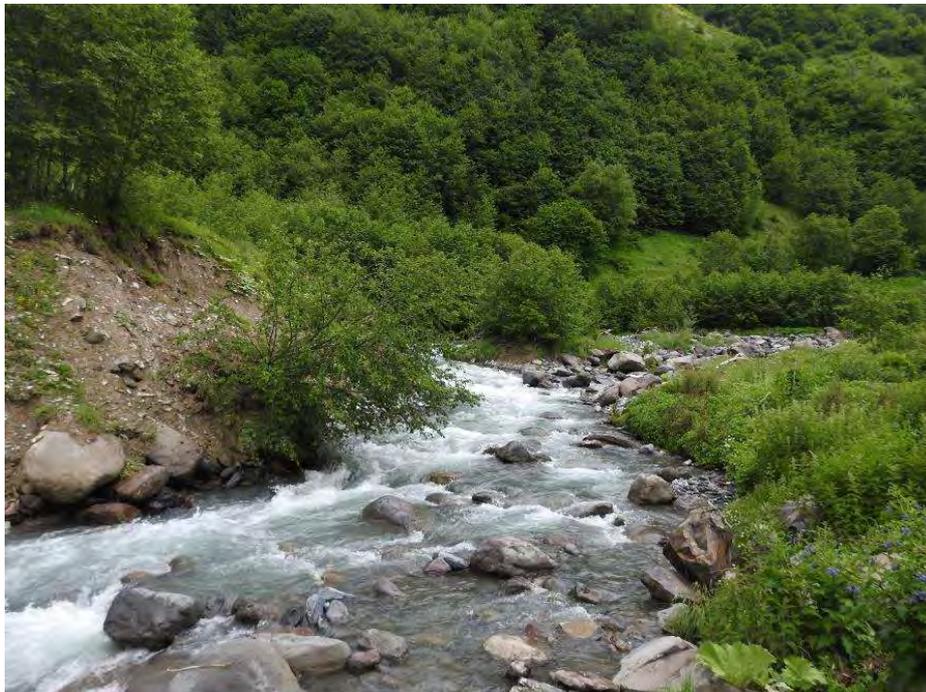
In the surveyed section, no otter presence was identified. Although the rainy weather and high water levels could have negatively affected the process of identifying traces of otter, the 2018 survey results also indicated no presence of otters.

During the survey, the survey team has identified signs of the brown bear presence in the target area. The footprints of Georgian Red List species Brown Bear (*Ursus arctos*) were found at the GPS coordinates N42.42748°/E44.52921° (Figure 5.4.1) and N42.42549°/E44.53967° (Figure 5.4.2). In both cases, the rain had impacted the footprints of the bear, however they are clearly visible on the pictures below. The footprints were found at appx. 0.5 – 1 km apart and in an area where the settlement is close to the river. The locations where bear footprints have been identified are very close to the settled areas along the river. These locations are also shown on the map above (**Error! Reference source not found.**).



**Figure 5.4.1 Trace of Brown Bear (1)****Figure 5.4.2 Trace of Brown Bear (2)**

The survey along the right bank of the River Khada was carried out on 20<sup>th</sup> June, 2019. The length of surveyed route is around 3 km. No evidence of otter presence was found during this survey. The riverbed in the section contains boulders and vegetation very close to the river channel. During the 2018 survey, otter presence was confirmed. The typical view of the survey area is shown on Figure 5.4.3 below.

**Figure 5.4.3 The View of the Survey Area**

The survey along the rivers Bidara, Tergi and Narovani was conducted on 21<sup>st</sup> June, 2019.

Otter faeces were found near village Kobi at GPS coordinates N42.55759°/E44.500347° (see Figure 5.4.4). During the autumn survey in 2018, evidence of otter presence was found in Tergi river at the confluence with Narovani River (coordinates N42.56749°/E44.51856°) and along the Tergi river at coordinates N42.56227°/E44.50068°. Otter presence has therefore been confirmed at these two areas; Tergi river and Narovani confluence.



**Figure 5.4.4 Otter Faeces**

### **5.5. Consistency between the autumn and spring surveys**

In autumn 2018 the otter surveys were conducted at four survey areas: the northern portal of the tunnel near to Narvana and Bidara confluence to the Tergi River; the southern portal of the tunnel near to the Tskere village; bridge crossings on the Khada River and confluence of Khada and Aragvi rivers. During the spring 2019 surveys, the survey area near Tskere was skipped as no evidence was found last year and the existing conditions are not favourable for otters.

The autumn survey results showed the presence of otters along the rivers Tergi and Narvana (near Kobi settlement) and in Khada river valley, while the spring survey showed the presence of otter only near Kobi settlement. During the spring surveys traces of Brown Bear (GRL species) were also recorded.

## 6. Bats Surveys

### 6.1. Background

Around thirty bat species are found in Georgia. Taking into account the existing habitats, 19 bat species may occur in and around the project area. These species are listed in Table 6.1.1 below.

**Table 6.1.1. Bat species might occur in the project area and its vicinities**

#	Scientific name	Common name	Status
1.	<i>Rhinolophus ferrumequinum</i>	Greater Horseshoe Bat	Habitats Directive Annex II species
2.	<i>Rhinolophus hipposideros</i>	Lesser Horseshoe Bat	Habitats Directive Annex II species
3.	<i>Myotis blythii</i>	Lesser Mouse-eared Bat	Habitats Directive Annex II species
4.	<i>Myotis mystacinus</i>	Whiskered Bat	
5.	<i>Myotis nattereri</i>	Natterer's bat	
6.	<i>Pipistrellus pipistrellus</i>	Common Pipistrelle Bat	
7.	<i>Pipistrellus pygmaeus</i>	Soprano Pipistrelle	
8.	<i>Pipistrellus nathusii</i>	Nathusius' Pipistrelle Bat	
9.	<i>Pipistrellus kuhlii</i>	Kuhl's pipistrelle bat	
10.	<i>Hypsugo savii</i>	Savi's Pipistrelle Bat	
11.	<i>Nyctalus noctule</i>	Noctule	
12.	<i>Nyctalus leisleri</i>	Leisler's Bat	
13.	<i>Nyctalus lasiopterus</i>	Greater noctule bat	IUCN – VU
14.	<i>Vespertilio murinus</i>	Particoloured Bat	
15.	<i>Eptesicus serotinus</i>	Serotine Bat	
16.	<i>Eptesicus nilssonii</i>	Northern Bat	
17.	<i>Plecotus auratus</i>	Brown long-eared bat	
18.	<i>Plecotus macrobullaris</i>	Alpine Long-eared Bat	
19.	<i>Tadarida teniotis</i>	European free-tailed bat	

Note: Species recorded previously are highlighted in green.

The limited literature available includes the following records:

**Table 6.1.2. Data on bat species presence in the region of northern portal of main tunnel**

<b>Around Kobi village</b>	Brown long-eared bat ( <i>Plecotus auratus</i> ) (Bukhnikashvili 2004).
<b>Around Sno village</b>	Whiskered Bat ( <i>Myotis mystacinus</i> ), Natterer's bat ( <i>Myotis nattereri</i> ), Common Pipistrelle Bat ( <i>Pipistrellus pipistrellus</i> ), Soprano Pipistrelle ( <i>Pipistrellus pygmaeus</i> ) and Leisler's Bat ( <i>Nyctalus leisleri</i> ) (Bukhnikashvili 2013)
<b>Dariali gorge</b>	Common Pipistrelle Bat ( <i>Pipistrellus pipistrellus</i> ) in 2013

All bat species occurring in Georgia are protected under the framework of the Convention on Conservation of Migratory Species of Wild Animals (CMS), Annex IV of the Habitats Directive and the associated Agreement on the Conservation of Populations of European Bats (EUROBATS). The important species and habitats supporting them in the project area are summarized in Table 6.1.3:

**Table 6.1.3. Notable bat Species that may be present in the Project Area**

Species	Habitat Requirements
<b>Giant Noctule</b> <i>(Nyctalus lasiopterus)</i>	(IUCN VU) Forages over mixed and deciduous and riparian forests. It is highly dependent on mature forests with trees over 40 years old. Removal of mature trees might negatively affect this species. It feeds mostly on moths and beetles but may also hunt on small songbirds at heights up to several hundred meters. A migrant, summer roosts are in hollow trees and bat boxes, and occasionally in buildings. Trees and rock crevices may also be used as hibernacula in winter.
<b>Greater Horseshoe Bat</b> <i>(Rhinolophus ferrumequinum)</i>	Forages in deciduous woodland (particularly early in the year), shrubs and summer grazed pastures (particularly late in the summer). Feeds on beetles, moths and other insects at low heights and flies up to 3 km from the roost at nights. Summer roosts are located in warm natural and artificial underground sites; bats use caves all year, as well as buildings for summer breeding. In winter bats hibernate in cold underground sites (usually large caves). Threats include fragmentation and isolation of habitats, change of management regime of deciduous forests & agricultural areas, loss of insects (pesticide use), and disturbance and loss of underground habitats and attics.
<b>Lesser Horseshoe Bat</b> <i>(Rhinolophus hipposideros)</i>	Forages close to the ground within and along the edges of broadleaf deciduous woodland (primary foraging habitat), but also in riparian vegetation and shrubs open areas are avoided. Feeds on midges, moths and craneflies. Summer roosts (breeding colonies) are found in natural and artificial underground sites; in winter bats hibernate in underground sites (including cellars, small caves and burrows). Habitat loss and fragmentation pose a threat to this species.
<b>Lesser Mouse eared Myotis</b> <i>(Myotis blythi)</i>	Forages in scrub and grassland habitats, including farmland and gardens. Maternity colonies are usually found in underground habitats such as caves and mines, and sometimes buildings. Hibernates in winter in underground sites. Threats include changes in land management, including agricultural pollution and disturbance to roosts in caves.

## 6.2. Survey Approach and Limitations

Surveys were undertaken in line with the guidance included in the EUROBATS “Guidelines for Surveillance and Monitoring of European Bats (2014)”. The surveys involved a range of equipment including cameras: (Nikon Coolpix p900 and Canon SX50); ultrasonic bat detectors (Pettersson D240 and Pettersson D240x) and a stationary bat detector (Anabat Express). Species were identified using the Kaleidoscope pro program.

The first session of bat surveys were conducted in the autumn of 2018. However, the weather during the survey was very cold, and it was close to impossible to detect the bat species. The reconnaissance surveys were conducted to identify locations for further fieldwork to be carried out in 2019. The following potential sensitive areas were identified where more detailed surveys had to be undertaken (see Table 6.2.1).

During the field surveys the weather was rainy and wet. Surveys were therefore conducted along the route using passive detectors. Surveys started after sunset and finished when bat activity was decreasing to the point that over the course of 1.5-2 hour no sign of activity of bats was identified.

**Table 6.2.1. Locations important for the Bat species, with indication of the habitats and species present**

Location	Habitats Present	Potential Species
Narvani Valley near Kobi	A range of wetland, rocky and woodland fringe habitats.	<i>Rhinolophus hipposideros</i> Lesser Horseshoe Bat <i>Pipistrellus pipistrellus</i> Common Pipistrelle Bat
Along the River Khadistskali near Bedona village,	Includes areas with old grottos and an area of small wetland (at N42.43969°/E44.52586°).	<i>Pipistrellus pygmaeus</i> Soprano Pipistrelle <i>Nyctalus lasiopterus</i> Greater noctule bat
On the plateau around the village of Zakatari	Houses, the small lake (N42.43797°/E44.50650°) and upland areas near Zakatkari	<i>Vespertilio murinus</i> Particoloured Bat <i>Eptesicus serotinus</i> Serotine Bat <i>Eptesicus nilssonii</i> Northern Bat <i>Plecotus macrobullaris</i> Alpine Long-eared Bat <i>Tadarida teniotis</i> European free-tailed bat <i>Plecotus auritus</i> Brown long-eared bat
Close to the village Tskere (N42.47574°/ E44.53461°)	Village with riverine habitat as well as local gardens. The higher altitude, means that a smaller number of species are expected to be present	<i>Pipistrellus pipistrellus</i> Common Pipistrelle Bat <i>Vespertilio murinus</i> Particoloured Bat <i>Eptesicus serotinus</i> Serotine Bat <i>Eptesicus nilssonii</i> Northern Bat

The survey was undertaken by a group of specialists led by Ioseb Natradze. The fieldwork was conducted during the period of 19<sup>th</sup> – 21<sup>st</sup> of June 2019.

The survey was undertaken according to the description in the methodology and the 2019 field study involved complex surveys (e.g. radio tracking) in areas where notable species are potentially present. Surveys for roost sites are also considered important (e.g. houses, mature trees, rock fissures, etc.). Surveys particularly focussed on the following notable species:

- **Giant Noctule** (*Nyctalus lasiopterus*)
- **Lesser Mouse-eared Myotis** (*Myotis blythi*)
- **Greater Horseshoe Bat** (*Rhinolophus ferrumequinum*).
- **Lesser Horseshoe Bat** (*Rhinolophus hipposideros*)

### 6.3. Survey Results

Bat surveys were performed in the following locations:

**Table 6.3.1. Description of survey locations**

Location /date	Habitats Present	Recorded Species
Narvani River Valley near Kobi 19/06/2019	A range of wetland, rocky and woodland fringe habitats. Where rocky places are situated in confluent of rivers Narvani and Tergi.	Passive detector was installed here during the night in order to study bat activity. 1. <i>Nyctalus leisleri</i> 2. <i>Nyctalus lasiopterus</i> 3. <i>Myotis</i> sp.
On the plateau around the village of Zakatari 20/06/2019	Houses, the small lake (N42.43797°/E44.50650°) and upland areas near Zakatkari	Second route was studied near village Kaishauri, coordinates are N42.43831°/E44.50664°. In the surrounding of existing lake high activity of bats was observed. Following species were identified: <ul style="list-style-type: none"> <li>• <i>Pipistrellus pipistrellus</i></li> <li>• <i>Eptesicus serotinus</i></li> <li>• <i>Nyctalus noctula</i></li> <li>• <i>Nyctalus</i> sp</li> <li>• <i>Myotis</i> sp</li> <li>• <i>Myotis daubentoniid</i></li> </ul>
Along the River Khadistskali near Bedona village 20/06/2019	Includes areas with old grottos and an area of small wetland (at N42.43969°/E44.52586°). Third route was studied in the river Khadistskali gorge, from N42.45462°/E44.52898° to N42.42933°/E44.55090°.	Bat activity was low. Following species were identified: <ol style="list-style-type: none"> <li>1. <i>Pipistrellus pipistrellus</i></li> <li>2. <i>Nyctalus leisleri</i></li> <li>3. <i>Myotis</i> sp</li> </ol>
Close to the village of Tskere (N42.47574°/E44.53461°).	Village with riverine habitat as well as gardens. The higher altitude, means that a smaller number of species are expected to be present	

Bat activity was low with the exception of one site near Kaishauri village which has the following coordinates: N42.43831°/E44.50664°. Rainy weather resulted in a cooler temperature, which therefore decreased bat activity. N.B. *Myotis daubentonii* was observed in the area during the surveys. This is the first recorded siting in the area during the survey period and its presence has not been recorded in any previous studies.

The following species were identified during the survey (see Table 6.3.2):

**Table 6.3.2. List of Bat species identified during the survey**

	Latin name	English name	Conservation status
1.	<i>Myotis sp</i>	Mouse-eared bat	
2.	<i>Myotis daubentoniid</i>	Daubentons' bat	
3.	<i>Nyctalus sp</i>	Noctule	
4.	<i>Nyctalus noctula</i>	Noctule bat	
5.	<i>Nyctalus leisleri</i>	Lesser Noctule	IUCN (VU)
6.	<i>Nyctalus lasiopterus</i>	Gaian Noctule	
7.	<i>Pipistrellus pipistrellus</i>	Common pipistrelle bat	
8.	<i>Eptesicus serotinus</i>	Serotine bat	

#### 6.4. Recommendations

Given the altitude of bat habitats, further surveys for bats are needed and should be carried out in warmer weather when bat activity is highest. This will provide more accurate information on the presence of bats (and their numbers) and the location of their habitats. Such surveys should involve a minimum of 4 working nights and three researchers. Passive bat detectors should also be used within the project area. The surveys should use hand-held detectors and should involve transects, surveying from one hour before dusk. Surveys should focus on the four areas highlighted above. Before starting surveys, relevant study polygons should be selected within the target site and mist nets installed in those areas where a higher possibility of bats catching exists. Field transects should be defined and conducted according to the recommendations provided by "Guidelines for Surveillance and Monitoring of European Bats (2014)", which was developed under the umbrella of the Agreement on the Conservation of Populations of European Bats (EUROBATS). As such they should be covered at a suitable speed to cover 100m in 8 or 10 minutes.

#### 6.5. Consistency between autumn and spring surveys

As during the first session of the surveys did not allow the identification of any bat species in the area, due to an unusually cold autumn in 2018, the survey only included identification of the locations for spring surveys. Spring surveys were carried out according to the plan developed on the basis of the information collected in autumn.