

APPENDIX H
BASELINE DATA COLLECTION METHODOLOGY

1 General

Background data and information was obtained from reputable published and unpublished sources, e.g., on: climate, topography, geology and soils, natural resources, flora and fauna, agriculture, and socio-economic data.

Several site inspections were conducted by the Project EIA team during 2018. The project area was reviewed and areas of potential environmental significance assessed carefully.

In addition, several surveys were undertaken to collect additional baseline data by a Local Consulting Firm (LCF) specializing in environmental and social studies. They include:

- (i) Instrumental Noise and Vibration Monitoring.
- (ii) Instrumental Air Quality Monitoring.
- (iii) Instrumental Water Quality Surveys.
- (iv) Biodiversity Surveys.
- (v) Physical and Cultural Resources Surveys.
- (vi) Socio-economic Surveys.

Formal discussions were held with a number of stakeholders (see **Section I**) in order to identify any specific areas of interest, or concern that needed to be surveyed or identified as part of the baseline collection phase.

2 EIA Team Composition

The EIA has been prepared by the following specialists:

Nick Skinner – Environmental Specialist

An experienced professional with a range of skills relating to environmental and social management. He has prepared more than forty environmental and social impact assessments (ESIA) in more than 30 countries for a range of funding agencies including the EIB, EBRD, World Bank Group, Millennium Challenge Corporation, JICA, ADB and USAID. Projects include power generation, transmission and distribution, gas production, roads, bridges, tunnels, irrigation and agriculture, rail and metro and water treatment. Most recently he completed the EIA for the Khevi – Argveta road, part of the E-60 in Georgia.

Amy Sexton – Social Specialist

Amy Sexton has diverse social performance management, impact assessment and auditing experience in infrastructure and natural resources projects across the globe. She has more than 15 years of professional experience, including in the lead Social Expert role for Environmental and Social Impact Assessments (ESIAs) for various mining and associated infrastructure projects to meet international Lending requirements, including in Mongolia, Kyrgyz Republic, and Turkey. She has also led social audits of projects against international Lender policies – such as the TANAP gas pipeline in Turkey – and supported projects in achieving their social performance requirements across Asia and Africa. Her expertise encompasses social development, resettlement and land acquisition, cultural heritage, and community health, safety and security, including to meet EBRD, ADB and IFC sustainability policies.

Rob Evans – Ecologist

Rob is a chartered ecologist and a specialist in Sustainable Project Finance. He brings over 25 years of experience in implementing ecological impact assessments and ecological management plans from across the world. Rob has worked extensively with or for a range of financing organisations including the IFC, EBRD, EIB, and ADB and World Bank and has

undertaken a number of projects in and around the Caucasus, dating back to 1998. For the work on this report Rob has also had additional support from the following:

- Bird surveys: Gia Edisherashvili (with support from Ilia Mirotadze)
- Bat surveys: Ioseb Natradze
- Otter Surveys: Sasha Bukhnikashvili (with field support from Nugzar Surguladze)
- Support Coordination : David Girgvliani (DG Consulting Ltd).

Nino Tskvitishvili, botanist at Gamma Consulting Ltd. Graduated from Tbilisi Ivane Javakhishvili State University in 1978. Continued her studies at All-Union Research Institute of Tea and Subtropic cultures. Obtained PhD in Biological Sciences in 1985. Her professional experience includes working at various positions (from Researcher to Head of Lab of Plant Physiology) in Anaseuli, Georgia. From 2006 till 2011 she was employed as botanist and biodiversity specialist at scientific research firm Gamma. Since 2011 - is acting as biodiversity specialist (botanist) at Gamma Consulting Ltd. Her responsibilities include: desktop and field surveys, data analysis, habitat surveys, assessment of impact on vegetation/flora and habitats, development of recommendations for impact mitigation/compensation, development of recommendations for biological recultivation of disturbed areas, participation in audits and environmental and social impact assessment studies. As a team member and project team coordinator she participated in more than 60 projects, included those funded by IFIs. Nino was involved in Kvesheti Kobi project as coordinator and manager of the biodiversity team (flora). She participated in site surveys, habitat description and assessment of sensitivity, ranking of impact on biological environment and development of mitigation measures.

Giorgi Iankoshvili, zoologist. Graduated from Ilia State University - School of Engineering and Natural Sciences with BSc in Ecology and Georgian Technical University, Agrarian Sciences and Biosystems Engineering with BSc in Forestry. Obtained Master's degree in Ecology in 2017. Since 2015 is employed as Researcher at Ilia State University. From 2014 is field research specialist, ecologist. Member of environmental NGOs Caucasian League (Head of environmental department); Georgian young greens (member), Caucasian Energy (member), Sabuko (member). Invited professor at Ilia University School of Natural Sciences and Engineering (subject field methods of biodiversity Assessment) Iliani school of natural sciences and engineering. Field survey specialist for Ilia State University and Alexander Koenig research museum in Bonn. In 2017 -2018 was acting as biodiversity (terrestrial wildlife) specialist and field survey team member in Gamma Consulting. Was responsible for desktop data gathering, field surveys and data analysis, mapping of sensitive locations and habitats, assessment of impact on wildlife (including avian species) during construction and operation of road infrastructure, hydropower plants, transmission line projects, assessment of impact on protected areas (Emerald network, national PAs), habitat surveys, mapping. Giorgi was involved in Kvesheti Kobi project as coordinator and manager of biodiversity team (wildlife). He participated in site surveys, habitat description and assessment of sensitivity, ranking of impact on biological environment and development of mitigation measures.

Giorgi Martashvili, ichthyologist at Gamma Consulting Ltd. Graduated from Tbilisi Ivane Javakhishvili State University in 1976. Qualification - hydrobiologist-ichthyologist. Continued studies at Moscow Lomonosov State University. After completion of the postgraduate course, was employed as senior researcher at Ivane Javakhishvili Tbilisi State University (faculty of biology, department of ecology). From 1985 till 1999 has been acting as chief ichthyologist, director and consultant for a range of state owned fish farms in Georgia. Since 2015 is managing projects and lecturing at Georgian Agrarian University (subject – ichthyology). Joined Gamma as ichthyologist and head of aquatic survey team in 2015. His responsibilities include: managing of the team, data gathering and analysis, field surveys, assessment of impact from various developments on aquatic environment, elaboration of mitigation and compensation measures, monitoring. Since joining the company he has been involved in more than 30 various scale ESIA and aquatic surveys. Giorgi was involved in Kvesheti Kobi project

as coordinator and manager of the aquatic survey team. He participated in field surveys, data gathering and analysis.

Tamta Kapanadze, botanist at Gamma Consulting Ltd. Graduated from Tbilisi Ivane Javakhishvili State University in 2011, continued studies at Ilia State University. In 2015 obtained her MSc degree in ecology. Since then has been employed as inspector at Department of Environmental Supervision (entity under the Ministry of Environment), later as macropaleontologist at Georgian National Museum. In 2017 joined Gamma team. Her responsibilities in the company include floristic surveys, data gathering and analysis, habitat studies. As a part of biodiversity survey team she participated in XXXX projects including ESIA/EIA for road, transmission line and other infrastructure and industrial developments. Tamta was involved in Kvesheti Kobi project as team member - botanist. She participated in field surveys, data gathering and analysis.

Nino Kheladze specialized in spatial information management and analyses. Graduated from Tbilisi Ivane Javakhishvili State University in 2000 with BSc degree in Organization of Business in Communications. For about 7 years she was working at private GIS Company "Geographic" where she was involved in several multidisciplinary projects and was responsible for managing spatial information within various thematic projects. She made two master degrees in Geo-Information Management at University of Twente (UT) within 2007-2011 years. From 2011 till 2015, Nino Kheladze has been working actively in Caucasus Environmental NGO Network (CENN) as a project manager/team leader in number of national, regional assignments funded by international donors, mostly involved in hazard, vulnerability and risk mapping, DRR/CCA related issues in GIS environment. Since 2015 she is part of the organization Environment and Development as well as Gamma Consulting and is working as an independent consultant with local and international development organizations (e.g. UNDP, RECC, BSEA). During her career Ms. Nino Kheladze has been involved mostly in environmental analyses, mapping and modeling using GIS environment. Nino Kheladze participated in Kvesheti-Kobi as GIS specialist supporting habitat mapping activity.

Levan Zazadze, ecologist at Gamma Consulting Ltd. Graduated from Tbilisi Ivane Javakhishvili State University in 2014 with BSc in ecology. Continued studies at St. Andrew the first-called Georgian University of patriarchate of Georgia - Faculty of informatics mathematics & and natural sciences. Obtained MSc degree in Ecology in 2016. PhD student – since 2016. Joined Gamma team in 2015. Since then he participated in 22 projects including feasibility studies, ESIA's, monitoring and spatial planning projects. Levan was involved in Kvesheti Kobi project as support team member. His tasks included participation in site surveys, contribution to habitat mapping.

Niko Gaprindashvili, ecologist at Gamma Consulting Ltd. Graduated from Tbilisi Ivane Javakhishvili State University in 2014 with BSc in ecology. Continued studies at St. Andrew the first-called Georgian University of patriarchate of Georgia - Faculty of informatics mathematics & and natural sciences. Obtained MSc degree in Ecology in 2016. PhD student – since 2016. Joined Gamma team in 2015. Since then he participated in 22 projects including feasibility studies, ESIA's, monitoring and spatial planning projects. Niko was involved in Kvesheti Kobi project as support field team member.

Iulon Gagoshidze, archaeologist. Graduated from Tbilisi Ivane Javakhishvili State University in 1958. Doctor Habilitatis – since 1983. Academician of Gelati Academy of Sciences since 1995. During his career, since 1957, he has been acting as member and head of 20 various archaeological expeditions in Georgia and abroad including assignments in Georgia Tajikistan (Takht-i-Sangin), Crimea (Murmekion), Cyprus (Gialia) and Israel (Umm-Leizun). Since 2009 is acting as Chief Scientist at Georgian National Museum. From 2010 is invited expert – associate at Gamma. As consultant archaeologist and expert he has been involved

in infrastructure projects impact assessments. The most recent include: Khevi-Argveta, Kvesheti-Kobi road projects.

3 Detailed Methodology

The following section outlines the detailed methodology followed for the collection of data.

3.1 Geology

Methodology for collection of baseline data – Geological maps were collected and geological information from the FS reviewed and incorporated into the report. Discussions with the Detailed Design Consultants Geotechnical specialist were also undertaken to discuss the geological conditions within the Project area based on information collected during the detailed design phase.

Sources of Data:

Detailed Design Consultant.

3.2 Topography

Methodology for collection of baseline data – The topography of the project area was assessed using Google Earth and Topographical maps.

Sources of Data:

Detailed Design Consultant – Site plans and profiles.
Google Earth.

3.3 Soils

Methodology for collection of baseline data – Soils maps were collected and soils information from the FS reviewed.

Sources of Data:

Detailed Design Consultant.

3.4 Climate and Climate Change

Methodology for collection of baseline data – Meteorological data, including atmospheric pressure, air temperature, relative humidity, precipitation, wind speed and direction, were collected from secondary sources. Recently completed climate change reports were collected and reviewed.

3.5 Air Quality

Methodology for collection of baseline data – Instrumental air quality monitoring was undertaken within the Project area during 2018 to determine baseline conditions. NO₂, SO₂, CO, PM₁₀, PM_{2.5} and Total Dust were monitored four times (30 minute averaging period) over a 24 hour period. The following equipment was used:

- (i) Carbon monoxide meter (China), range 0-100ppm
- (ii) Dust measuring unit CW-HAT 200, range 0-500 µg/m³
- (iii) Air analyser, TESTO-350 (Germany), range: CO (0-10 000 ppm); NO (0-4 000 ppm); NO₂ (0-500 ppm); SO₂ (0-5 000 ppm).

Site visits were also undertaken to assess if there were any other point sources of air pollution within the Project corridor.

Reference Documents:

- (i) IFC (2007). Environmental, Health and Safety Guidelines. General EHS Guidelines: Environmental. Air Emissions and Ambient Air. April 2007.

1.6 Hydrology

Methodology for collection of baseline data – Maps and locations of surface water courses were reviewed and discussions with the Detailed Design Consultant undertaken.

Instrumental monitoring of surface water quality was undertaken in 2018 to determine baseline conditions in the Project area, specifically in the areas close to the bridge sites. Parameters monitored included pH, electrical conductivity (EC), turbidity, BOD, COD, dissolved oxygen (DO), Temperature, Total suspended solids (TSS), Total Coliform Bacteria, Oil and Grease, Total Phosphorus, Total Nitrogen, Total Ammonium, Petroleum Hydrocarbons, Total Residual Chlorine, Total Zinc, Magnesium, Dissolved Copper. Groundwater samples were also taken from two sites in March 2018.

The protocol for the surface water monitoring was as follows:

- (i) Water sampling for chemical analysis was done in line with requirements of the technical regulation of the Sanitary rules on water sampling, approved by the Governmental decree #26 (dated January 3, 2014).
- (ii) Sampling protocol was filled in on the sampling site. Samples marked.
- (iii) The samples were stored in secure location to preclude conditions which could alter the properties of the sample or lead to its contamination/loss.
- (iv) Samples were in custody sealed during storage and/or transportation and kept in the custody of the sampler until the samples were relinquished to another party.
- (v) The samples were delivered to the lab within 24 hours from sampling. Prior to delivery to the lab the samples were kept in portable refrigerator.

Containers:

- (i) Samples were collected in 1 litre PET bottles.
- (ii) For TPH amber glass bottles were used.
- (iii) BOD samples were collected in 300ml bottles.
- (iv) 1 litre sterile bottle was used for the sample intended for microbiological examination.

In addition to the samples for offsite analysis, parameters such as temperature, dissolved oxygen, pH, important for fish wellbeing were measured on the spot.

1.7 Biodiversity

Overview

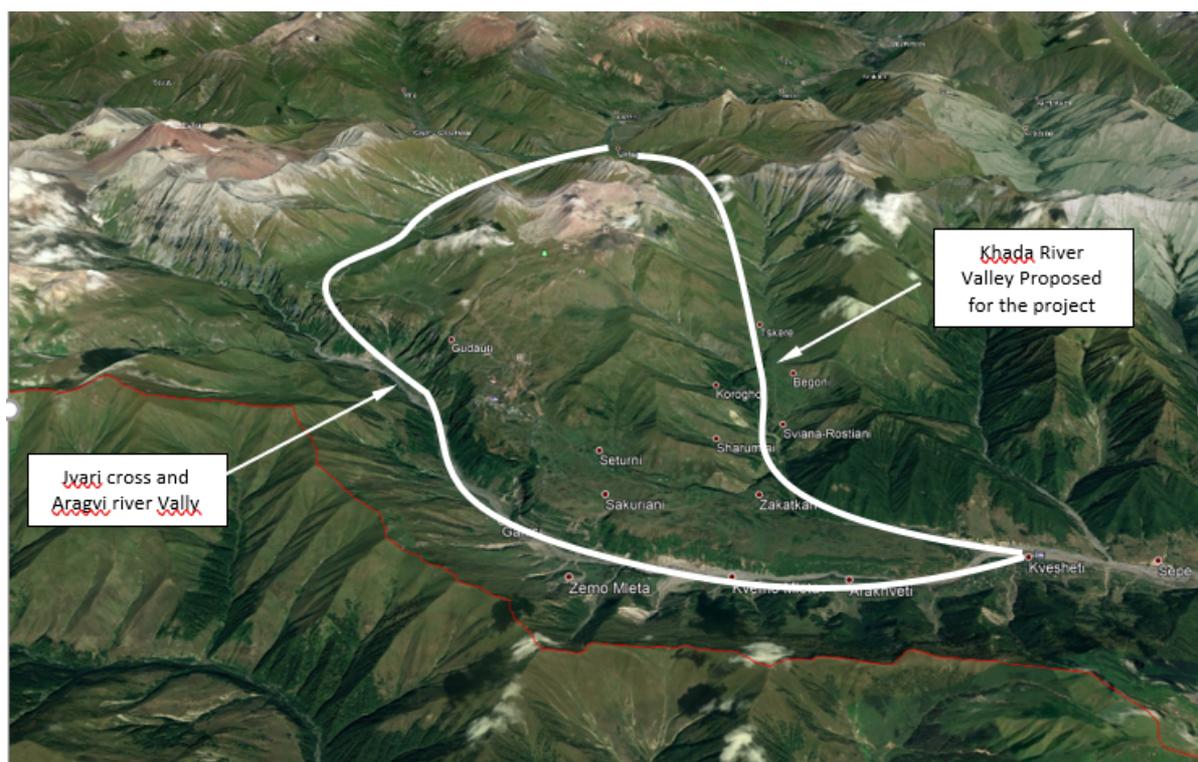
The baseline assessment methodology has sought to use a combination of desk studies, site walk-over surveys and specific studies to identify the potential for key ecological receptors (sensitive habitats and notable species) to be present within the project Area of Interest. Particular attention has been paid to:

- Identifying areas of potential for Natural and/or Critical Habitat and Priority Biodiversity Features present within the Aol

- Mapping and Analysing any such habitats.
- Calculating any residual habitat loss to help ensure that ‘no net loss’ can be achieved

Area of Interest / Study Area – The following study areas have been used in this assessment:

- For the initial screening, a 50km radius around the proposed road site was used as an initial study area to understand the potential for notable species to be present.
- General biodiversity studies (notable plants and animals with small daily ranges) then focussed on a smaller buffer area of 150m either side of the proposed road (and other areas such as spoil disposal areas)
- For watercourses a study area of 500m upstream and 2km downstream of river crossing points was considered.
- For the autumn 2018 migratory bird survey the work focussed on surveys of the two corridors from the south slope of the Caucasus ridge, namely the Aragvi river Gorge where the existing road is passing and the Khada river gorge up to Tskere village which is the point of southern portal of the proposed new road. The north side of Caucasus ridge, where the Portal is located close to the Tergi river at the confluence of the Tergi and Bidara rivers and the Narvana river the right tributary of the Tergi were also evaluated. The work allowed us to compare the characteristics of the migration corridor along existing road and Jvari cross, which is historical route connecting north and south parts of the Caucasus. This corridor is better studied from the point of view of the migratory birds compared with Khada river Gorge.



For otters, walkover surveys were undertaken of the rivers and streams in the vicinity of the proposed project. The survey area was split into 4 different parts covering 1) the northern portal of the tunnel near to Narvana and Bidara confluence to the Tergi river 2) the southern portal of the tunnel near to the Tskere village 3) Bridge crossings on the Khada river and 4) confluence of Khada and Aragvi rivers..

Review

A wide-ranging review of existing literature has been undertaken. For Protected & Important Areas and IUCN Red List species this has included a review of IBAT data (see www.ibatforbusiness.org) from an area of 50km² around the Project southern portal. This has then been supplemented by a range of other data sources as referenced throughout the document, and including the Georgian Biodiversity database (www.biodiversity-georgia.net)¹ as well as information from:

- IUCN (<https://www.iucn.org/>);
- Protected Area designations
- The Red List of Georgia
- The Red List of Endemic Plants of the Caucasus Region and Adjara Plant Red List;
- Critical Ecosystem Partnership Fund (CEPF) – conservation programmes on the Caucasus Biodiversity Hotspot (www.cepf.net);
- Fauna and Flora International (FFI) conservation programmes- Georgian carnivore conservation (www.fauna-flora.org);
- USAID – Support for the National Parks Programme (<http://map.usaid.gov/ProjectDetail?id=a0cd00000012aSaAAI>);
- UNDP/GEF – Catalyzing Financial Sustainability of Georgia's Protected Areas (<http://undp.org/ge/>);
- World Wildlife Fund (WWF) Caucasus – Various programmes eg 'Programme of Work on Protected Areas across the Caucasus' (<http://wwf.panda.org>);
- <http://datazone.birdlife.org/country>
- Georgian Biodiversity database <http://www.biodiversity-georgia.net/>
- IBA details <http://aves.biodiversity-georgia.net/spa-n-9>

Stakeholder Consultation

The literature review has been further supplemented by engagement with a range of stakeholders of particular information of relevance to the project. This process is ongoing and is intended to ultimately include the likes of included:

- MoEPA.
- Georgian Centre for the Conservation of Wildlife (<http://gccw.bunebaprint.ge>)
- Georgian Centre for Biodiversity Conservation and Research (www.nacres.org);
- SABUKO: Society for Nature Conservation and Birdlife Partner in Georgia. <https://sabuko.ge>
- German International Cooperation Society (GIZ) "Biodiversity Integrated Management in the South Caucasus (IBiS) Program"
- Contributors to the national BAP, namely: Regional Environmental Centre of Caucasus (REC Caucasus), Ecovision, WWF – Caucasus Program Office, NACRES, Ilia State University and Elkana)
- Local communities and fishermen.

The following provides a summary of the consultations undertaken to date relating specifically to Biodiversity.

¹ This contains information on species of Georgia's inland and freshwater ecosystems and is hosted by Ilia State University. The establishment of the unified national system of biomonitoring is ongoing for assessing the status of biodiversity – see (www.biomonitoring.moe.gov.ge/) (Source: Biotrends, Results of the NBSM, Indicator R7-financial resources for nature conservation);

Organisation	Representatives	Date
Ministry of Environmental Protection & Agriculture	Carl Amirgulashvili Head of Biodiversity & Forestry Department	28/09/18
<p>Discussion covered a range of issues around protected areas. Key points included:</p> <ul style="list-style-type: none"> • Kazbegi Park Expansion: Carl was aware of the GIZ backed proposals but the expansion was not considered to be under serious discussion yet. Other Parks were seen as priorities and the process was constrained by resources.* • Emerald Network: development of the network is currently still in the early stages. Research is ongoing and is internationally backed (eg by GIZ, but also EBRD). Focus is currently on key species (mostly birds, and species threatened by hydropower) but habitats will be considered later. • Appropriate assessment: This has not been considered required for this element of the Project as the road is in tunnel under the proposed site. New guidelines including dealing with AA in EIA are due out in Dec 18. • Overall project is considered relatively benign, but it does need to make sure it avoids sea buckthorn areas with disposal sites. Additional information is available eg from Illia State University (working on Berne convention species) as well as UNDP Projects on monitoring & research data <p>Update: A bill has since been introduced by the Deputy Environment Minister Nino Tandilashvili to expand the Kazbegi National Park from 69,518 hectares to 78,201 hectares. The bill, which has been worked on for two years with the support of the German government, is supported by the Environmental Protection and Natural Resources Committee, and passed the first reading of the committee on 05/11/18.</p> <p>GIZ report "Assessment of Wintering Habitat Conditions of Great Rosefinch and White winged Redstart in Kazbegi Municipality and Recommendations to Improve Conservation Status of Selected Habitats" Zura Jvakhishvili 2018.</p>		

Organisation	Representatives	Date
Georgian Centre for the Conservation of Wildlife	Ekaterina Kakabadse	26/09/18
<p>Leads the "Support Program for Protected Areas" and work regarding the expansion tension of the Kazbegi National Park. This is a 5-year Project funded by KfW, but due to finish in 2019. It has been supporting the Agency for Protected Areas with the development of baseline studies, management plans, socio-economic assessments, education, communication strategies, infrastructure, equipment and training. Key points of note were that:</p> <ul style="list-style-type: none"> • Local concerns to designation: Many people in the Kazbegi region have been against protected areas after imposition of strict controls in the region some 12 years ago. They worry that the extension will curtail livelihoods. Working with trusted community leaders (eg Regional Advisory Councils) is key • Expansion History: Kazbegi has grown over years: the elements that are strict reserves are over 40 years old and primarily forestry. Natural monuments were added later. Kazbegi IBA covers almost whole areas of proposed expansion (SPA is smaller). Now proposed to add area of traditional use / tourism zone. • Current Proposals: Proposed expansion was bigger based just on conservation objectives but Regional Advisory Councils reduced it. Proposals have been at parliament for over a year and were first presented in late 2015. 1st hearing is due (now done: 05/11) • Importance of Livelihoods (especially given concerns over pasture management). Kazbegi National Park Friends Association has been developed to improve things – support PR, education, management strengthening, commercial activities, honey production, tourist infrastructure etc (see also CNF). • NACRES and Illia State University (ISU)* can help with long term monitoring. • Project Concerns: included emergency exits and venting, Gadauri Access Road, drainage and run off and spoil disposal. <p>*ISU specialists were included in the Gamma and DG Consulting teams.</p> <p><i>Feasibility Study for the Ecoregional Programme III (Georgia), Kazbegi Project Final REPORT KfW German Financial Cooperation with Georgia</i></p>		

“Spatial Analysis Used in Baseline Study for the Preparation of Management Plan of Kazbegi Protected Areas” Tamar Bakuradze, Andrei Kandaurov*, Marine Mosulishvili*, Dali Nikolaishvili4, Mamuka Gvilava, Sophiko Kenkebashvili August 2017

Organisation	Representatives	Date
Georgian Centre for Biodiversity Conservation & Research (NACRES) www.nacres.org	Kakha Rartsivadza	26/09/18
Meeting included an overview of NACRES work and ongoing studies, the expertise they have and the services they can provide. NACRES do not have any existing data for the Project area but are willing and able to support in the future. NACRES were interested in the work that had been done and thought that the Project was providing good information on biodiversity issues.		

Organisation	Representatives	Date
Sabuko www.sabuko.ge	Natia Javakhishvili, Director	16/11/2018
<p>SABUKO is a Society for Nature Conservation and Birdlife Partner in Georgia dedicated to the conservation of wild bird species and their habitats. It also seeks to raise awareness about the value of nature and the importance of its protection. Its activities include education and awareness raising; field surveys, expeditions, systematic monitoring, satellite tagging and data analyses; rehabilitation and restoration of key habitats; stakeholder engagement and development of Eco-tourism (birdwatching). It also implements the Birdlife Strategy at a national level.</p> <p>A brief review was undertaken of the project and the proposed EIA process was discussed. Sabuko had little raw data from the Project Area, but the presence of nesting Egyptian Vultures near the Tunnel 1 portal was raised, which the Project agreed to look into. In terms of migration it was agreed that the primary route was not via the Khada Gorge, but along the main rivers but Batuni Raptor Count (BRC) may have more information. Sabuko would be ok to work with the project going forward if their concerns were seen to be addressed.</p>		

Organisation	Representatives	Date
Caucasus Nature Fund (CNF) www.caucasus-naturefund.org	Tea Barbakadze National Program Coordinator Georgia Ted Jonas Board Member	28/09/18
<p>CNF provides long-term support and management assistance for the protected areas of Armenia, Azerbaijan and Georgia. It actively seeks to conserve the unique flora, fauna and ecosystems of the Caucasus for future generations while at the same time improving the lives of local people today. It works through public-private partnerships with the three governments, to provide long-term support for the Protected Areas. CNF applies a 50% principle whereby it can match (grants) but not exceed state budgets for a specific park’s operating funds. It promotes sustainable development in communities surrounding the Protected Areas, long-term planning processes and the involvement of local people.</p> <p>In Georgia, CNF has partnered with BMZ, CI, WWF Germany and KfW and is supporting 10 protected in Areas, including Kazbegi (since 2015). It is particularly supporting operational and management efficiency through provision of 3 year grants including part payment of ranger salaries, improving local capacity building, and supporting sustainable tourism and local businesses (eg honey production). Particular areas of interest include:</p> <ul style="list-style-type: none"> • Poaching. It has some data on the park. Not typically a large-scale “commercial” issue rather local people providing traditional guided services (often to people from Tblisi or Russia). CNF supports anti-poaching activities including remote sensing and monitoring. (eg working with NACRES on tur and chamois). WWF may have more information on Russian poaching. • Tourism: 2/3 of national park is important for tourism and recreational activities. The Khada Gorge is important for this. Georgia tourism association and Ministry of Tourism have more data on ecotourism. • Land use zoning. This is uncontrolled around Gadauri and in mountain regions in general. The Ministry of Infrastructure and Regional Development has a masterplan but application is weak. 		

Major concerns about the Project (apart from impact on tourism in Khada Gorge) are strategic – what other roads are being developed? what Parks do they go through? What are cumulative impacts? How will they be maintained? On this project will the road solve the problem or will freight just back up at the Russian border (customs). Is road really the right option? Why isn't pollution costed into freight charges?

Remote Sensing Data

Habitats were assessed remotely, using aerial imagery, mapped and classified into different Biomes² for 150m either side of the proposed road (and any associated works). The following key biomes were considered and then further classified according to Georgian national system:

- Agro-ecosystems;
- Anthropic habitats (manmade) including buildings and roads;
- Grasslands;
- Eroded terrains (bare earth);
- Riparian habitats;
- Bushes (both native and introduced);
- Forests (semi-natural and plantation, nationally owned and naturally regenerated woodlands);
- Others (transitional communities and areas too small to map).

Field Studies

The remotely sensed data and literature studies were ground-truthed through a series of field visits, which included quadrat assessments of species assemblages. The work provided a seasonal snapshot of the species present in the area and as a result a precautionary approach has been taken to the potential for notable species to be present. A more detailed survey was also undertaken as part of the forest inventory Recommendations are included in this report for additional surveys to be undertaken as the project execution progresses.

- **Vegetation:** The initial vegetation classification was subject to a limited ground truthing via point source field sampling using grids to review species presence and abundance. Site visits were undertaken by national biodiversity specialists on April 19th 2018 (northern portal) and May 8th 2018 (southern area).
- **Terrestrial Fauna and Birds:** During the walkover visits an overview was obtained of habitats present and the potential for notable species to be present within the Aol. Records were taken of any bird seen in the Aol and incidental observations made of other species present as indicated by sightings, footprints, droppings etc.
- **Aquatic fauna:** Aquatic surveys were undertaken up to 50m upstream and 300m downstream of proposed river crossing points between May 4-11, 2018. This included hand searches and fish nets.

The above approach was supplemented by additional observations made during further visits to the sites in May and June 2018. In addition the following surveys were undertaken in autumn 2018:

- **Autumn bird migration surveys:** Vantage point counts were made of migrant birds at the end of September and into October 2018. Counts were made at each vantage point on at least 4 occasions and for at least 3 hours per count. Counts used binoculars and

²Biomes are the largest unit of ecological classification that is convenient to recognize below the entire globe. Terrestrial biomes are typically based on dominant vegetation structure (e.g., forest, grassland). Ecosystems within a biome function in a broadly similar way, although they may have very different species composition. For example, all forests share certain properties regarding nutrient cycling, disturbance, and biomass that are different from the properties of grasslands. <http://www.biodiversityz.org/content/biome>

spotting scopes and were targeted to run from one hour after sunrise until two hours before sunset. Counts were not made on days of poor weather when migration and visibility was limited. Records were made of migrating birds (or group of birds) including time of passage (awaited) and relative position (including height). At low intensities individual birds were counted, with higher counts should in multiples of 10. Two people were used for each observation session.

- **Otter surveys.** These were undertaken during the periods of 29-30 September, 04-06 October and the 1-3 November 2018. The work was done by an experienced surveyor and involved searching for evidence such as dung (spraints), tracks (footprints), feeding remains, otter slides (into water), holts (underground dens) and couches (above ground sites where otters rest during the day).
- **Bats:** A walkover survey of the Aol was undertaken by a national bat expert to identify any habitats of particular interest. This will be followed up by further studies in the late spring of 2019 once bats emerge from their roosts.

The results of these autumn surveys have been summarised in the ESIA assessment and are also provided as a stand-alone report provided as an annex to the ESIA.

Evaluation Approach

The IBAT data was used to identify a 'long list' of potentially important species that could be present within the broader study area. The site visits and desk studies were then used to focus this on those important species and habitats which had the potential to be both present within the Project Aol (eg suitable habitat was present for notable species) and be impacted upon by the proposed works. Where field visits confirmed presence of key species this was noted, but given the limited extent and duration of the field surveys a failure to observe evidence of a species was not necessarily taken to indicate its absence. The resulting shortlist of species and habitats which could be impacted by the works was then allocated an importance based on the uniqueness and vulnerability of habitats present and their importance to endangered or critically endangered species; endemic or geographically restricted species, or species qualifying as restricted-range under Birdlife or IUCN criteria the conservation status of a species according to the IUCN red list categorizations, its legal status (eg in EU/Georgian law); its conservation status within Georgia; and potential to act as umbrella species and drive appropriate mitigation for a range of species;

Table H-1: Habitat and Species Valuation

Habitat Value	Description	Species Description
Very high / International	Habitat supports globally threatened species of plant and animals or Annex 1 habitats of the Habitats Directive AND is within or close to an area designated for those habitats that would classify as Critical Habitat .	Ramsar, Natura 2000 or IBA qualifying species, IUCN red list – vulnerable/endangered/critically endangered globally threatened species, plant or animals. Animals on Annex 2 or 4 of the Habitats Directive (which are notable in the region) and within or near an area designated for those qualifying features. Species for which Georgia supports a significant functioning population that contributes to the species Global conservation status.
High / National	Habitat supports nationally threatened species of plant and animals or is habitat required to maintain the ecological structure and functions needed to maintain	Nationally threatened species of plant and animals of functioning populations of animals on Annex 2 or 4 of the Habitats Directive which are considered notable in the region. Study Area supports a significant

	the viability of priority biodiversity features. Habitats that would classify as Priority Biodiversity Features	functioning population that contributes to the special National conservation status.
Moderate /Regional	Habitat supports locally rare and/or species rich communities that are of concern at the Regional level	Locally rare species, species that are of conservation concern in the Regional area. Species which are functioning populations of animals on Annex 2 or 4 of the Habitats Directive.
Low/ Local	Habitat supports a low diversity of common species of plants and animals	Common species of plants and animals that are not rare or threatened
Negligible/Less than Local	Habitat is artificial and or supports and very low diversity of common species of plants and animals	Very common species of plants and animals

The above process was also used as a pre-screening process for habitats and species with the potential to trigger Priority Biodiversity Features and/or Critical Habitat requirements (very high or high scores in the valuation tables).

Table H-2 - IBA Qualifying Criteria

	Trigger	Criterion and Notes
International Designations (IBA)	A1. Globally threatened species	The site is known or thought regularly to hold significant numbers of a globally threatened species . <i>The site qualifies if it is known, estimated or thought to hold a population of a species categorized by the IUCN Red List as Critically Endangered, Endangered or Vulnerable. In general, the regular presence of a Critical or Endangered species, irrespective of population size, at a site may be sufficient for a site to qualify as an IBA. For Vulnerable species, the presence of more than threshold numbers at a site is necessary to trigger selection.</i>
	A2. Restricted-range species	The site is known or thought to hold a significant component of a group of species whose breeding distributions define an Endemic Bird Area (EBA) or Secondary Area (SA). <i>This category is for species of Endemic Bird Areas (EBAs). EBAs are defined as places where two or more species of restricted range, i.e. with world distributions of less than 50,000 km², occur together. More than 70% of such species are also globally threatened. Also included here are species of Secondary Areas. A Secondary Area (SA) supports one or more restricted-range species, but does not qualify as an EBA because less than two species are entirely confined to it. Typical SAs include single restricted-range species which do not overlap in distribution with any other such species, and places where there are widely disjunct records of one or more restricted-range species, which are clearly geographically separate from any of the EBAs.</i>
European Designations (SPA)	B2. Species with an unfavorable conservation status in Europe	The site is one of the most important in the country for a species with an unfavourable conservation status in Europe (SPEC1/2/3) and for which the site-protection approach is thought to be appropriate

	Trigger	Criterion and Notes
	C2. Concentrations of a species threatened at the European Union level	The site is known to regularly hold at least 1% of a flyway population or of the EU population of a species threatened at the EU level (listed on Annex I and referred to in Article 4.1 of the EC Birds Directive).
	C5. Congregatory – bottleneck sites	The site is a ‘ bottleneck ’ site where at least 5,000 storks (Ciconiidae) and/or at least 3,000 raptors (Accipitriformes and Falconiformes) and/or 3,000 cranes (Gruidae) regularly pass on spring or autumn migration.

Table H-3: Types of Protected Areas

Type	Extent ³	Reason for Designation	Permitted Land Uses
Strict Nature Reserves. ~ IUCN Protected Area Category I Equivalent	14 SNRs with a total area of 140,000 ha	Typically afforded a high level of protection with armed ranger service. Established to “maintain nature, natural processes and genetic resources in a dynamic and pristine condition, and to conduct scientific research and studies, with a minor impact, for educational and environmental monitoring purposes”.	Public access is usually not allowed though scientific research and supervised educational activities are permitted. In recent years some limited access to visitors has been allowed to provide financial support.
National Parks IUCN Category II Equivalent	10 NPs with a total area of almost 350,000 ha	Generally created to preserve natural as well as aesthetic values. Many have a strictly protected core, where scientists study natural processes in unaltered habitats.	Recreation is allowed in specially designated zones, as well as opportunities for environmental education and working with the public. Some allow traditional natural resource use in designated areas.
Managed Nature Reserve IUCN IV-VI	19 with a total area of 60,000 ha	Traditionally often created as hunting refuges, now include landscape, botanical, and zoological sanctuaries. Usually poorly protected and lacking an administrative body, rangers and scientific staff etc.	Generally forbid logging, drainage of wetlands, use of chemicals, and other intensive forms of nature use. May permit hunting, fishing, and collection of non-timber forest resources such as mushrooms, berries, and medicinal plants.
National Monuments	40	Relatively small areas of national importance, represented by ecosystems of rare, unique and highly aesthetic features, specific geographical and hydrological formations, and individual samples of plants or fossils of living organisms. Natural Monument can be a cave, a valley, river deltas, wood groves etc.	Limited use of national monument resources may be permitted.
Protected Landscapes	2 (37,700 ha)	Managed by the Administration established by a local Municipality, which governs the area in cooperation with the Agency of Protected Areas	Allow sustainable use of natural resources and development of eco-tourism in order to contribute towards conservation objectives.

³ <http://www.apa.gov.ge/en/protected-areas>

Type	Extent ³	Reason for Designation	Permitted Land Uses
Multi-Purpose Use Areas:	none to date.	Intended to include watersheds, productive forests, pasture, tourism etc. May be partially modified and include populated areas. Should not include unique natural formations of national importance	Intended for economic activities that are organized in accordance with the requirements of environmental protection and for use of renewable natural resources.

3.8 Socio-economic conditions

The LCF, Gamma Consulting, conducted a socio-economic baseline survey of households in the Project Area in June 2018. In total, 136 resident families were surveyed using a household questionnaire. This questionnaire investigated issues including household family membership, gender, age, marital status, residence, income, occupations/employment, and education, as well as household member migration, assets, agricultural context, and information regarding biodiversity and other locally significant issues.

The data were quality controlled and summarised by a senior member of Gamma staff. The socio-economic survey was conducted in the following villages of Kazbegi and Dusheti Municipality: Arakhveti, Begoni, Beniani, Gomurni, Zakatkari, Iukho, Kobi, Sviana-Rostiani, Seturni, Kvemo Mleta, Kvesheti, Gudauri (Kumliscikhe), and Tskere.

Small group interviews, Key Informant Interviews (KIIs) and Focus Group Discussions (FGDs) were additionally carried out to inform social baseline for this Project. The following KIIs and small group interviews have been carried out:

- One-to-one and small meetings with local residents have been held during the site visits in March, April and May 2018 in Kvesheti, Tskere and Kobi areas. (Source: PFS)
- 28 May 2018: Governor of Mtskheta-Mtianeti (held at RD offices);
- 1 June 2018: Early consultations with individual residents in Arakhveti, Begoni, and Zakatkari and Tskere;
- 4 July 2018: Mayor, Deputy Mayor and Social Specialist of Dusheti Municipality;
- 4 July 2018: Mayor, Deputy Mayor and Social Specialist of Kazbegi Municipality;

A number of FGDs have been carried out as follows:

- 6 July 2018: FGD with approximately 12 women in Kvesheti;
- 6 July 2018: FGD with two men in Kvesheti;
- 6 July 2018: FGD with approximately 5 people from Zakatkari (2 women, 3 men);
- 30 August 2018: Approximately 16 participants (men, women and young people) from villages including Begoni, Sviana-Rostiani, Tskere, Gomurni, Beniani;
- 30 August 2018: Approximately 11 participants, mostly Arakhveti residents (as per invitation) plus at least one from Bedoni; later, 2 or 3 Kvesheti residents also arrived;
- 31 August 2018: 8 participants from Kobi and Almasiani villages (6 men/2 women).

Data analysis from all engagement was undertaken by Gamma and the international advisor to EBRD, and synthesised for inclusion in this report.

Desktop data gathering was undertaken by Gamma and the international advisor to the EBRD for inclusion in the social baseline component of the report.

A questionnaire with Dusheti and Kazbegi municipalities was additionally sent with responses returned from both. Information gathered included demographic (including vulnerability) data, health, education, media, civil society, infrastructure, and key biodiversity and cultural heritage

features of each municipality. The results have not yet been finalised in English in order to be included within the current version of this report.

3.9 Infrastructure

Methodology for collection of baseline data – The existing infrastructure in the Project area was identified during site visits and in consultation with the Detailed Design Consultant.

3.10 Land Use

Methodology for collection of baseline data – A review of the land uses was undertaken based on existing maps of the project area, satellite images, aerial photos and site visits.

3.11 Waste Management

Methodology for collection of baseline data – A review of the existing waste management situation in the region was undertaken and local waste management facilities were identified.

3.12 Health and Educational Facilities

Methodology for collection of baseline data – Site visits identified the health and educational facilities within the Project area. This was confirmed by a web-based search.

Sources of Data:

- (i) Ministry of Education and Sciences Georgia - <http://www.mes.gov.ge/>
- (ii) Ministry of Health Georgia - <http://cloud.moh.gov.ge>

3.13 Cultural Resources

Methodology for collection of baseline data – Existing data was reviewed and a site walkover was undertaken during 2018 to determine what PCR was present within the Project area. The date of the site survey was 12-13 May 2018. The site survey team (3 specialists) was headed by key expert.

- Name of the key expert: Iulon Gagoshidze
- Qualification: Doctor Habilitatis, Tbilisi State University; Academician of Gelati Academy of Sciences; Chief scientist, Georgian National Museum
- Countries of Experience: Cyprus, Israel, Azerbaijan, Georgia
- CV see Appendix T.

3.14 Noise

Methodology for collection of baseline data

The noise was measured continuously, for 24 hours and the data were taken in every second. A total of 43,000-44,000 data measurements were obtained from every point.

Sampling was done with American noise meter „REED 8080“. The noise meter was calibrated by the Georgian National Agency for Standards and Metrology on April 23, 2018. Calibration Certificate: GE/MI 07-00474-18.

The points of measurement were selected in line with the requirements of Resolution no. 398 of the Government of Georgia on August 15, 2017 “On the levels of acoustic noise in the rooms of the residential houses and public establishments and their accommodation areas”⁴.

In the area, which immediately adjoins the residential houses and buildings of public establishments, a noise measuring device was installed at least 2 m from the structures of the buildings and at 1,5-2,0 m high from the ground level (See figures below).

Kvesheti village



Kvesheti village



During the measurements, the microphone was directed towards the main source of noise and was distanced from the entity making the measurements by at least 0,5 m. If it was impossible to identify the main source of noise in the area, the direction of the microphone was vertical and upwards.

Sources and Reference Documents:

- (i) IFC (2007). Environmental, Health and Safety Guidelines. General EHS Guidelines: Environmental. Noise. April 2007.
- (ii) Resolution no. 398 of the Government of Georgia on August 15, 2017 “On the levels of acoustic noise in the rooms of the residential houses and public establishments and their accommodation areas”⁵.

3.15Vibration

Location and Period - Measurements of the existing vibration level were undertaken at four locations in two villages – Kvesheti and Arakveti. The measurements were done at four points in the buildings near which the existing noise levels were measured. The vibration was measured in a 24-hour continuous mode. Samples were taken in every 1 second, with total 1440 samples taken at each point.

Equipment - The VM40 is designed for measuring vibration in buildings, bridges, towers, pipelines and various other large structures. The measurements serve to prevent possible structural damage or disturbance to people. The VM40 contains a sensor, recording and evaluation electronics and an accumulator in its robust casing. It is especially suitable for autonomous operation over longer periods of time e.g. on construction sites.

⁴ Technical Regulation sets the admissible level of acoustic noise in the rooms of the residential houses and public establishments and their accommodation areas.

⁵ Technical Regulation sets the admissible level of acoustic noise in the rooms of the residential houses and public establishments and their accommodation areas.

Triaxial Vibration Monitor VM40A/B



The instrument contains three highly sensitive piezoelectric systems for vibration measurement of all three special dimensions. The signal processing is controlled by a microprocessor. The VM40 is operated via its seven keypad buttons and illuminated LCD display. The measurement data can be transferred to a PC via the USB interface. The instrument also has a port for connecting a charger and a relay output for the external signaling of vibration occurrences. The VM40 can measure in accordance with the following standards:

DIN 4150-3: Structural Vibration – Effects of vibration on structures

BS 7385: Evaluation and measurement for vibration in buildings

SN 640312 a: Effects of vibration on buildings

Through menu navigation, all information concerning the type and location of the measurement and the building type is requested and operational errors are avoided. The display of the measurement values is carried out using the three peak values of vibration velocity (X/Y/Z) or the vector sum. Furthermore, the main frequency and its coordinate are displayed for the highest amplitude. Additionally, the VM40 displays the FFT spectrum of the measured vibration quantity. The spectral graph also indicates the limit value curve of the chosen standard, which enables you to analyze potential damage at a glance. If the limit value is exceeded, the measured value can be saved. The VM40 also contains two LEDs and a relay output for signaling alarm status. The VM40B also has the option of sending an SMS report, via its built-in GSM modem, if a limit value is exceeded.

4. List of Site Surveys by Date

#	Date	Location	Activity
Biodiversity			
1.	04-11 April, 2018	Tetri Aragvi, Khadistskali, Narvani, Baidara, Tergi	Ichthyological survey and interviews with fishermen
2.	19 April 2018	Tskere, Kobi	Biodiversity survey One to one meetings with local residents in the project area (biodiversity issues)
3.	08 May, 2018	Kvesheti-Zakatkari	Biodiversity survey One to one meetings with local residents in the project area (biodiversity issues)
4.	12-13 May, 2018	Settlements along Kvesheti-Kobi alignment (Kobi inclusive)	Biodiversity survey
Archaeology and cultural heritage			

5.	08 May, 2018	Kvesheti- Tskere and Kobi area	Cultural heritage
6.	19 April 2018	Kvesheti- Tskere and Kobi area	Cultural heritage
7.	12-13 May 2018	Kvesheti- Tskere and Kobi area	Archaeological survey
Water sampling			
8.	11 April, 2018	Tetri Aragvi, Khadistskali	Surface water sampling
9.	10 July, 2018	Narvani, Tergi, Baidara Kobi	Surface water sampling, Ground water sampling
Soil Sampling			
10.	11 April, 2018	Kvesheti, Kobi	Soil sampling
11.	10 July, 2018	Tskere	Soil sampling
Noise baseline			
12.	28 June-3 July, 2018	Kvesheti – Kobi alignment	Measurements
Vibration baseline			
13.	28 June-2 July, 2018	Kvesheti – Kobi alignment	Measurements
Air quality			
14.	12-13 May 2018	Kvesheti, Kobi	Measurements

5. EIA Project Area – Area of Influence

The potential impacts of the Project on its surrounding physical and biological environments include air and water quality impacts, noise generation, land transformation and changes to soil. These are expected to reduce with the increased distance from the Project facilities, affecting more the areas located closer, up to one kilometer, to the Project alignment. For this, a study area of one kilometer around the site was delineated (see Figures below), to assess the baseline conditions in the areas likely to be affected by the Project due to its proximity to the Project site. This is referred to as the Study Area in this report. The Study Area selected for the EIA includes sensitive receptors⁶ that are most likely to be impacted by the Project's development activities.

⁶ Sensitive receptors include, but are not limited to, residential areas, schools, places of worship, wetlands, and habitats. These are areas which are more susceptible to the adverse effects of an anthropogenic activity such as noise, air emissions, traffic influx, and privacy issues

Figure H-1: Lot 1 Approximate AOI

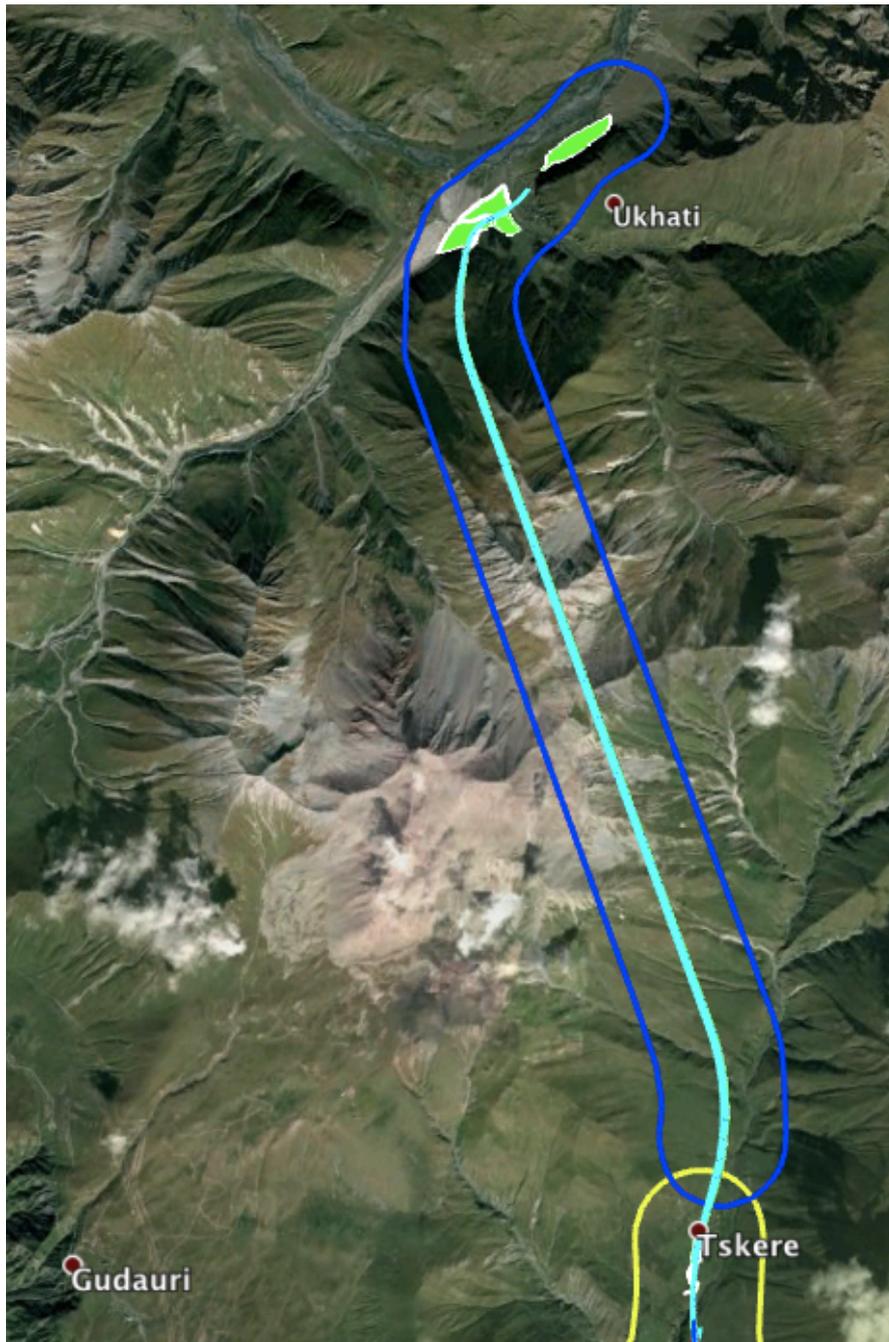


Figure H-2: Lot 2 Approximate AOI

