

Gudauri Access Road

Initial Environmental Examination

Under the North–South Corridor (Kvesheti–Kobi)
Road Project

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Prepared by the Roads Department of the Ministry of Regional Development and Infrastructure of Georgia and the Asian Development Bank.

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Acronyms and Abbreviations

AADT	Annual Average Daily Traffic
ARP	Access Road Project
AM	Accountability Mechanism
ADB	Asian Development Bank
AST	Above Ground Storage Tank
AQP	Air Quality Plan
BAP	Biodiversity Action Plan
BPAP	Borrow Pit Action Plan
BAT	Best Available Technology
BGL	Below ground level
BMP	Biodiversity Management Plan
BMEP	Biodiversity Monitoring and Evaluation Plan
BoQ	Bill of Quantities
BOD	Biological Oxygen Demand
BRI	Bridge
CAP	Corrective action plan
CFC	Chlorofluorocarbon
CHM	Cultural Heritage Monitor
CO	Carbon monoxide
COD	Chemical Oxygen Demand
CO ₂	Carbon Dioxide
Cr	Chromium
DD	Detailed Design
EA	Executing Agency
EAC	Environmental Assessment Code
EBRD	European Bank for Reconstruction and Development
EC	Electrical conductivity
EcoW	Ecological Clerk of Works
EIA	Environmental Impact Assessment
EHS	Environmental Health and Safety
EMP	Environmental Management Plan
EM	Environment Manager
ERP	Emergency Response Plan
ES	Executive Summary
EU	European Union
EWH	East West Highway
EWHIPs	East West Highway Improvement Projects
FE	Iron
FS	Feasibility Study
GDP	Gross Domestic Product
GEOSTAT	National Statistics Office of Georgia
GEL	Georgian Lari
GHG	Greenhouse Gases
GoG	Government of Georgia
GOST	Technical Standard
GRM	Grievance Redress Mechanism
GRC	Grievance Redress Committee
H&S	Health and Safety
HC	Hydrocarbon
IBA	Important Bird Area
IBC	Intermediate bulk storage containers
IFC	International Finance Corporation
IFI	International Finance Institutions
IEE	Initial Environmental Examination
IES	International Environmental Specialist
IUCN	International Union for Conservation of Nature

LARP	Land Acquisition and Resettlement Plan
LC	Least Concern
LCF	Local Consulting Firm
MELT	Modified Eccentric Loader Terminal
MAC	Maximum Allowable Concentrations
MCA	Multi-criteria analysis
MoEPA	Ministry of Environment Protection and Agriculture
MoESD	Ministry of Economy and Sustainable Development
MPE	Maximum Permissible Emission
MPC	Maximum permissible concentrations
MPD	Maximum Permissible Discharges
MSDS	Material Safety Data Sheet
NEA	National environmental agency
NES	National Environmental Specialist
NGO	Non-Governmental Organization
NH ₄ ⁺	Ammonium
Nm ³	Normal cubic meter
NO _x	Nitrogen oxides
NO ₂	Nitrogen Dioxide
NO ₃	Nitrate
Ni	Nickel
NT	Near Threatened
OHS	Occupational Health and Safety
PA	Per Annum
PAP	Project Affected Person
PAH	Polycyclic aromatic hydrocarbons
PCR	Physical and cultural resources
PPV	Peak Particle Velocity
Pb	Lead
PM	Particulate matter
POPs	Persistent organic pollutants
PO ₄	Phosphate
PMU	Project Managing Unit
PPE	Personal Protective Clothing
PPTA	Project Preparatory Technical Assistance
PPM	Parts per million
SPM	Suspended Particulate Matter
RD	Road Department
RoW	Right of Way
SFF	State Forest Fund
SniP	Construction Standards
STD	Sexually transmitted diseases (such as HIV/AIDS)
SEMP	Specific Management Plan
SO ₂	Sulfur Dioxide
SPS	Safeguard Policy Statement
TEM	Trans-European North-South Motorway
TMP	Traffic Management Plan
TOR	Terms of Reference
TSP	Total Suspended Particulates
TSS	Total suspended solids
UNEP	United Nations Environment Program
USD	United States Dollar
UST	Underground Ground Storage Tank
VU	Vulnerable
WB	World Bank
WMP	Waste Management Plan

Units of Measurement

HP	Horsepower
HZ	Hertz
in/sec	Inch per second (25.4mm/sec)
Km	Kilometer
km/h	Kilometers per Hour
Km ²	Square kilometer
L _{eq}	Equivalent Continuous Level
mg/l	Milligram per liter
mg/m ³	Milligram per cubic meter
mg/kg	Milligram per kilogram
m ³ /s	Cubic meters per second
m ³ /h	Cubic meters per hour
m ³ /d	Cubic meter per day
M	Meter
m ²	Square meter
m ³	Cubic Meter
m ³ /s	Cubic meter per second
MtCO ₂ e	Million tons of CO ₂ equivalent
PPM	Parts per million
°C	Degrees Celsius
µg/m ³	Micrograms per cubic meter

Exchange Rates

Currency Exchange Rates as of 16 February 2023

1 US\$ = 2.63 (GEL)

(\$ refers in this report to US-Dollars)

Executive Summary

Introduction

1. The Environmental Impact Assessment (EIA) for the Kvesheti – Kobi portion of the North – South Corridor Road Project, or the “KK Project” has been completed and disclosed by both the Asian Development Bank (ADB) and the European Bank for Reconstruction and Development (EBRD), known forthwith as the “Lenders”. Construction of the road is now underway with commencement of the work formally given on 1 October 2020.
2. As part of the Project, a permanent access road between the main highway at Zakatkari and Gudauri is also planned. This access road was not fully assessed as part of the original EIA and therefore this Initial Environmental Examination (IEE) has been prepared to ensure that the access road, referred to as the “Access Road Project” or “ARP”, complies with the ADB Safeguard Policy Statement (2009) as ADB will be the financier of the ARP.¹
3. This IEE has been completed as part of the process of compliance with the ADB Safeguard Policy Statement (SPS, 2009) in relation to the ARP and provides a road map to the environmental measures needed to prevent and/or mitigate negative environmental effects associated with the Project. The IEE provides a detailed description of the direct and indirect environmental effects associated with the proposed Project during key periods of work. More specifically, the IEE:
 - Describes the existing socio-environmental conditions within the immediate ARP area (the wider environment is described in detail in the KK Project EIA);
 - Describes the ARP design, construction activities and operational parameters;
 - Describes the extent, duration and severity of potential impacts;
 - Analyzes all significant impacts; and
 - Formulates the mitigation actions and monitoring program and presents it all in the form of an Environmental Management Plan (EMP).
4. Based on the existing ADB SPS, 2009, this Project falls under ADB’s project Category B due to limited scale and scope of works with potential impacts such as air quality, noise etc. being mostly site specific and short term in nature.

Project Description

5. The ARP comprises a short section of new road, approximately 5 km in length, connecting the KK Project road at Zakatkari interchange with an existing road just south of Gudauri. The road will comprise two lanes, 3.5m in width with a design speed of 60 km per hour. The road is intended to serve as a link between the new KK Project road and the existing road to Gudauri from Tbilisi, thereby avoiding a dangerous set of hairpin turns which currently provide access to Gudauri immediately after Arakhveti, adjacent to the Aragvi river.
6. This ARP will be financed by ADB as part of the overall KK Project with the Ministry of Regional Development and Infrastructure (MRDI) as the Executing Agency (EA) on behalf of the Government of Georgia (GoG) and the Roads Department (RD) of the MRDI as the implementing agency (IA).

¹ ARP is located within Lot 2 which is financed by ADB. EBRD co-finance Lot 1.

Alternatives Considered

7. Several alternatives were considered as part of the KK Project in general and the ARP. The following summarizes the alternatives considered.
8. “No Action” alternative: In this instance, it means that for road users to get to Gudauri, they would have to continue using the existing road. This issue was assessed in depth as part of the KK Project EIA. The “No Action” Alternative would see the continued deterioration of the existing road pavement and its drainage structures and a potential continuation of the high ratio of accidents noted in the KK Project EIA along with difficulties in maneuvering heavy goods vehicles (HGVs), especially in the areas with hairpins, leading to a high level of delays and is thus not a viable option.
9. Upgrading of Existing Road (Alternative Zero): Since there are a range of technical and safety issues relating to the existing road, thus while technically it is possible to upgrade it, but it will not resolve the key issues due to the following factors:
 - Pavement can be upgraded by adding safety barriers and slightly upgrading the alignment at some curves but these actions would not have significant impacts on the landscape/local communities along the existing alignment, but functionality and safety of the road would remain at the same levels. So, to significantly upgrade the safety and functionality of the existing road, the current alignment would need to be significantly changed with a resulting significant impact on the landscape and the local communities.
 - Since currently there is no alternative route to Kobi from Kvesheti (and no detour route), the construction period of several years would have huge impacts on road users and the local community as portions of the road are closed to allow for construction works. This could have significant impacts on the local economy for several years, including the Gudauri tourist area.
 - The existing road is located along a bird migration corridor, that goes along the Aragvi river close to portions of the fragmented Kazbegi National Park. The proposed ARP completely avoids the Aragvi river, thereby reducing potential impacts to this area and the newly extended Kazbegi National Park.
 - Regarding issues such as increased vehicle emissions and noise, the ARP will generate additional levels of air emissions and noise along its alignment on the plateau, the impacts of which are assessed in the main body of this IEE. However, traffic currently bypassing Mleta will drastically decrease meaning improved air quality and lower noise levels for the villagers in this location.

Given all the above constraints Alternative Zero was ruled out for further consideration.

10. Alternative Alignment: Only one alteration to the alignment is required based on the planned design in these figures. This change is based on the findings of the cultural heritage surveys undertaken as part of the KK Project and this IEE to avoid the Sameba Complex (including a tower and its associated structures). Accordingly, an alternative alignment has been provided to avoid this site.

Existing Conditions

11. The following section summarizes the most relevant socio-environmental characteristics in the Project area.
12. Soils and Geohazards - Geologically, the ARP is located within an area of quaternary volcanic rock, mainly volcanic lavas and tuffs (discordant calc-alkaline andesitic and dacitic continental lavas). The study area is in the 9-point earthquake zone (MSK 64 scale).

13. Hydrology - The only river within the immediate vicinity of the ARP is the Kvishkhevi, also known locally as simply the Khevi river. The rivers main flow is during the spring and autumn periods. Anecdotal information indicates that the river water is not used for any purposes, such as potable water, or cooking water. Other major rivers such as the Aragvi and Khadistkali river can be found in the wider area. The region is rich in ground water. Within the KK Project area and the ARP Project area. a system of fissure aquifers in the Mesozoic sediments and in the volcanic rocks is present. Discussions with local villagers have indicated that there is no mineral water source on the Didveli plateau.
14. Climate - Dusheti municipality comprises medium and high mountain areas. Elevation ranges from 870m to 4,000 masl, therefore the climate conditions are rather diverse. In the lower areas, the climate is moderately humid with mild winter and warm lengthy summer. Average annual temperature in the low-sited areas (870-899 masl) is 9.7 °C. Precipitation level is around 750mm. In the higher-sited areas the climate is more humid, precipitation level increases and ranges from 1,200 till 1,600mm.
15. Air Quality - The ARP is in a remote rural region of Georgia. No point sources of significant emissions are present within the ARP area. The only source of emissions to air within the ARP corridor are from the occasional vehicles and from any wood burning for heating or cooking in the local villages. Air quality monitoring for six key pollutant parameters (PM₁₀, PM_{2.5}, SO₂, NO₂, CO and O₃) at three different locations and all parameters were within the project standards.
16. Habitat - Based on the ecological surveys conducted, mainly along the existing track from Zakatkari to the main road to Gudauri, several different habitats were identified, all of which are modified habitat apart from some small portions of 'Wet Meadows' which are natural habitat. The wet meadows are at distance of more than 150m from the alignment and they are not anticipated to be directly affected by the ARP
17. Designated Sites - The Kazbegi National Park is the only nationally designated area close to the Project area, its nearest point being several hundred meters away to the west of the existing road to Gudauri. The ARP is also located close to the Kazbegi IBA/KBA, but does not cross into it, and in fact the portion of the Kazbegi IBA/KBA closest to the ARP is occupied by residential and agricultural properties. None of these sites are critical habitat or priority biodiversity features.
18. Notable Flora - The KK Project EIA concluded that overall no Critically Endangered or Endangered flora species (either IUCN RL or Georgian RL) have been recorded from the KK Project area. All species identified as potentially present within the KK Project area to be affected are considered common across the region and this is considered also to be the case for the ARP area.
19. Notable Fauna - According to the KK Project EIA only three IBA trigger species of birds could potentially be present in the KK / ARP area. Further analysis indicated that, in fact, only one of these species is known to be present in the ARP area - Corncrake (*Crex crex*). No large mammals were identified during pre-construction surveys undertaken by the KK Project Lot 2 Contractor on the Didveli plateau during spring 2021. Bat surveys were undertaken as part of the Supplementary Ecological Survey (2019) in parts of the Didveli plateau, including close to Zakatkari and Kaishaurni. The survey, undertaken on 20/06/2019, noted that 'high bat activity was observed' – but none of the bats identified as special status. Kazbegi Birch Mouse (*Sicista kazbegica*) (IUCN: EN, GRL:VU) may also be present in the Project area.
20. Physical Cultural Resources - Surveys and desk top analysis identified several sensitive receptors within the Project corridor including the Sameba Complex. In addition, the NACHP also recognizes the wider area as a historically established cultural landscape

21. Noise - No sources of significant levels of noise are present within the ARP area. Noise monitoring was undertaken at three locations within the ARP area to determine the baseline conditions with values ranging between 40.1 up to 47.7 dBA.

Key Impact Identification

22. Air Quality - Lack of foresight in the siting of construction camps, rock crushing plants, concrete batching plants in the pre-construction phase could lead to significant air quality impacts in the construction phase, especially to sensitive receptors with residents located within 350 m of the project site boundary. During construction of the road, air quality may be degraded by a range of operational activities including; exhaust emissions from construction machinery; open burning of waste materials; and dust generated from haul roads, unpaved roads, exposed soils, material stockpiles, etc. This can lead to health impacts to locals and impacts to ecology and crops.
23. The main source of air pollution during the operational phase will be vehicles moving on the highway. The main pollutants from vehicles are: NO₂; SO₂; carbon dioxide (CO₂); and particulate matter (PM). An assessment of impact on air quality during operation of the highway was performed. Traffic data provided by the ADB was used as a basis for calculation. The model results were based on 2049 traffic volumes to simulate the worst-case scenario. The model concluded that the limit value for all particulate matter emissions (PM₁₀ and PM_{2.5}) is not expected to be exceeded. Further, all modelled gas emissions are well below Project standards in 2049.
24. Soils and Geology - Soil erosion can occur on embankments and around structures if adequate consideration of this issue is not provided in the design phase. Potential soil contamination is a possibility in the construction phase resulting from poorly managed fuels, oils and other hazardous liquids used during the project works. It is also possible, that without adequate protection measures, soil erosion could occur on road embankments, areas of cut and at material stockpiles.
25. Hydrology - No impacts to surface water have been identified that have not been assessed as part of the KK Project EIA. No groundwater users have been identified that could be impacted by ARP activities.
26. Biodiversity - The KK Project EIA identified several generic potential impacts relating to biodiversity. These generic impacts are also directly applicable to the ARP. Impacts specific to the ARP include:
- Protected and Notable Sites – The ARP never enters or overlaps any of the identified sites. As such, direct impacts to these sites are not anticipated. It should be noted that the existing road does enter the Kazbegi KBA / IBA and is adjacent to the Kazbegi National Park. The ARP will help remove nearly all road traffic from these areas, a significant benefit of the ARP.
 - Notable Habitat – The ARP alignment avoids both wet meadows identified in this IEE.
 - Notable Species – As noted by the KK Project EIA, many species are present within the broader project area. None of these are expected to trigger Critical Habitat or Priority Biodiversity Features in line with PR6. Potential impacts to notable species include direct mortality, fragmentation of habitats, visual and noise disturbance and impacts from pollution.
27. Waste Management and Spoil Disposal - Road construction will inevitably generate solid and liquid waste products including inert waste and hazardous waste. In addition, uncontrolled discharges of sewage and 'grey water' from construction sites and worker's camps may also cause odors and pollute local water resources.
28. During operation, roadside litter may accumulate along the road which could also lead to accidents and could also become caught up in rivers, trees and bushes making the waste difficult to remove. Uncollected roadside waste may attract vermin, entrap or poison animals in their habitats.

29. Social Infrastructure (including Utilities) - Several utilities are located within the ARP corridor and one school has been identified in Seturni with one pupil. Construction works, specifically earthworks, have the potential to impact upon the gas pipelines where the road alignment directly crosses these pipelines. No other utilities are anticipated to be directly impacted by the ARP.
30. Land Acquisition and Compensation - Construction of the ARP will necessitate the acquisition of several land plots along the alignment. The census identified 79 AHs with 229 APs. 3 of the AHs are classified as vulnerable. However, there will be no physical resettlement under the ARP.
31. Access - There are 24 access points to properties and land along the alignment while current designs do not show the presence of any road crossings for livestock, and this could lead to potential vehicle/livestock collisions during the operational phase.
32. Health and Safety - Construction activities may result in road traffic accidents between vehicles, pedestrians and vehicles and livestock and vehicles. Migrant workers may also increase community health and safety risks, for example, through the spread of sexually transmitted diseases. Workers' rights including occupational health and safety need to be considered to avoid accidents and injuries, loss of man-hours, labor abuses and to ensure fair treatment, remuneration and working and living conditions. The increased flow of traffic across the plateau during the operational phase may lead to traffic accidents involving livestock.
33. Lighting - The ARP is, in effect, an extension of the KK Project road and therefore all potential impacts associated with street lighting, work zone lighting and camp site lighting noted in the KK Project EIA are applicable to the ARP, e.g. light spill and glare.
34. Noise - The KK Project EIA concluded that construction traffic and equipment could generate noise levels in neighboring residential areas, including Zakatkari, between 65 and 80dBA. Similar noise levels can be anticipated in the villages along the ARP alignment.
35. An operational noise model was developed for 4 different variants namely, year 2025, year 2030, year 2035 and year 2040. It was assessed that moderate and major exceedances have been identified at five receptors across the different time variations and the construction of noise barriers is necessary to minimize noise impacts to an acceptable level.
36. Vibration - A vibration model prepared for this IEE assuming construction works consisting of the worst-case scenario from a vibration standpoint of conducting percussive piling has indicated that there is one property that may potentially suffer cosmetic damage during the construction phase. However, as noted earlier no piling is anticipated on the ARP and therefore no impacts to this property are anticipated. During the operational phase highway traffic is not likely to have any measurable impact on the structures or on comfort.
37. Physical Cultural Heritage and Cultural Landscape - General construction activities and specifically earthworks and excavations have the potential to impact upon existing PCR in the Project area. Most of the identified receptors do not overlap with construction zones. Therefore, these sites are unlikely to be impacted by project works, although as requested by the NACHP, they should be carefully monitored. The exception is the Sameba Complex, which was directly within the zone of construction, and re-alignment of ARP has already been considered and an updated design prepared by the Contractor. It is also possible that during excavation additional archeological finds could occur that have not been recorded to date.
38. Once opened, the ARP will alter the landscape which has been recognized as an established cultural landscape, although to a lesser degree perhaps than the neighboring Khada Valley. The first couple of kilometers of the road will have an impact with some areas of excavation and fill

altering the natural landscape and the views from towers on the upper plateau looking towards the lower plateau.

Proposed Key Management and Mitigation Actions

39. The KK Lot 2 Contractor will also be responsible for ensuring all the mitigation measures currently used for the KK road are extended to the ARP. However, several additional mitigation and management measures have been identified in this IEE, and these also need to be implemented by the Lot 2 Contractor. They are summarized below.
40. Air Quality – The KK Lot 2 Contractor will update his Air Quality Management Plan to include the ARP and will include the mitigation & monitoring measures for Lot 2 within the scope of ARP activities, e.g., for the management of dust and combustion emissions. Additional measures for the management of odor and volatile organic compounds are also included in the EMP addendum found in Appendix A.
41. Climate Change – The Lot 2 Contractor will identify drainage systems that might have insufficient capacity and increase dimensions accordingly in his design.
42. Geohazards - Ensure that all national design codes are followed.
43. Biodiversity – Lot 2 Contractor will expand his current activities to cover ARP. In addition, wet Meadows will be fenced off for the duration of construction and signs erected to ensure that workers do not enter these areas. Habitat removal within the RoW will be undertaken outside the Corncrake breeding season (mid-May to end-August) and a survey of habitat to be cleared prior to construction including specific surveys for endemic plants will be completed.
44. Waste Management and Spoil Disposal - Revise the existing Spoil Disposal Plan and update as needed to reflect any ARP specific issues.
45. Social Infrastructure (including Utilities) - Designs should ensure that the pipelines can remain in-situ while at the same time all safety codes for gas transmission are respected. Close coordination between the RD, TSO, Engineer and Contractor will be required during the final design and construction phases of the Project. Lot 2 Contractor will also update his emergency response plan to include working in the vicinity of the gas pipelines. The ERP should include a specific section relating to awareness and training of the workforce operating in this area.
46. Access – The Lot 2 Contractor will update the Traffic Management Plan to ensure that the ARP is included. During operation traffic signs will be provided to warn road users of the presence of livestock and pedestrians, and the speed limit upon leaving the main highway, which will be limited to 60 km/h.
47. Health and Safety - Extend the KK road safety awareness program to villages across the Didveli plateau.
48. Noise – Temporary noise barriers will be installed, if needed during construction where noise levels are negatively impacting upon residents. Permanent noise barriers will be installed per the requirements of the noise model, as summarized in this IEE.
49. Physical Cultural Heritage and Cultural Landscape – For Sameba Complex, the preferred mitigation measure was to change the alignment to avoid direct impacts to this site and it has already considered and implemented based on NACHP recommendation. Vibration monitoring will also be undertaken as needed at this site and other sensitive sites determined by this IEE. The

Lot 2 Contractor will also provide adequate protection (fencing, barriers, signage, etc.) during construction of sensitive PCRs determined by this IEE.

Consultations

50. Stakeholder engagement has been undertaken throughout the development of the Project, with the view to determining and responding to the views of interested and parties potentially affected by the Project throughout the life of the Project, and ensure open and transparent, two-way communication between the Road Department and stakeholders.
51. Two rounds of comprehensive stakeholders' consultations with local communities and institutional stakeholders were organized. The first and second rounds of public consultations was conducted on 23rd March 2022 and 24th May 2022 respectively. The first consultation meeting focused on providing information to the project affected persons on the activities envisaged in the Resettlement Action Plan and IEE while the second meeting focused on providing project information to the stakeholders along with details on the land acquisition and resettlement procedures and to receive feedback from the affected persons. Where relevant, the concerns of the stakeholders have been incorporated into the report and mitigation measures proposed.

Monitoring Actions

52. Monitoring of the mitigation and management measures in this IEE will be completed by the KK Road Lot 2 Contractor using his existing environmental and social team. Monitoring will be expanded into the ARP once construction works commence following the same format and reporting procedures as currently used under the KK EIA.

Conclusions & Implementation

53. This IEE has established that, except for the residual impacts mentioned below, there are no significant environmental issues that cannot be either totally prevented or adequately mitigated to levels acceptable to the national and international standards for Project activities.
 - Dust. Despite several targeted mitigation measures, it is still possible that dust could be a nuisance around construction zones and haul routes, specifically during the summer months.
 - Special Status Species. To ensure that Corncrakes are not harmed, or a breeding cycle is not lost (adult survival is under 30%), habitat removal within the RoW will be undertaken outside the breeding season (mid-May to end-August). This will ensure that no nests are lost, and that species are only displaced from the project area to breed elsewhere. However, it is still possible that some minor impacts to Corncrake could occur.
 - Unmet employment expectations. Although efforts will be made to manage employment expectations, it is likely that members of the local community who are not selected for jobs are likely to be disappointed with the selection process. However, the numbers are likely to be relatively small and therefore the impacts are of low significance.
 - Loss of key workers to the ARP. No specific mitigation measures have been provided for this issue, which is an unavoidable consequence of the project. However, the initial impacts are of low significance and therefore residual impacts will also be low.
 - Sexual Exploitation, Abuse and Harassment. Training of the workforce and development of the Gender Action Plan should help mitigate Impacts. However, such incidents cannot be completely ruled out. Therefore, any such incidents should be followed up with instant dismissal and reporting to the relevant authorities to take legal action.
 - Land Acquisition. Residual impacts are anticipated to be low if the LARP is implemented correctly. A GRM has been prepared to manage complaints received during this process.

- Disposal of spoil material. The Lot 2 Contractor shall revise his existing spoil disposal plan to include the additional material from the ARP.
 - Accidents involving humans and livestock. Implementation of the KK Project EIA mitigation measures and ensuring that hazardous worksites are demarcated should reduce the potential for accidents involving the local community. However, accidents cannot be entirely ruled out. Residual impacts are of low significance.
 - General construction noise. Implementation of the mitigation measures in this IEE and within the KK Project EIA should ensure that impact significance is reduced to low.
 - Traffic Noise. Construction of the proposed noise barriers will ensure that in nearly all cases there is no significant impact.
 - Construction works damaging cultural objects. Demarcating the site and providing information to workers in the area of the PCR should reduce potential impact significance to low.
 - Construction works damaging Sameba Complex. Moving the alignment from the Sameba Complex and undertaking pre-construction survey work will ensure that any impacts to this site will be of low significance.
54. A detailed EMP was provided for the KK Project Lot 2. Most of the requirements of the KK Project Lot 2 EMP remain valid for the ARP and these requirements are included within existing contracts with the KK Project Lot 2 Contractor. However, some site-specific mitigation and management measures have also been identified by this IEE and those measures are provided as a Lot 2 EMP addendum in Appendix A. The RD will ensure that this EMP addendum is implemented by the Contractor and the RD themselves.

I. Introduction

I.1. Project Background

55. The Environmental Impact Assessment (EIA) for the Kvesheti – Kobi portion of the North – South Corridor Road Project, or the “KK Project” has been completed and disclosed by both the Asian Development Bank (ADB) and the European Bank for Reconstruction and Development (EBRD), known forthwith as the “Lenders”. Construction of the road is now underway with commencement of the work formally given on 1 October 2020.
56. As part of the Project, a permanent access road between the main highway at Zakatkari and Gudauri is also planned. This access road was not fully assessed as part of the original EIA and therefore this Initial Environmental Examination (IEE) has been prepared to ensure that the access road, referred to as the “Access Road Project” or “ARP”, complies with the ADB Safeguard Policy Statement (2009) as ADB will be the financier of the ARP.²

I.2. Project Overview and Objectives

I.2.1. Project Overview

57. The ARP comprises a short section of new road, 5km in length, connecting the KK Project road at Zakatkari interchange with an existing road just south of Gudauri. The entire alignment is located on the Didveli plateau which will also be referred to in this report as the “plateau”. The road will comprise two lanes, 3.5m in width with a design speed of 60km per hour. The road is intended to serve as a link between the new KK Project road and the existing road to Gudauri from Tbilisi, thereby avoiding a dangerous set of hairpin turns which currently provide access to Gudauri immediately after Arakhveti, adjacent to the Aragvi river.

I.2.2. Project Implementation

58. This ARP will be financed by ADB as part of the overall KK Project budget following a minor change in scope to the existing project loan agreement. The Ministry of Regional Development and Infrastructure (MRDI) is the Executing Agency (EA) for the KK Project on behalf of the Government of Georgia (GoG), and the Roads Department (RD) of the MRDI is the implementing agency (IA).

I.3. Purpose of the IEE

59. This IEE has been completed as part of the process of compliance with the ADB Safeguard Policy Statement (SPS, 2009) in relation to the ARP. The IEE provides a road map to the environmental measures needed to prevent and/or mitigate negative environmental effects associated with the Project. The IEE provides a detailed description of the direct and indirect environmental effects associated with the proposed Project during key periods of work. More specifically, the IEE:
- (a) Describes the existing socio-environmental conditions within the immediate ARP area (the wider environment is described in detail in the KK Project EIA);
 - (b) Describes the ARP design, construction activities and operational parameters;
 - (c) Describes the extent, duration and severity of potential impacts;

² ARP is located within Lot 2 which is financed by ADB. EBRD co-finance Lot 1.

- (d) Analyzes all significant impacts; and
- (e) Formulates the mitigation actions and monitoring program and presents it all in the form of an Environmental Management Plan (EMP).

I.4. Report Structure

- 60. Section 1: Introduction – The section in hand provides the introductory information.
- 61. Section 2: Legal, Policy and Administrative Framework – This section presents an overview of the policy/legislative framework as well as the environmental assessment guidelines of Georgia that apply to the proposed project. Most of this section remains unchanged from the KK Project EIA, and as such reference is made to this document throughout this section of the IEE.
- 62. Section 3: Description of the ARP – Section 3 describes the Project design and construction activities.
- 63. Section 4: Assessment of Alternatives – This section presents a summary analysis of the ‘no project’ alternative as well as any alternative alignment options.
- 64. Section 5: IEE Approach – Section 5 outlines the methodology used to complete the assessment.
- 65. Section 6: Description of the Environment – This section of the report discusses the local environmental baseline conditions. This section is divided into subsections relating to:
 - (a) Physical: geology and soils; topography; climate and air quality; hydrology and geohazards.
 - (b) Biological: flora and fauna (including Red List species) and nationally and internationally designated sites.
 - (c) Social: population; communities; demographics; employment and socioeconomics; land use; infrastructure (including local access roads); public health and safety; physical cultural heritage; waste management and noise.
- 66. Surveys have been conducted to address important gaps in the existing data and to collect up-to-date information on topics and areas where potentially significant negative impacts may occur, specifically biodiversity and cultural heritage.
- 67. Section 7: Environmental Impacts and Mitigation Measures – Outlines the potential environmental impacts and proposes mitigation measures to manage the impacts. The residual impacts of the ARP are also presented. This portion of the report also discusses cumulative impacts of the proposed ARP and other planned or on-going projects in the region as well as any potential induced impacts of the ARP. No specific transboundary impacts have been identified.
- 68. Section 8: Public Consultation, Information Disclosure – Section 8 provides a summary of all the stakeholder consultation activities undertaken. ARP Grievances will be managed in line with the existing KK Project EIA.
- 69. Section 9: Environmental Management Plan – This section of the IEE comprises an Environmental Mitigation Plan and an Environmental Monitoring Plan which is specific to the ARP. The EMP does not repeat all the mitigation measures already provided under the KK Project EIA which are also applicable to the ARP.
- 70. Section 10: Conclusions and Recommendations – The final section of the IEE provides the report conclusions and recommendations, including a description of any residual impacts.

2. Policy, Legal and Administrative Framework

2.1. Overview

71. The KK Project EIA provides a detailed outline of:

- (a) Environmental Legislation of Georgia;
- (b) The Administrative Framework;
- (c) Environmental Regulations and Standards of Georgia;
- (d) National Technical Regulations Relevant to the Project;
- (e) Environmental Permitting Procedure;
- (f) Permit and Licenses Required for Off-site Works During Construction; and
- (g) International Conventions Relevant to the Project Ratified by Georgia;

72. Most of this section remains unchanged from the KK Project EIA, and as such reference is made to this document throughout this chapter.

2.2. General

73. Georgian legislation comprises the Constitution, environmental laws, international agreements, subordinate legislation, normative acts, presidential orders and governmental decrees, ministerial orders, instructions, and regulations. Along with the national regulations, Georgia is signatory to several international conventions, including those related to environmental protection.

74. The Ministry of Environmental Protection and Agriculture (MoEPA) of the Government of Georgia is responsible for regulating the activities that affect the natural environment.

2.3. Environmental and Social Legislation of Georgia

75. A list of Georgia’s environmental legislation as it pertains to the proposed project is given in Table I.

Table I: List of environmental laws and regulations relevant to the project

Year	Law / Regulation	Consolidated version -Last revision	Code
1994	Law on soil protection	02/11/2021	370.010.000.05.001.000.080
1995	Constitution of Georgia	23/03/2018	010.010.000.01.001.000.116
1996	Law on subsoil	16/12/2021	380.000.000.05.001.000.140
1996	Law on environmental protection	02/03/2021	360.000.000.05.001.000.184
1996	On the system of protected areas	26/04/2022	360.050.000.05.001.000.127
1997	Law on wildlife	17/03/2022	410.000.000.05.001.000.186
1997	Law on water	15/07/2020	400.000.000.05.001.000.253
1999	Law on protection of atmospheric air	17/03/2022	420.000.000.05.001.000.595
1999	Law on compensation of damage from hazardous substances	02/03/2021	040.160.050.05.001.000.671
2000	Law on regulation and engineering protection of the sea and riverbanks	15/07/2020	400.010.010.05.001.000.830
2003	Law on Red List and Red Book of Georgia	16/03/2021	360.060.000.05.001.001.297
2003	Law of Georgia on conservation of soil and restoration-amelioration of soil fertility	02/11/2021	370.010.000.05.001.001.274

Year	Law / Regulation	Consolidated version -Last revision	Code
2005	Law on licences and permits	17/07/2020	300.310.000.05.001.001.914
2007	Law on Tbilisi National Park	23/03/2018	360.060.000.05.001.003.048
2014	Waste code	17/03/2022	360160000.05.001.017608
2017	Environmental Assessment Code	17/03/2022	360160000.05.001.018492
2020	Forestry code of Georgia	15/12/2021	390000000.05.001.019838

76. Brief summaries of the listed documents are provided in the KK Project EIA.

77. Laws and regulations related to social aspects and land ownership applicable to the project are presented in Table 2.

Table 2: List of social and land ownership related laws relevant to the project

Year	Law / Regulation	Last revision	Code
1997	Civil code of Georgia	29/03/2022	040.000.000.05.001.000.223
1999	Law on rules for expropriation of property for public needs	15/07/2020	020.060.040.05.001.000.670
2005	Law of Georgia on Spatial Development and Basis for City-building	20/07/2018	330.090.000.05.001.001.845
2007	Law on cultural heritage	16/11/2021	450.030.000.05.001.002.815
2007	Law on public health	22/12/2021	470.000.000.05.001.002.920
2010	Law on state property	30/12/2021	040.110.030.05.01.004.174
2010	Labor Code	01/12/2021	270000000.04.001.016012
2015	Law on Development of High-mountain Areas	16/03/2021	010110020.05.001.017881
2019	Organic Law of Georgia on Agricultural Land Ownership	25/06/2019	370030000.04.001.017924

78. Brief summaries of the listed documents are provided in the KK Project EIA.

2.4. Action Plans and Strategies

2.4.1. National Biodiversity Strategy and Action Plan

79. The Georgian National Biodiversity Strategy and Action Plan (NBSAP) was adopted in 2005 and updated in 2014. It sets out the goals, objectives and policies for the protection and conservation of biodiversity in Georgia. The initial NBSAP included nine strategic goals to help ensure that Georgia “will be a country where biological diversity is sustained and rehabilitated within a political, social and economic context that favors the wise use of natural resources and adequate benefit sharing” by aiming to:

- (a) Develop a protected areas system to ensure conservation and sustainable use of biological resources.
- (b) Maintain and restore Georgia’s habitats, species and genetic diversity through ex-situ and inter-situ conservation measures, and sustainable use of biological resources.
- (c) Conserve Georgian agrobiodiversity through ensuring its sustainable use and by promoting of ex-situ and in-situ conservation measures.
- (d) Promote sustainable hunting and fishing through adequate planning, restoration, and protection of key biological resource.
- (e) Develop a biodiversity monitoring system and an active and integrated biodiversity database to ensure sustainable use and conservation of biological resources.

- (f) Protect both the human population and biodiversity from potential threats from genetically modified organisms (biotechnology), through strengthening the law and increasing public involvement in decision making.
 - (g) Raise public awareness of biodiversity issues and to encourage public participation in the decision-making process.
 - (h) Ensure appropriate financial and economic programs are in place to support effective conservation of biodiversity, and to ensure the delivery of the BSAP.
 - (i) Further improve national legislation (and associated institutions) relating to biodiversity conservation, through the creation of new, and elaboration of existing laws and regulations, and through ensuring harmonization to international legal responsibilities.
80. The first 10-year period did not see all these fully implemented but did see a number of key achievements including:
- (a) Development of the system of protected areas.
 - (b) Preparation of the National Red List of Georgia based on international criteria and categories.
 - (c) Development of conservation management plans for endangered species and groups of species and launching of their implementation.
 - (d) Initiation of the national biodiversity monitoring system.
 - (e) Ex-situ and/or on-farm conservation of several endemic and endangered plant species and crops.
 - (f) Launching of the Georgian biodiversity clearing house mechanism.
81. The 2014 update to the NBSAP (for the period of 2014-2020) has adopted a more holistic, cross-cutting, and ecosystem-based approach and goes further in terms of formulating a comprehensive policy and defining national priorities. It envisions that by 2030 Georgia *“will be a country with population living in harmony with nature, biodiversity will be commonly valued, biological resources – conserved and wisely used. This will provide natural continuity of ecosystem processes, healthy environment and benefits essential for all people”*.
82. It includes a situational analysis, strategic approaches, and actions in five new areas including Inland water ecosystems, Forest ecosystems, Natural grasslands and Cross-cutting issues and governance. It also seeks to strengthen cross-sectorial cooperation and partnerships amongst key stakeholders³ (including ministries, private sector, NGOs, Universities, and media) and includes 21 national goals for protection of biodiversity, which are in line with key strategic targets of the Convention on Biodiversity and Aichi Targets⁴. These include actions to:
- (a) Address the underlying causes of biodiversity loss through integration of biodiversity issues into governmental activities and public life.
 - (b) Reduce the direct pressures on biodiversity and promote sustainable use of biological resources.
 - (c) Improve the status of biodiversity by safeguarding ecosystems, species, and genetic diversity.
 - (d) Enhance the benefits to all from biodiversity and ecosystem services.
 - (e) Enhance implementation of biodiversity strategy through participatory planning, knowledge management and capacity building.

³ The process was coordinated by a supervision committee under the direction of MoENRP with representation from organisations including WWF (Caucasus Program Office), IUCN (Caucasus Cooperation Centre) and National NGOs such as NACRES, and GreenAlternative as well as Ilia State University.

⁴ <https://www.cbd.int/doc/world/ge/ge-nr-05-en.pdf>

83. A primary goal of the NBSAP to help support national obligations under the EU Association Agreement and facilitate harmonization with EU environmental policy. It is especially important in promoting legislative changes, protection of global and European significance habitats and species and establishment of the “Emerald Network”, and enhancement of the country’s involvement in the regional process of sustainable forestry, such as “European forests” and reconciliation of the Georgian forestry policy, legislation, and standards with EU requirements.

2.4.2. Related Plans

84. In addition to the NBSAP there are several other key National Plans of relevance to biodiversity and conservation as outlined below.

Table 3: Other National Plans

Document	Relevance
National Environmental Action Plan (NEAP 2012)	<p>Outlines overall approach to environmental protection. Includes specific chapters on both biodiversity and protected areas and forests and forestry. The NBSAP includes detailed actions for achieving NEAP goals and objectives such as:</p> <ul style="list-style-type: none"> • Rehabilitation, protection and conservation of viable populations and habitats of selected endangered species; • Improvement of effectiveness of hunting and fishery management to ensure sustainable use of fauna resources; • Development of an effective protected areas network; • Improvement of the effectiveness of the Protected Areas management through the capacity building of its administration and introduction of financial sustainability mechanisms; • Creation of proper databases for biodiversity conservation and sustainable management of biological resources by developing the relevant national biomonitoring system; • Development of background for establishment of a sustainable forestry system; • Mitigation of unsustainable and illegal forest use (logging); • Mitigation of eutrophication.
National Forest Strategy	<p>Aimed at establishment of a system of sustainable forest management to ensure:</p> <ul style="list-style-type: none"> • protection of biological diversity; • effective use of the economic potential of forests considering their ecological value; • public participation in forest management related issues; • fair distribution of derived benefits; <p>Priority is to be given to meeting the needs of the local population, and everybody’s principally free access to forest resources. Restoration of degraded forests and afforestation are also identified as priority areas.</p>
Rural – Agricultural Development Strategy (2015-2020)	<p>Promotes long term agricultural development but includes preservation of biodiversity as a key aim, as well as strengthening cooperation with MoEPA and associated agencies of neighboring countries. Relevant activities include:</p> <ul style="list-style-type: none"> • Introduction of “good agricultural practices”, which will promote mitigation of environmental pollution through optimal application of chemical fertilizers and substances; • Refinement of agrarian ecosystem and natural grassland management systems; • Introduction of the system for biofarm establishment, encouragement, sustainable management and certification. <p>Special emphasis is placed on preservation of agrarian biodiversity and endemic species and it includes actions around:</p> <ul style="list-style-type: none"> • creation of an effectively manageable genetic bank; • detailed inventory and restoration of local species and forms; • informing farmers and other stakeholders of agrarian biodiversity and endemic species.

Document	Relevance
Road Safety Strategy (2022). ⁵	The strategy sets out the key directions recommended by international organizations and global experts for successful and sustainable long-term road safety management in Georgia. The need for the strategy has been conditioned by rising level of registered motor vehicle and necessity to allow Georgia to achieve substantially improved results and sustained success in its road safety activity. The strategy describes national capacity building and shared responsibility for road safety in the state. Developed through capacity review and in consultation with the key governmental partners and road safety stakeholders, the Strategy sets a new long-term vision and goal for road safety in Georgia, stresses benefits of long-term investment in road safety, mentions measures and targets to address the key road safety problems.

2.5. Administrative Framework

85. Details of the administrative framework of the Project can be found in the KK Project EIA.

2.6. Environmental Regulations and Standards

2.6.1. Ambient Air Quality Standards

86. Maximum permissible values for air born pollutants are set by “Technical regulations – Ambient air quality standards” (approved by GoG decree 383, dated 27 July 2018). Note that Georgian values mirror EU standards.

Table 4: Ambient Air Quality Standards

Parameter	Maximum Permissible value*	IFC Guideline Value	EU Ambient Air Quality Guidelines	Averaging period
Sulphur dioxide (SO ₂) µg/m ³	350		350	1 hr
	125	20	125	24 hr
Nitrogen dioxide (NO ₂) µg/m ³	200	200	200	1 hr
	40	40	40	1 year
Particulate matter (PM ₁₀) µg/m ³	50	50	50	24 hr
	40			1 year
Particulate matter (PM _{2.5}) µg/m ³	25	10	25	1 year
Ozone (O ₃) µg/m ³	120	100	120	Daily max. average 8 hr

* Source: Technical regulation on approval of atmospheric air quality standards (approved by GoG on 27/07/2018, document code 300160070.10.003.020699)

Project Air Quality Standards

87. The ambient air quality sampling undertaken for this report and the air quality model will be assessed against National and IFC standards.

2.6.2. Water Quality Standards

Surface Water

88. Surface water quality requirements depend on category of water body (ref. “Technical regulations of protection of surface water from pollution”, approved by decree 425 of the Government of

⁵ National Centre for Disease Control, Georgia, 2016 (<http://www.ncdc.ge/Handlers/GetFile.ashx?ID=6164d012-744c-4077-bdc8-7943b43fe1f7>)

Georgia, 31/12/2013). The categories are (a) household water use, (b) domestic water use, and (c) fisheries. The latter, in its turn, splits in highest, first and second categories.

Table 5: Surface Water quality requirements by water use category

	Water use category			
	Household water use	Recreational water use ⁶	Fisheries	
			Highest and first	Second
	Increase not higher that listed below is allowed			
Suspended solids	0.25mg/l	0.75 mg/l	0.25mg/l	0.75 mg/l
	For rivers with natural content of suspended solids 30mg/l, around 5% increase is allowed			
	If wastewater contains suspended particles with deposition rate above 0.2mm/sec discharge in water reservoirs is not allowed. Discharge of effluents containing suspended particles with deposition rate above 0.4mm/sec is prohibited.			
Floating matter	Patches and films of oil, petroleum products, fats must not be detectable			
Colour	Must not be visible in water column		Water must not have unusual color	
	20cm	10cm	-	
Odor, taste	Water must not have odor and taste of higher than 1 unit intensity		Water must not result in unusual odor and taste in fish	
	After chlorination of other treatment	Without treatment	-	
Temperature	After discharge of wastewater, temperature in water reservoir must not exceed by more than 5% compared to the natural value		For water bodies where cold-water loving fish is found (<i>Acipenseridae</i> , <i>Coregonidae</i>), maximum allowable temperatures in summer and winter are 20C and 5C respectively, for other water bodies 28C (in summer), 8C (in winter)	
pH	Must be in 6.5-8.5 interval			
Water mineralization	<1000mg/l, Incl. chlorides – 350mg/l; sulphates – 500mg/l	To comply with requirement given in section related to taste (see above)	In accordance with taxation	
Dissolved oxygen	Must not be lower than			
	4mg/l	4mg/l	6mg/l	6mg/l
Biological oxygen demand	At 20C must not exceed			
	3mg/l	6mg/l	3mg/l	6mg/l
Chemical oxygen demand	Must not exceed			
	15 mg/l	30 mg/l	-	-
Chemical substances	Must not exceed maximum permissible limits			
Pathogens	Must be free for pathogens, including viable helmint eggs, tenia oncosperes and viable cysts of pathogen organisms			
Toxicity	-	-	At the point of discharge and control section of the river toxic impact must not be observed.	

Groundwater (Drinking Water)

⁶ According to the Technical regulations for protection of surface water from pollution three categories of water use are set:

1. სასმელ-სამეურნეო (хозяйственно-питьевое, literally drinking-domestic) which is generally translated as household water use. This category refers to water bodies for drinking and domestic water use.

2. სამეურნეო-საყოფაცხოვრებო (хозяйственно-бытовое, domestic) which is generally translated as domestic water use. This category includes surface water bodies used for recreation.

3. water for fisheries (which is split in two:– a. highest, first and b. second category)

According to these classification household water includes water for drinking.

89. Groundwater quality standards are not set under Georgian law. Drinking water quality standards are commonly used instead as assessment criteria for groundwater. Quality of drinking water is determined by the “Technical Regulations for Drinking Water” (approved by order №58 of the Government of Georgia, 15.01.2014).

Table 6: Drinking Water Quality Criteria

Parameter	Units	Value
Odour	Unit	2
Taste	Unit	2
Colour	Grad	15
Turbidity	Turbidity units (formazine) or mg/l (kaolin)	3.5 or 2
Metals and Miscellaneous		
Boron, B	mg/kg	0.5
Arsenic, As	mg/kg	0.01
Cadmium, Cd	mg/kg	0.003
Copper, Cu	mg/kg	2
Mercury, Hg	mg/kg	0.006
Nickel, Ni	mg/kg	0.07
Lead, Pb	mg/kg	0.01
Selenium, Se	mg/kg	0.01
Zinc, Zn	mg/kg	3
Total Petroleum Hydrocarbons, TPH	mg/kg	0.1
Cyanide	mg/kg	0.07
Sulphate	mg/kg	250
Chloride	mg/kg	250
pH	pH value	6-9
Sodium, Na	mg/kg	200
Microbiological characteristics		
Thermotolerant coliforms	Bacteria in 100cm ³	not allowed
Total coliforms	Bacteria in 100cm ³	not allowed
Mesophylic aerobes and facultative anaerobes	Colony forming units in 1cm ³	< 50
Colifagues	Negative colonies in 100m ³	not allowed
Sulphitereducing clostridia	Spores in 20cm ³	not allowed
Lamblias and cysts	Cysts in 50dm	not allowed

Effluent Discharge

90. In addition to the above, the IFC provides guidelines values for effluent discharge. The following table provides these values with which the Project shall comply, for example relating to water discharge from construction camps.

Table 7: Indicative Values for Treated Sanitary Sewage Discharges

Pollutant	Unit	Guideline Value
pH	pH	6-9
BOD	Mg/l	30
COD	Mg/l	125
Total Nitrogen	Mg/l	10
Total Phosphorus	Mg/l	2
Oil and Grease	Mg/l	10

Pollutant	Unit	Guideline Value
Total Suspended Solids	Mg/l	50
Total Coliform Bacteria	MPN ^A / 100 ml	400

A – MPN = Most Probable Number

Surface Water Quality and Groundwater Project Standards

91. Construction phase water quality monitoring will be assessed against national standards.

Wastewater Discharge Project Standards

92. Wastewater discharge from construction sites and camps shall be assessed against IFC values (for any treated sanitary sewage discharge).

2.6.3. Noise Standards

93. Admissible noise standards of the IFC and Georgian national standards for residential areas are similar. The national standards for noise are set according to the “Technical regulation – Acoustic noise limits for rooms/premises in residential houses and public establishments” (Document #300160070.10.003.020107, 15/08/2017); see Table 8.

94. For IFC, noise impacts should not exceed the levels presented in Table 9 or result in a maximum increase in background levels of 3 dB at the nearest receptor location off site. Note that Georgian standards refer to the allowable limits indoors, not at the building façade.

Table 8: Georgian Standards for Noise Levels

Purpose/use of area and premises	Allowable limits (dBA)		
	L _{day}		23:00 – 08:00
	08:00 – 19:00, Day	Evening 19:00-23:00	L _{nights} Night
Educational facilities and library halls	35	35	35
Medical facilities/chambers of medical institutions	40	40	40
Living quarters and dormitories	35	30	30
Hospital chambers	35	30	30
Hotel/motel rooms	40	35	35
Trading halls and reception facilities	55	55	55
Restaurant, bar, halls	50	50	50
Theatre/concert halls and sacred premises	30	30	30
Sport halls and pools	55	55	55
Small offices (≤100m ³) – working rooms and premises without office equipment	40	40	40
Small offices (≤100m ³) – working rooms and premises without office equipment	40	40	40
Conference halls /meeting rooms	35	35	35
Areas bordering with houses residential, medical establishments, social service and children facilities (<6 storey buildings)	50	45	40
Areas bordering with houses residential, medical establishments, social service and children facilities (>6 storey buildings)	55	50	45
The areas bordering with hotels, trade, service, sport and public organizations	60	55	50

Note:

I. In case noise generated by indoor or outdoor sources is impulse or tonal, the limit must be 5dBA less than indicated in the table.

2. Acoustic noise limits given above are set for routine operation conditions of the ‘space’, i.e., windows and door are closed (exception – built-in ventilation canals), ventilation, air conditioning, lighting (in case available) are on; functional (baseline) noise (such as music, speech) not considered.

Table 9: IFC Noise Level Guidelines

Receptor	One-hour L_{aeq} (dBA)	
	Daytime 07.00-22.00	Night-time 22.00 – 07.00
Residential; institutional; educational	55	45
Industrial; commercial	70	70

95. For workplace noise the following IFC standards are applicable.

Table 10: IFC Work Environment Noise limits

Type of Work, workplace	IFC General EHS Guidelines
Heavy Industry (no demand for oral communication)	85 Equivalent level L_{aeq} , 8h
Light industry (decreasing demand for oral communication)	50-65 Equivalent level L_{aeq} , 8h

Project Noise Standards

96. For baseline monitoring, and construction and operational phase noise assessment, IFC guideline limits will be followed. For workplace noise, IFC guidelines shall be followed.

2.6.4. Vibration Standards

97. The Georgian Standards for vibration are designed for human comfort. These are shown in Table 11. Note that no Georgian standards for building damage exist.

Table 11: Georgian General Admissible Vibration Values in Residential Houses, Hospitals and Rest Houses, Sanitary Norms 2001

Average Geometric Frequencies of Octave Zones (Hz)	Allowable Values X_0 , Y_0 , Z_0			
	Vibro-acceleration		Vibro-speed	
	m/sec ²	dB	m/sec 10 ⁻⁴	dB
2	4.0	72	3.2	76
4	4.5	73	1.8	71
8	5.6	75	1.1	67
16	11.0	81	1.1	67
31.5	22.0	87	1.1	67
63	45.0	93	1.1	67
Corrected and equivalent corrected values and their levels	4.0	72	1.1	67

Note: It is allowable to exceed vibration normative values during daytime by 5 dB. In this table of inconstant vibrations, a correction for the allowable level values is 10dB, while the absolute values are multiplied by 0.32. The allowable levels of vibration for hospitals and rest houses have to be reduced by 3dB.

98. The German Standard DIN 4150-3 – Vibration in Buildings – Part 3: Effects on structures provides short term and long-term limits⁷ for vibration at the foundation for various structures (see Table 12). This standard is considered international best practice.

Table 12: Guideline Values for Vibration Velocity to be Used When Evaluating the Effects of Short-term and Long-term Vibration on Structures

Group	Type of structure	Guideline Values for Velocity (mm/s)				
		Short-term			Uppermost Floor	Long-term
		At foundation			Uppermost Floor	Uppermost Floor
		Less than 10 Hz	10 Hz to 50 Hz	50 to 100 Hz	All frequencies	All frequencies
1	Buildings used for commercial purposes, industrial buildings and buildings of similar design	20	20 to 40	40 to 50	40	10
2	Residential dwellings and buildings of similar design and/or use	5 (105 dB) ⁸	5 to 15	15 to 20	15	5 (105 dB)
3	Structures that because of their particular sensitivity to vibration, do not correspond to those listed in Lines 1 or 2 and have intrinsic value (e.g., buildings that are under a preservation order)	3 (100.5 dB)	2 to 8	8 to 10	8	2.5 (99.0 dB)

Source: DIN 4150-3, Structural Vibration, Part 3: Effect of vibration on structures

99. DIN 4150-3 notes that “experience has shown that if these values are complied with, damage that reduces the serviceability of the building will not occur. If damage nevertheless occurs, it is to be assumed that other causes are responsible. Exceeding the value in the table does not necessarily lead to damage”.

Project Vibration Standards

100. German Standard DIN 4150-3 will be followed during the construction phase.

2.6.5. Soil Quality

101. Soil quality is currently assessed by Methodological Guides on Assessment of Level of Chemical Pollution of Soil (MG 2.1.7.004-02). However, these limits will soon be replaced as Georgia harmonizes its regulations with the EU and moves away from the outdated standards prepared while part of the Soviet Union. The national standards for soil quality are given in Table 13 along with the limits proposed by MoEPA and the Ministry of Labor, Health, and Social Affairs.

Table 13: Soil screening values

Compound	Units	Current Limit	Proposed Limit
Metals and Miscellaneous			
Arsenic, As	mg/kg	2	30
Cadmium, Cd	mg/kg	2*	0.5** – 1.0***
Copper, Cu	mg/kg	3-132*	60**-100***
Mercury, Hg	mg/kg	2.1	

⁷ Short-term vibrations are defined as those that do not occur often enough to cause structural fatigue and do not produce resonance in the structure being evaluated and long-term vibrations are all the other types of vibration.

⁸ The formula for conversion from mm/s to dB can be found in Appendix E – Vibration Assessment of the KK Project EIA.

Compound	Units	Current Limit	Proposed Limit
Nickel, Ni	mg/kg	4-80*	60** - 80***
Lead, Pb	mg/kg	32-130*	100** - 140***
Zinc, Zn	mg/kg	23-220*	130** - 200***
Total Petroleum Hydrocarbons	mg/kg	1000	-
Cyanide	mg/kg	0,2	-
Volatile Organic Compounds			
Benzene	mg/kg	0.3	0.05
Toluene	mg/kg	0.3	-
Total xylenes	mg/kg	0.3	0.05
Semi Volatile Compounds			
Benzo(a)pyrene	mg/kg	0.02-0.2	0.1
Isopropylbenzene	mg/kg	0.5	-
Pesticides			
Atrazine	mg/kg	0.01-0.5	-
Lindane	mg/kg	0.1	-
DDT (and its metabolite)	mg/kg	0.1	0.075

* Note: Sodium and neutral (clay and clayey) pH >5.5 – No screening value available, ** Light Soils, ***Other Soils

2.7. National Technical Regulations Relevant to the Project

102. Technical (national) regulations applicable to the ARP can be found in the KK Project EIA.

2.8. Environmental Permitting Procedures

103. Environmental permitting procedure is defined in Environmental Assessment Code. The Procedure can be found in the KK Project EIA.

2.9. Licenses, Permits, and Approvals

104. ARP will be required to obtain several permits and consents, of which the main permits and the implementing national legislation are described in Table 14. The Law on Licenses and Permits governs the issue of all permits and consents. Subject to satisfaction of application requirements, all the permits are issued within 30 days from application submission.

Table 14: Permits Register

Permit Required Activity	Permit Title	Issuing Authority	Implementing Law	Responsible Party for Obtaining License
Pre-construction				
Construction activities	Project Design Approval Construction Permit	MoESD	Law of Georgia on Licenses and Permits (last revision 17/07/2020. Document code: 300.310.000.05.001.001.914); Government Resolution N257 “On Terms and Conditions of issuance of Construction Permit”	Not required. KK Project Road permit includes ARP
Construction activities	Land Acquisition - LARP	ADB, MoESD, National Agency of Public Registry of Ministry of Justice, Court	Law on Procedures for Expropriation of Property for Pressing Social Needs, Civil Code (last revision 09/06/2022.	RD

Permit Required Activity	Permit Title	Issuing Authority	Implementing Law	Responsible Party for Obtaining License
			Document code: 040.000.000.05.001.000.223)	
Construction activities	Maximum Admissible Discharge Limits (if required)	MoEPA/(National environmental agency)NEA	Environmental Assessment Code (last version 17/03/2022. Document code: 360160000.05.001.020533), Government Regulation N414 “On Approval of the Technical Regulation on Calculation of Maximum Admissible Discharge Limits (MADL) for Pollutants Discharged with Wastewater in Surface Water Bodies” (last revision 10/12/2014. Document code: 300160070.10.003.017621); EIA	Contractor
Construction activities	Maximum Limits of Emissions(if required)	MoEPA/NEA	Environmental Assessment Code (last version 17/03/2022. Document code: 360160000.05.001.020533), Government Regulation N408 “On Approval of Technical Regulations for Calculating Threshold Limit Values of Emission of Harmful Substances into the Ambient Air,” EIA	Contractor
Construction activities	Water Abstraction from a Surface Water Body (if required)	MoEPA/NEA	Environmental Assessment Code (last version 17/03/2022. Document code: 360160000.05.001.020533), Government Regulation #17 “On Approval of Environmental Technical Regulations” (last version 10/01/2014. Document code: 300160070.10.003.017608), EIA	Contractor
Construction activities	License for abstraction of inert material (if required)	MoESD	Law of Georgia on Licenses and Permits (last revision 17/07/2020. Document code: 300.310.000.05.001.001.914), Law on Fees for the Use of Natural Resources (last version 15/12/2021. Document code: 210.020.000.05.001.001.707)	Contractor
Construction				
Tree felling in state forest lands for ROW and Permanent Facilities (if required)	Forest Use Agreement (if required)	MoEPA	Forestry Code of Georgia (last version 15/12/2021. Document code: 390000000.05.001.019838); Resolution No. 496 of 2021 of Georgian Government on Charter on Granting the Status of Forest and Determining and Correcting/Changing Forest Borders; Resolution No.221 of Government of Georgia on	Contractor

Permit Required Activity	Permit Title	Issuing Authority	Implementing Law	Responsible Party for Obtaining License
			Approval of Rules for Forest Use (last version 21/05/2021. Document Code: 390000000.10.003.022776); Resolution N132 of Government of Georgia on Approval of Regulations on Rules and Conditions of Issuance of Forest Usage License (last version 12/08/2002. Document code: 390.050.020.10.003.000.266)	
Tree felling in state forest lands for Temporary Facilities (if required)	Forest Use Agreement (if required)	MoEPA - National Forest Agency (NFA)	Forestry code of Georgia - last updated 15/12/2021; Resolution No. 496 of 2021 of Georgian Government on Charter on Granting the Status of Forest and Determining and Correcting/Changing Forest Borders; Resolution N.221 of Government of Georgia on Approval of Rules for Forest Use (last version 21/05/2021)	Contractor
Construction or Upgrade of Access Roads (if required)	Approval of Construction or Upgrade Activities	; Local Municipalities	Government Resolution N257 “On Terms and Conditions of issuance of Construction Permit”	Contractor
Spoil Disposal (if required)	Spoil Disposal Approval – Environmental Decision	MoEPA	Law “On Subsoils” (last revision 16/12/2021. Document code: 380.000.000.05.001.000.140); Environmental Assessment Code (last version 17/03/2022. Document code: 360160000.05.001.020533)	Contractor
Running own quarry (in case contractor decides to)*	License for Abstraction of Inert Material	MoESD	Law of Georgia on Licenses and Permits (last revision 17/07/2020. Document code: 300.310.000.05.001.001.914), Law on Fees for the Use of Natural Resources (last version 15/12/2021. Document code: 210.020.000.05.001.001.707)	Contractor
Right on Land	Project’s Registered Rights to Land	MoESD, Court	Law on procedures for expropriation of property for pressing social needs (last revision: 15/07/2020. Document code: 020.060.040.05.001.000.670)	RD
	Approval of the Topsoil Storage	Local Administration, Landowners	Law “On Subsoils” (last revision 16/12/2021. Document code: 380.000.000.05.001.000.140)	Contractor
Waste Management, if required	Approval of Waste Management Plan	MoEPA	Waste Management Code of Georgia (last version 17/03/2022. Document code: 360160000.05.001.017608)	Contractor

Permit Required Activity	Permit Title	Issuing Authority	Implementing Law	Responsible Party for Obtaining License
Re-cultivation Plan, if required	Approval of Re-cultivation Plan	MoEPA	Government Resolution N424 “On Approval of the Technical Regulation on Removal, Storage, Use and Re-cultivation of the Fertile Soil” (last revision 10/01/2014. Document code: 300160070.10.003.017647)	Contractor

Note: Purchase of material from already existing licensed quarries is preferable. In this case, a copy of the license and agreement with the quarry operator must be provided. If contractor already has permit for operation of the asphalt unit – a copy of permit (Environmental decision) must be provided.

105. If wastewater is to be discharge into the surface water body, the Contractor will be obliged to calculate the limits of discharge into the waterbody. The limits are to be approved by the MoEPA/NEA. The quality of wastewater should ensure compliance of recipient surface water quality (in the section located in 1km upstream the point of use) with the limits set in the Annex 1 and 2 to the technical regulation for protection of water from pollution. To protect the surface water quality, for each point of discharge maximum permissible discharge limits must be defined separately. The document (limits of discharge) must set the discharge limits to ensure compliance of recipient water body with the quality standard.

106. For sewage, the following parameters are generally considered – suspended solids, BOD, COD, total N and total P, pH, coliforms. For other (“industrial”) discharge, the list of parameters generally includes – suspended solids, BOD, TPH, and ph. The set of components depends on the type of potential pollutants.

2.10. Construction Permits

107. The Law on Licenses and Permits defines protocols for the issue, amendment, and withdrawal of permits. For projects such as this, a construction permit is needed. Construction permit refers to a different hierarchical permit which, proceeding from the economic interests of permit seekers, is divided into three mutually-dependent but in terms of administrative procedure independent stages: I stage – establishment of urban planning conditions; II stage – endorsement of architectural-construction design; and III stage – issuance of construction permit. The rules and principles defined by this law for permit issuance shall apply to these stages.

108. The responsible authority (the RD) must obtain the following approvals before it gets approval from the Ministry of Economy and Sustainable Development (MoESD):

- (a) Geological conclusions to be issued by National Environmental Agency;
- (b) Cultural heritage clearance to be issued by National Agency of Cultural Heritage;
- (c) Environmental Decision issued by MoEPA;
- (d) Project design approval to be issued by MoESD; and
- (e) Project’s registered rights to land.

2.11. State Forest Fund

109. Procedures for the use of State Forest Fund are provided in the KK Project EIA.

2.12. International Conventions and Agreements

110. Important international environmental treaties that have been signed by Georgia are provided in the KK Project EIA⁹.

1. ⁹ Environmental Impact Assessment for GEO: North–South Corridor (Kvesheti-Kobi) Road Project/December 2018 <https://kveshetikobiroad.ge/wp-content/uploads/2020/09/Environmental-Impact-Assessment.pdf>

3. Description of the Access Road Project

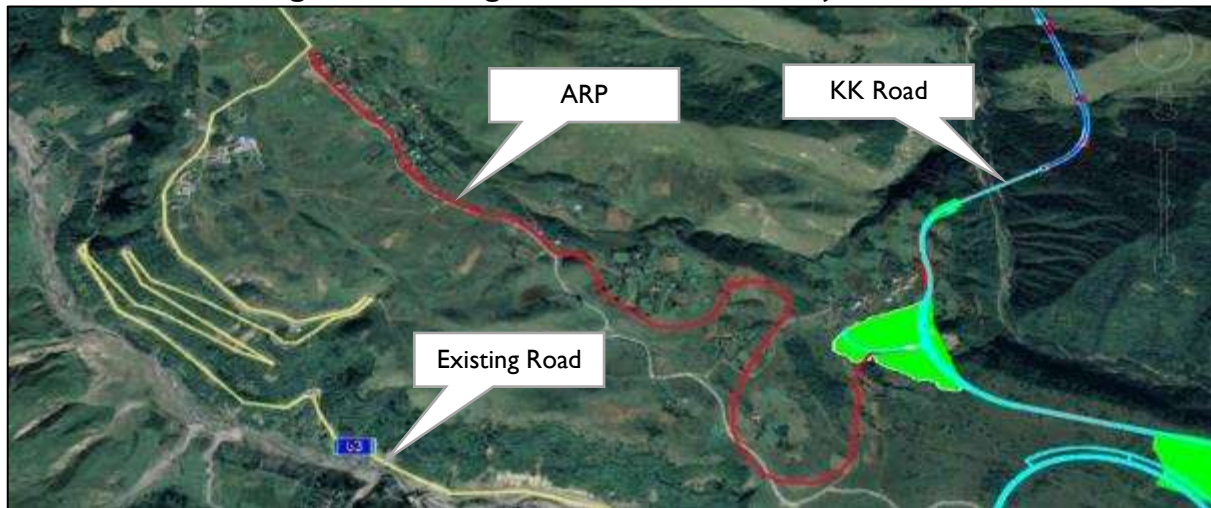
3.1. Introduction

111. This section of the report presents the description of the various ARP components, including the road alignment (based on a detailed design), design parameters and summary of the construction process and activities.

3.2. ARP Overview and Location

112. The ARP is a road construction project. The road is in Dusheti municipality, Mtskheta-Mtianeti region. The ARP comprises the Zakatkari – Gudauri access road and connects the existing road to Zakatkari where it will join up with the KK Project road which is currently under construction.

Figure 1: Existing Road, ARP and KK Project Road



Source: Google Earth

113. The ARP will connect Zakatkari with Gudauri, thereby bypassing the existing road between Arakveti and Gudauri and its dangerous hairpins. An existing unpaved track 2-2.5m in width currently traverses the plateau and connects the villages of Zakatkari, Kaishaurni and Seturni.

Figure 2: Existing Unpaved Track



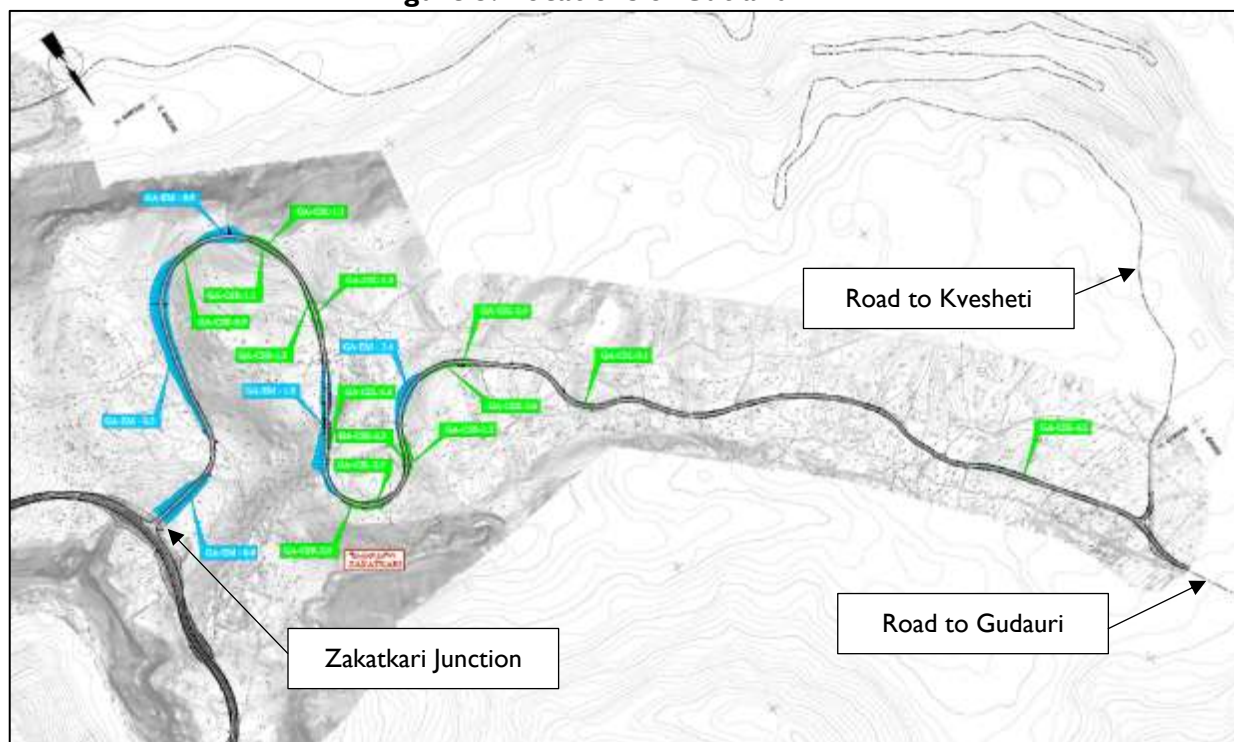
Source: Addendum to the Land Acquisition and Resettlement Plan. June 2019.

114. The only traffic found on this track are vehicles owned by local villagers, and occasional tourists. Run-off on this track is collected by natural narrow drainage ditches only when it rains.

3.3. Proposed Design

115. The alignment axis begins in the chainage 7+760 of the main KK Project road at the grade junction GJ-7.7. The axis contains two very different stretches; the first one is 3.30 km long, (Zakatkar and Kaishauri), it is in the steeper topography of the plateau and where there are no buildings close, the road alignment is completely new because there are only narrow gravel tracks with a very high longitudinal gradient. The new road will require some cut (highlighted in blue) and fill works (highlighted in green) as shown in the figure below.

Figure 3: Locations of Cut and Fill

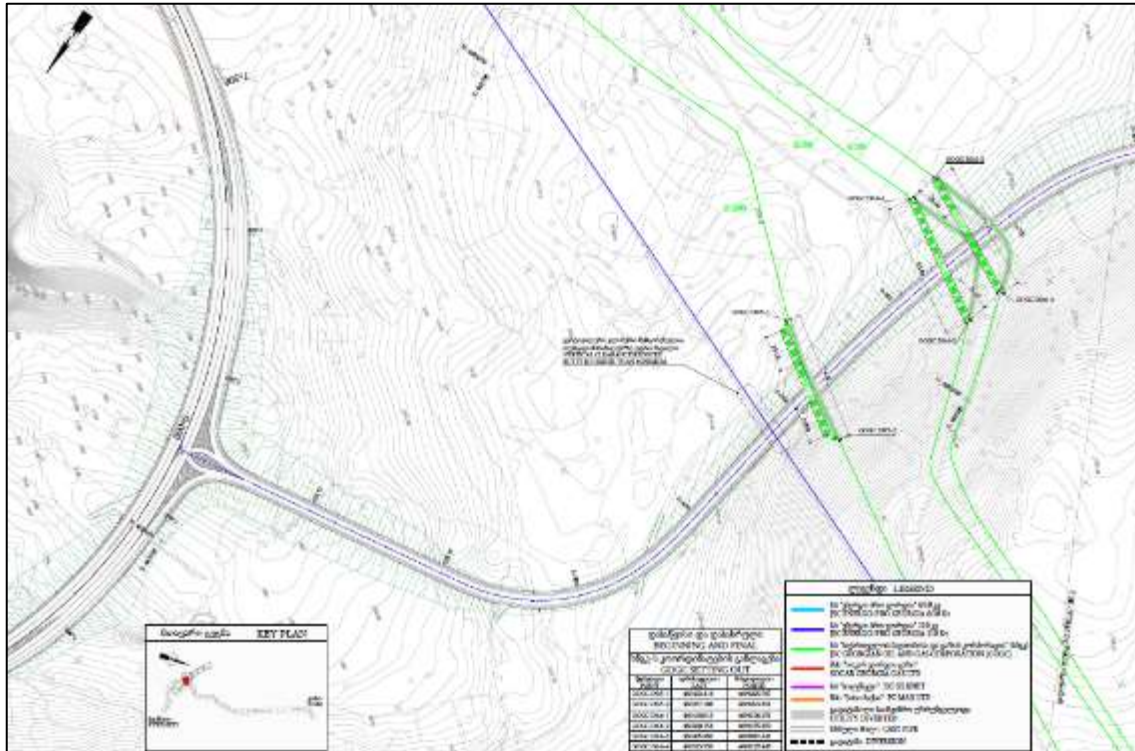


Source: Preparation of Pre - Feasibility Study and Feasibility Study for Jinvali - Larsi Road and Detailed Design for the Construction of Kvesheti -Kobi Road Section. IDOM. 2018

116. The second stretch is 1.66 km long (Seturi - existing road), and it is on the existing unpaved road that connects to the existing international road in Gudauri. The figure above illustrates these features where the cut and fill activities can be seen closer to the Zakatkari junction. The project road bypasses Zakatkar, Kaishauri and does not cross rivers and lakes.

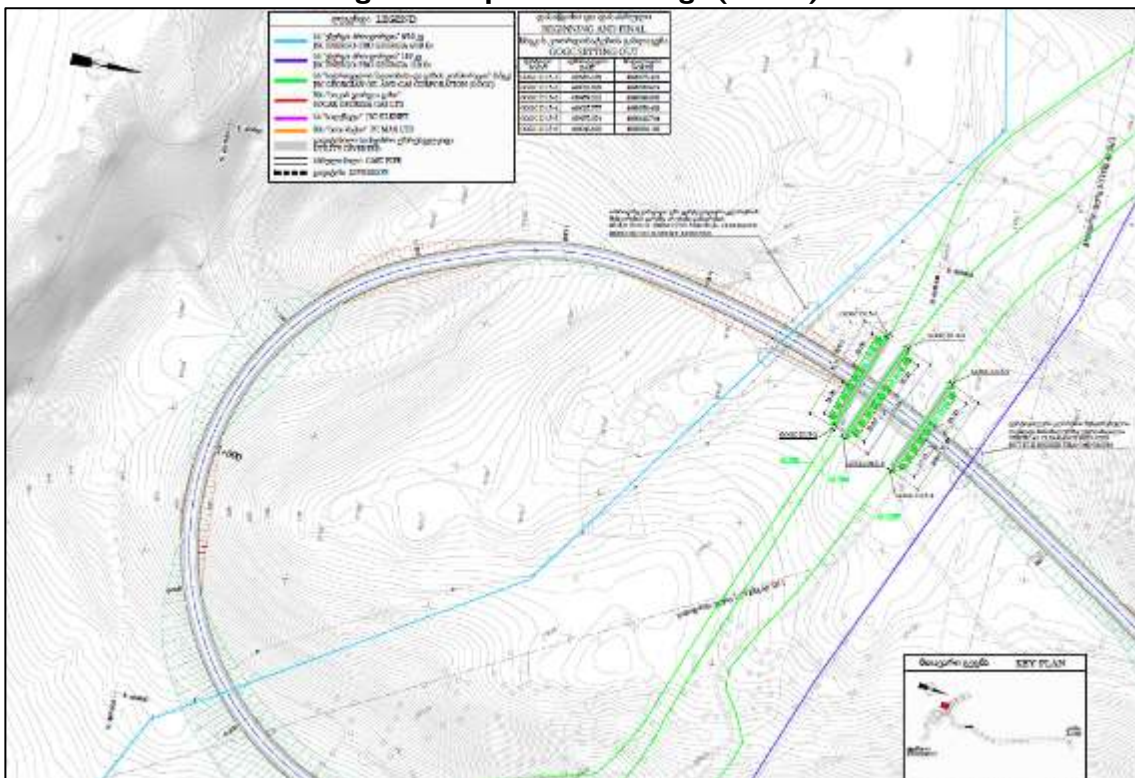
117. The critical section is located at chainage 1+520 where there is the crossing of the gas pipeline and at the top of a hill at ground level +1,719.94, the road reaches this level by means of the maximum suitable length and the referred maximum longitudinal gradient of 8%. There is another crossing at chainage 0+520 where there is an embankment, and these pipes should be diverted with an extra protection pipe again. These crossings are shown in the following figures:

Figure 4: Pipeline Crossings (0+520)



Source: Preparation of Pre - Feasibility Study and Feasibility Study for Jinvali - Larsi Road and Detailed Design for the Construction of Kvesheti -Kobi Road Section. IDOM. 2018

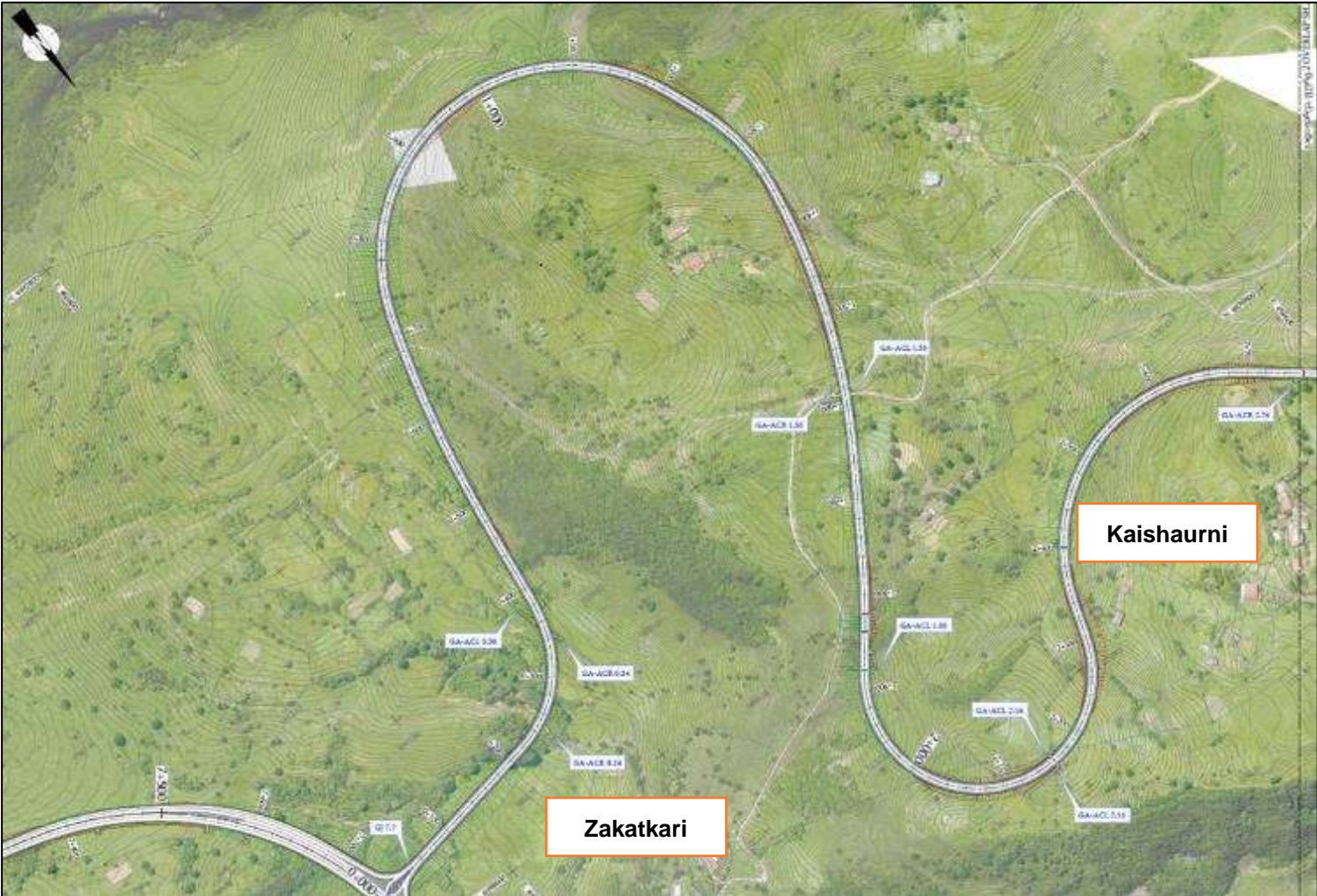
Figure 5: Pipeline Crossings (1+520)



Source: Preparation of Pre - Feasibility Study and Feasibility Study for Jinvali - Larsi Road and Detailed Design for the Construction of Kvesheti -Kobi Road Section. IDOM. 2018

118. Figure 6 to Figure 8 provides a set of three detailed maps of the ARP.

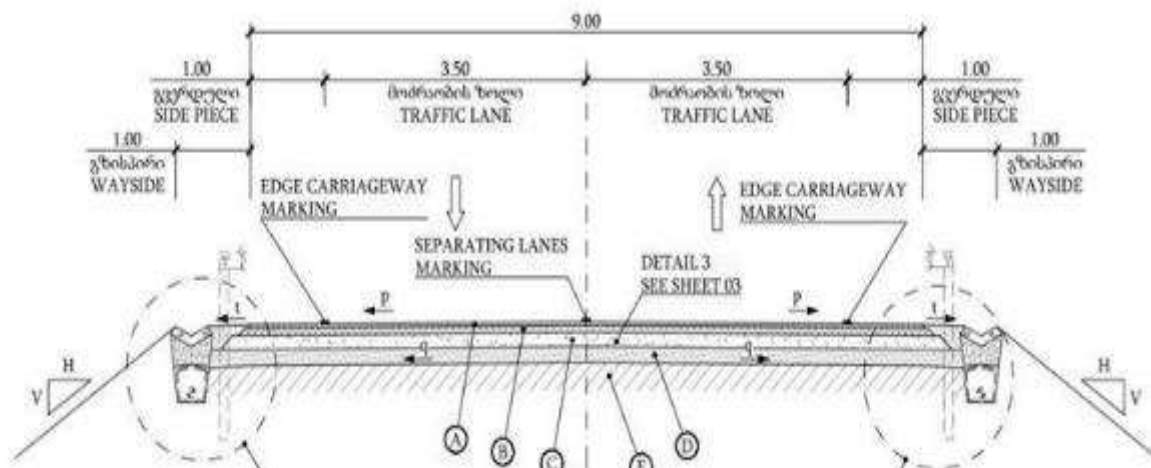
Figure 6 Section I (Km 0 – Km 2.75)



Source: Preparation of Pre - Feasibility Study and Feasibility Study for Jinvali - Larsi Road and Detailed Design for the Construction of Kvesheti -Kobi Road Section. IDOM. 2018

119. The main characteristics of the proposed ARP are as follows:
- (a) Two lanes
 - (b) Each lane is 3.50 m wide
 - (c) Shoulder width is 1.00 m
 - (d) Total width (paved) is 9.00m
 - (e) Roadside width: variable

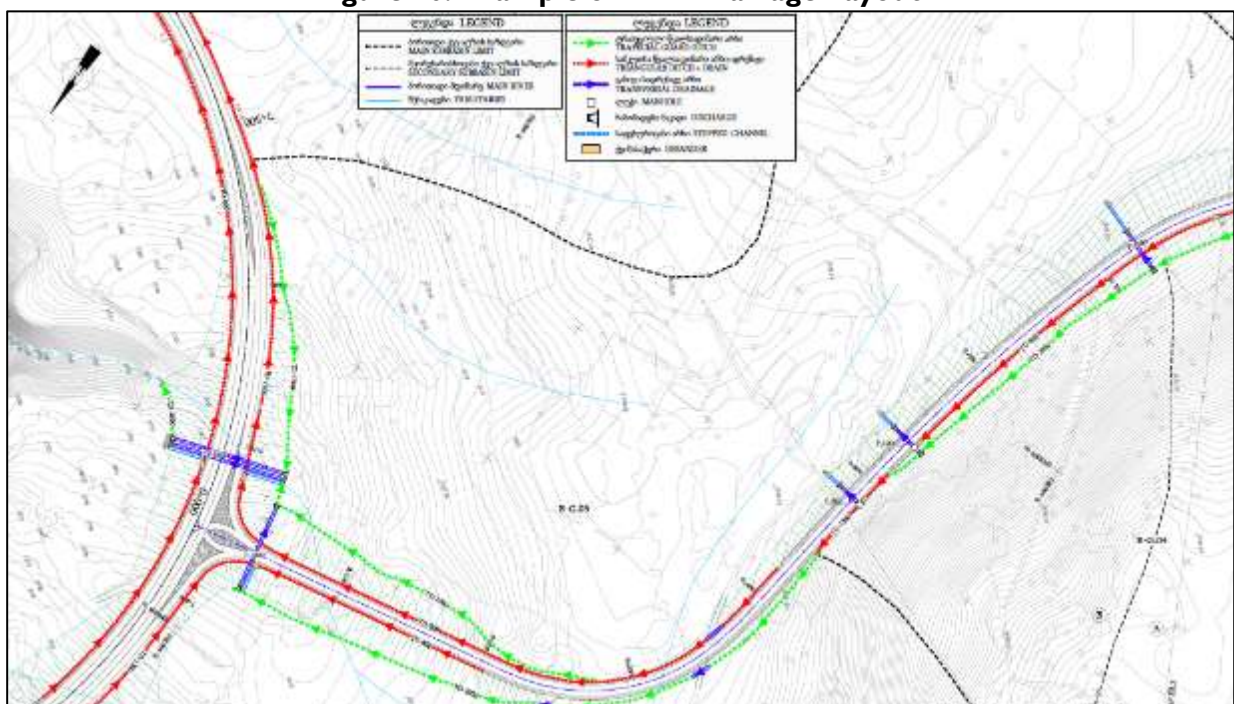
Figure 9: Cross section of the road (2 lane)



Source: Source: Addendum to the Land Acquisition and Resettlement Plan. June 2019.

120. The road has been designed to ensure continued access, as far as practical, to all local properties along the ARP. The access points are shown on Figure 6 to Figure 8.
121. Drainage will be provided along the alignment in the form of side drains and cross drains (culverts).

Figure 10: Example of ARP Drainage Layout



Source: Preparation of Pre - Feasibility Study and Feasibility Study for Jinvali - Larsi Road and Detailed Design for the Construction of Kvesheti -Kobi Road Section. IDOM. 2018

3.4. Construction

3.4.1. Construction Process

122. Before and/or during the construction phase, the following activities will be undertaken:
123. **Land Acquisition** – Under the terms of the Loan of the ADB, before the commencement of the construction works, the Employer must prepare the Land Acquisition and Resettlement Plan (the LARP), obtain the approval of ADB and then implement the plan and acquire the land.
124. **Site-Specific Environmental Management Plan (SSEMP)** – Ensure that the SSEMP is submitted to the Engineer for review at least 30 days before taking possession of any work site. No access to the site will be allowed until the SSEMP is reviewed by the Engineer and approved by the RD / PIU.
- (a) **Site Clearing Works** – The works include the following site clearing works within or adjacent to the RoW (within the Project buffer¹⁰) of the Project Road, in accordance with the Drawings or instructions of the Engineer. Pre-construction surveys for cultural heritage are completed per the requirements of the Archaeological Five Phase Strategy (prepared as part of the KK Project EIA) Moreover, the Cultural Heritage General Action Plan and Archeological Survey Report prepared by NACHP (2020-2021) cover ARP. To ensure an accurate identification of the existing vegetation within the project area, it is recommended that the ECoW conduct pre-construction surveys and compile a comprehensive tree inventory list. Additionally, obtaining drone video footage is advised to establish the current environmental conditions prior to the commencement of any construction activities.
- (b) Clearing and grubbing.
- (c) Removal of any other natural or artificial objects within the RoW.
- (d) Removal and disposal of all vegetation and debris within the designated limits of the RoW.
125. **Relocation of Existing Services** – The Works include the relocation of all services affecting the construction of the Project Road within the RoW. The services include the following:
- a) water mains
- b) overhead electric supply lines
- c) gas and oil pipelines
- d) underground telephone cables
126. **Construction Activities** – The main construction phase aspects are described in detail below.
127. **Earthworks** - The Works include the following types of earthworks necessary for the construction of the Project Road and all associated works:
- a) Removal of topsoil, (the approximate volume will be 5000 m³)
- b) Construction of embankments.
- c) Construction of subgrade.
- d) Removal and replacement of unsuitable materials.
- e) Structural excavation.
- f) Excavation for the construction of side drainage and cross-drainage works.

¹⁰ Buffer refers to the land that is required for the construction and operation of the road. The buffer, in its entirety, will be the property of the GoG and, as such, all properties or land not belonging to the GoG must be procured as part of the LARP before works can commence in this area.

- g) Excavation for the removal and relocation of the existing utilities.
 - h) All backfilling necessary for the construction of retaining walls or other earth retaining structures, cross-drainage structures and associated works, side drains and erosion protection work.
 - i) Preparation of beddings and filters for all structural, cross-drainage, side drains or pavement works.
 - j) Excavation, filling or backfilling necessary for the execution of any other incidental works.
128. Culverts - Project works include the construction of culverts and underpasses, including inlet and outlet structures and associated works in accordance with the Specification. The scope of the cross drainage works includes:
- a) Construction of new culverts at locations where no cross-drainage structure existed before.
 - b) Construction of new scour protection and channel lining works.
129. Other Drainage Structures - Surface runoff from the carriageway and all other pavements, and any cut and embankment slopes must be discharged through longitudinal drains designed for adequate cross section, bed slopes, invert levels and the outfalls. The Works include construction of the drainage system components according to the types, dimensions, classes, and material requirements for this work.
130. Pavement – Once the sub-base has been prepared, the pavement will be laid, including the following steps:
- a) Laying binder and surface course
 - b) Lay asphalt surface
 - c) Install butt joints and transitions
 - d) Compacting with rollers
 - e) Finishing – with sealers and road markings.
131. Once these activities are completed, the Engineer will undertake quality control of the pavement to ensure compliance with technical specifications.

3.4.2. Construction Equipment and Staff

132. Table 15 provides indicative lists of the key equipment required in the construction phase. The equipment will be taken from the Project equipment used for Lot 2.

Table 15: Key Equipment

No.	Equipment Type and Characteristics	Minimum Number required
1	Bulldozer (>245HP)	4
2	Excavator (>100HP)	6
3	Asphalt Paving Machinery	1
4	Front Loader (>135HP)	5
5	Motor grader (>135HP)	5
6	Vibratory roller (> 13T)	2
7	Tipper truck (10T)	10
8	Tipper truck (16T)	10
9	Transit mixer (>6m ³)	6
10	Roadheader	1
11	Excavator Hammer	1
12	Jack Hammer	8
13	Truck mixer concrete pump	3

133. The construction phase will last approximately 12 months and will be undertaken in parallel with KK Project Lot 2 works. KK Project Lot 2 contractor will provide staff for the ARP from his existing contract as part of the KK Project. No additional jobs are anticipated to be created under this activity.

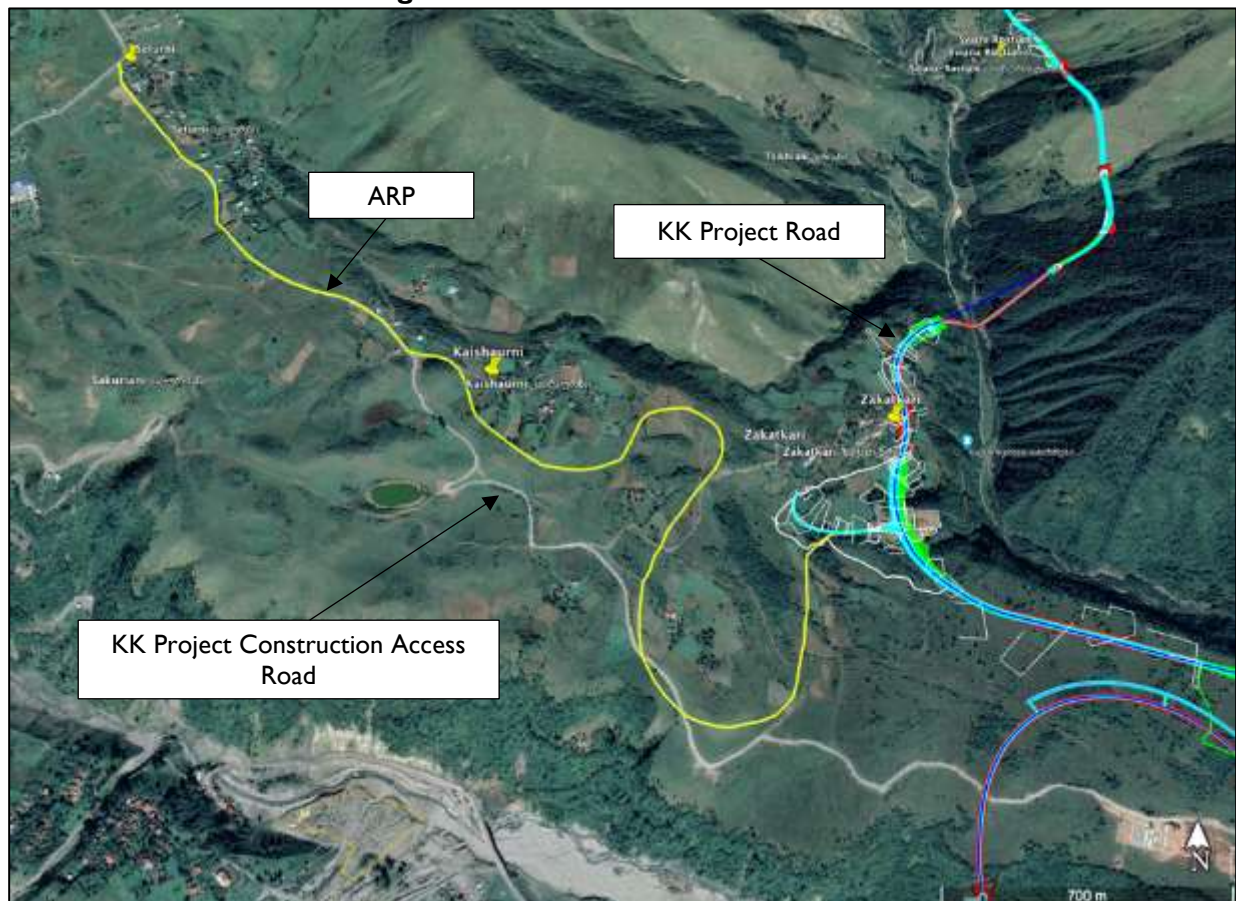
3.4.3. Construction Program and Schedule

134. The proposed works schedule is currently to be determined. However, works are anticipated to last for 12 months and will be undertaken during the period of works for Lot 2, e.g., between 2023 and 2024.

3.4.4. Access to Site

135. Access to the Plateau from the existing road to Gudauri has already been constructed as part of the access requirements for the main KK Project. Figure 11 below shows this route. Approximately half of this road follows the existing track in the plateau (see Figure 12). This construction access road has followed the requirements of the KK Project EIA and a method statement has been prepared for this road and approved by the KK Project Engineer.

Figure 11: ARP Construction Access



Note: ARP road is yellow; main KK Road project is light blue or dark / red where tunnel or bridge; construction access road is along existing APR alignment to Kaishaurni then after is visible directly from satellite image.

Figure 12: Existing Access Road, Kaishaurni



Source: Consultants own Photo, October 2021

3.4.5. Source of Construction Materials

136. Borrow pits for materials to build embankments are not foreseen, because the potential reserves of spoil material from the KK Project and also from the cut activities shown in Figure 3 above are likely to satisfy the necessary amounts of fill material for creating embankments. Should borrow material be required by the Contractor (due to existing material being unable to meet technical specifications), the borrow pit guidelines outlined in Appendix C of the KK Project EIA shall be followed.
137. KK Project Lot 2 Contractor has in place a concrete batching plant in Zakatkari. The KK Project provided several contractual requirements relating to the environmental and social management of concrete batching plants. A ‘Temporary Facilities’ assessment of this plant has been made as part of the KK Project. No corrective actions have been recommended for this facility and it is considered suitable for use under the ARP.
138. At this stage of the KK Project, there is no requirement for the Lot 2 Contractor to open an asphalt plant and this will be opened as the need for asphalt arises. The Lot 2 Contractor is contractually responsible for a range of environmental and social management measures relating to the operation of asphalt plants (as outlined in the KK Project EIA). The Lot 2 Contractor will use the same asphalt plants for ARP and KK Project. Accordingly, the requirements of the KK Project EIA will also apply to ARP.

3.4.6. Disposal of Spoil Material

139. According to information provided by Lot 2 Contractor, the construction of the ARP will require approximately 92,000m³ of cut. However, the road will need approximately 268,000m³ of fill material for embankments. This means that there will be a balance of -176,000m³ of cut and fill. Fill material will be re-used in ARP embankments and no excess spoil material will be generated requiring disposal at spoil disposal sites. Further, Lot 2 Contractor plans to use excess material from Lot 2 excavation works as fill material for the ARP, thereby reducing the amount of spoil material

sent to Lot 2 Spoil Disposal sites by 176,000m³. The exact amount of cut and fill by road section are provided in Appendix C.

3.4.7. Camps and Storage Areas

140. For ARP KK Project, Lot 2 Contractor will use his existing camps. Specifically, for this activity it is anticipated that works will be conducted out of Lot #2 Construction Camp in Zakatkari. This camp is currently operational and is subject to the contractual conditions set out by the KK Project EIA. Further, a ‘Temporary Facilities’ assessment of this camp has been made as part of the KK Project. Several corrective actions have been recommended for this facility.
141. Temporary storage areas will be required for certain activities, such as the storage of sand and gravels and construction equipment and vehicles. As per the situation with construction camps, the KK Project Lot 2 Contractor has already opened temporary storage as part of the KK Project works (in Arakveti). A ‘Temporary Facilities’ assessment of this area has been made as part of the KK Project. Several corrective actions have been recommended for this facility. Excerpts from the Temporary Facilities assessment, which has been updated in February 2023, are included in Appendix D.

3.4.8. Safety

142. An important part of the safety offered to the driver by the technical characteristics of the roads is that the elements and protective facilities, function as devices that, in case of accident or emergency, prevent the vehicle from leaving the road and will help reduce the harmful consequences of this situation.
143. The measures that have been planned include rigid security barriers. The installation of the containment system will be justified when the distance from the edge mark of the exterior roadway to an obstacle or dangerous area is less than a certain one, admitting that the risk of accident is associated with the containment system that is going to be eliminated. The containment systems parallel to the road used are the following: metal crash barriers, metal parapets, concrete barriers and railings where needed according to the relevant design and safety standards.

3.4.9. Traffic Forecasts

144. Traffic forecasts have been prepared for the Project based on updated traffic counts and data. The following table provides the total traffic forecasts and the number of vehicles going to Kobi via the new road (Bypass) and the number of vehicles diverting to Gudauri via the access road. These figures have been used for the Noise Model and Air Quality Model prepared for this report.

Table 16: Normal Traffic Forecasts

	Total			Bypass			Access road		
	Passenger	Goods	Total	Passenger	Goods	Total	Passenger	Goods	Total
2021	2,682	941	3,623						
2025	3,393	1,335	4,728	2,112	1,186	3,298	1,281	149	1,429
2030	4,259	1,766	6,026	2,650	1,569	4,220	1,609	197	1,806
2035	5,021	2,233	7,254	3,121	1,984	5,105	1,900	249	2,149
2040	5,919	2,823	8,742	3,675	2,508	6,184	2,244	315	2,559
2045	6,981	3,569	10,549	4,330	3,171	7,500	2,651	398	3,049
2049	7,967	4,305	12,271	4,936	3,825	8,761	3,030	480	3,510

Source: Asian Development Bank estimates

Note: Access Road is the Gudauri Access Road which is subject to this IEE. The Bypass is the main KK Road project.

4. Analysis of Alternatives

4.1. General

145. One of the objectives of an IEE is to investigate alternatives to the Project. In relation to a proposed activity, “alternative” means different ways of meeting the general purposes and requirements of the proposed activity. The following section presents a summary of the following ARP alternatives:

- ‘no project’ alternative.
- Upgrading of the Existing Road (Alternative Zero).
- Alternative Alignment.

4.2. ‘No Project’ Alternative

146. The “No Action” alternative in this instance means that for road users to get to Gudauri they would have to continue using the existing road. This issue was assessed in depth as part of the KK Project EIA. The Consultant does not consider that road users would use the ARP to travel beyond Gudauri to Kobi, unless they wish to do so for some specific reason, such as for sight-seeing – and such volumes of traffic are assumed to be low. As such, summarized below are the key points of that assessment relating to the movement of vehicles between Kvesheti and Gudauri.

147. The existing road is approximately 14 km long between Kvesheti and Gudauri. It runs from Kvesheti, through Arakveti, crosses the Aragvi river, then snakes up to the Plateau via a series of hairpins before reaching Gudauri.

Figure 13. Existing Road Conditions



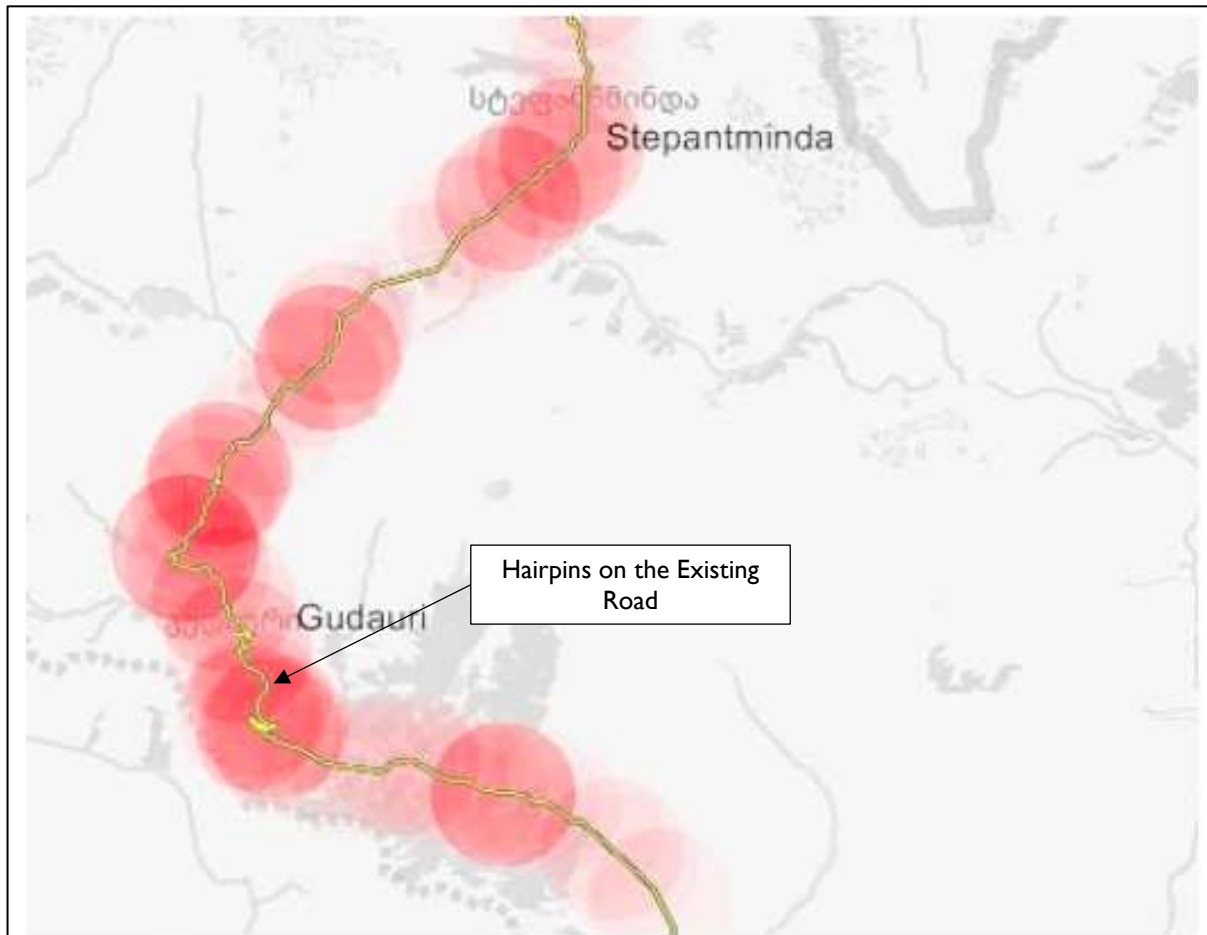
Source: Environmental Impact Assessment for the Kvesheti-Kobi Road Section. 2019

148. This portion of the existing road suffers from several technical and safety issues as follows:

- **Alignment:** the parameters are out of the National standard requirements (minimum radiuses, gradient, super-elevation, junctions, accesses, no population by-passes) and because of it, safety of road users and the local community is jeopardized.
- **Cross-section:** the minimum width of the carriageway/lane or shoulders is not enough at some stretches.
- **Pavement:** bad/very bad condition of the structural section of the pavement and/or the pavement itself.
- **Drainage:** lack of longitudinal/transversal drainage at some stretches. Rainwater and debris running onto the road surface which can result in accidents.
- **Cut slopes, retaining walls and protection structures:** currently in bad condition and do not fully prevent mudflows, rockfalls and/or landslides.
- **Lack of visibility and/or lighting.**
- **Lack of signaling and/or safety barriers,** for traffic flow and pedestrians.

149. The “No Action” Alternative would see the continued deterioration of the existing road pavement and its drainage structures and a potential continuation of the high ratio of accidents noted in the KK Project EIA and illustrated below (the darker red areas show higher concentrations of accidents).

Figure 14: Accidents Occurred on the Existing Road (2012 – 2016)



Source: Environmental Impact Assessment for the Kvesheti-Kobi Road Section. 2019

150. In addition to the technical and safety aspects, there can be difficulties maneuvering heavy goods vehicles (HGVs), especially in the areas highlighted the hairpins, which leads to a high level of delays and demand affected.

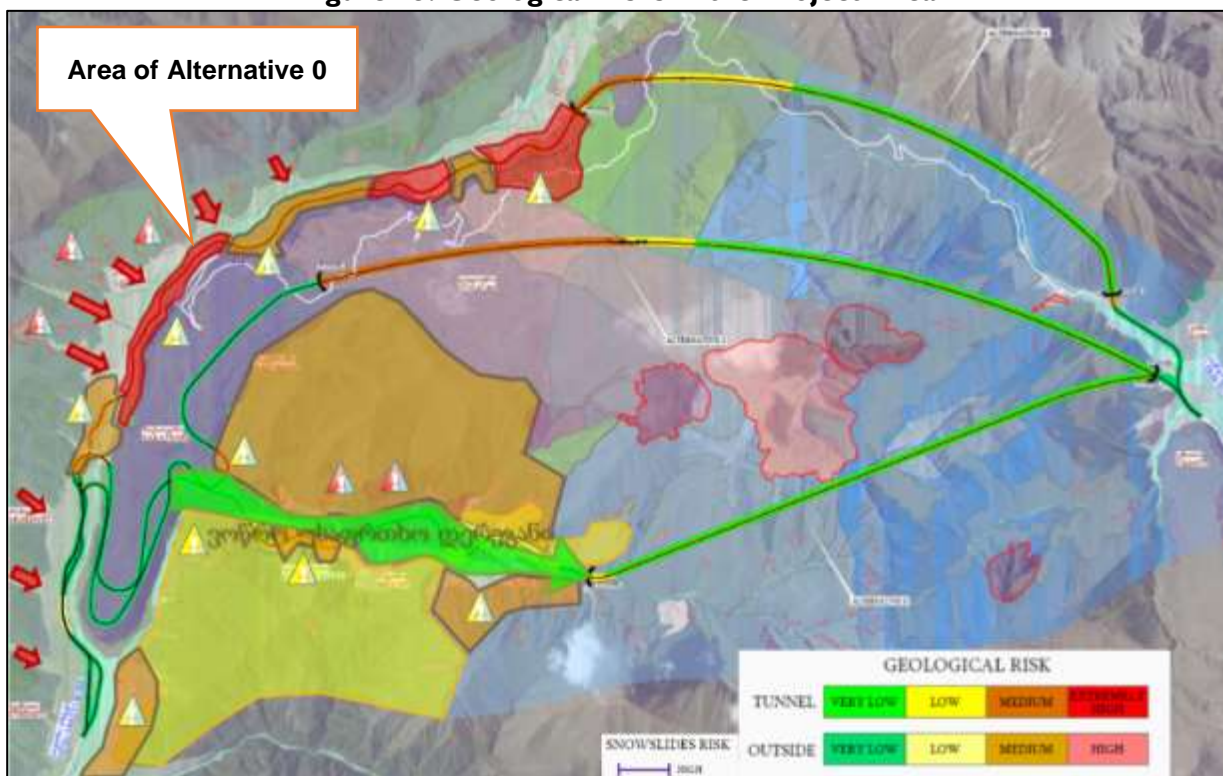
4.3. Upgrading of the Existing Road (Alternative Zero)

151. Like the ‘no project’ alternative, this alternative was also assessed in depth as part of the KK Project EIA. This section of the chapter focuses on the relevant portions of that assessment relating to the section between Kvesheti and Gudauri.
152. Upgrading of the existing road, referred to in the KK Project EIA as ‘alternative zero’, was assessed from a technical, financial, and socio-environmental perspective. The following section takes the findings of the KK Project EIA and discusses why upgrading of the existing road is not the favorable option in this instance.

Technical Aspects

153. As noted above, there are a range of technical and safety issues relating to the existing road. Technically, it is possible to upgrade the existing road, but it will not resolve the key issues described below.
154. It is possible to upgrade the pavement, add safety barriers, and slightly upgrade the alignment at some curves (small enhancements at some points, although almost entirely impossible on the hairpin sections). These actions would not have a significant impact to the landscape/local communities along the existing alignment, but functionality and safety of the road would remain at the same levels.
155. However, to significantly upgrade the safety and functionality of the existing road, the current alignment would need to be significantly changed, enhancing the gradient, minimum radius, cross section (enough space), visibility, etc. This would have a significant impact on the landscape and the local communities.
156. Given the fact that there is currently no alternative route to Kobi from Kvesheti (and no detour route), the construction period of several years would have huge impacts on road users and the local community as portions of the road are closed to allow for construction works. This could have significant impacts on the local economy for several years, including the Gudauri tourist area.
157. Alternative Zero was also assessed from a geological perspective. The alignment of the existing road is in areas of medium and significant geological risk as shown in Figure 15. There is ‘very low’ geological risk around ARP.

Figure 15: Geological Risks in the Project Area



Source: Environmental Impact Assessment for the Kvesheti-Kobi Road Section. 2019

Note: this picture belongs to the Pre-feasibility stage; after that, the Khada valley alternative was enhanced by modifying the alignment (in advance of Begoni, Tskere) and providing some extra tunnels and protection structures to avoid geological risks at the outside road.

Financial Aspects

158. Alternative Zero was also analyzed at pre-feasibility stage from a cost-benefit perspective. However, it was based on upgrading the entire road from Kvesheti to Kobi. As such the financial aspects of this alternative are not considered in this IEE due to a lack of relevant data on this issue.

Environmental Aspects

159. The existing road is located along a bird migration corridor, that goes along the Aragvi river close to portions of the fragmented Kazbegi National Park. The proposed ARP completely avoids the Aragvi river thereby reducing potential impacts to this area and the newly extended Kazbegi National Park.
160. Regarding issues such as increased vehicle emissions and noise, the ARP will generate additional levels of air emissions and noise along its alignment on the plateau, the impacts of which are assessed in the main body of this IEE. However, traffic currently bypassing Mleta will drastically decrease meaning improved air quality and lower noise levels for the villagers in this location.
161. Given all the above constraints Alternative Zero was ruled out for further consideration.

Figure 16: Existing road vs. protected areas (green shapes – boundaries of Kazbegi National Park)



Source: Protected Planet. <https://www.protectedplanet.net/en>. Accessed September 2021

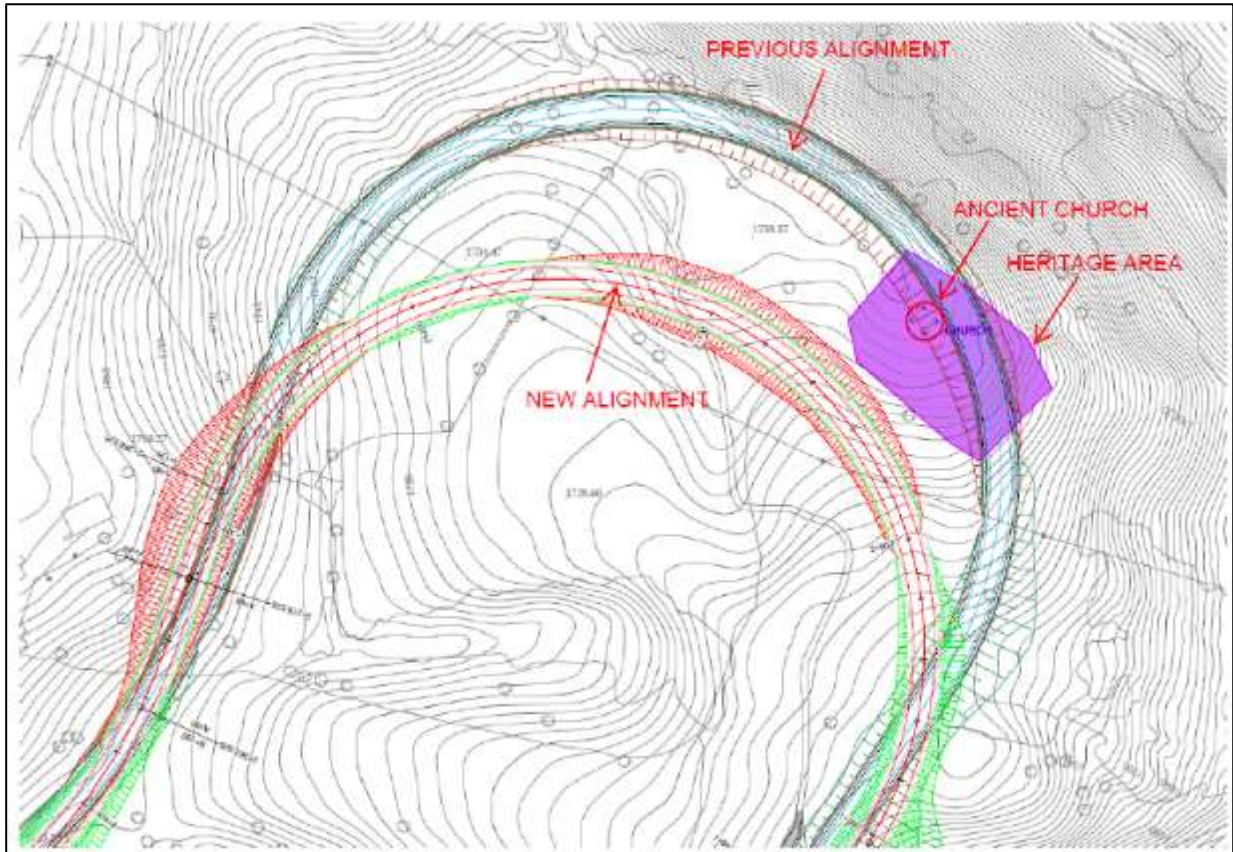
4.4. Alternative Alignments

162. The ARP alignment is shown in Figure 6, Figure 7 and Figure 8. Only one alteration to the alignment is required based on the planned design in these figures. This change is based on the findings of the cultural heritage surveys undertaken as part of the KK Project and this IEE. As noted in Section 6.4.7. below, the Sameba Complex (including a tower and its associated structures) was located directly across the ARP alignment at approximately KM 2.1.

According to the recommendations of the National Agency for Cultural Heritage Preservation of Georgia (NACHP) “Proximity of the monument to the road should be taken into consideration in order to avoid causing damage to the tower”.¹¹ Accordingly, Lot 2 Contractor has provided an alternative alignment to avoid this site as shown in the figure below (now located 97m from project road).

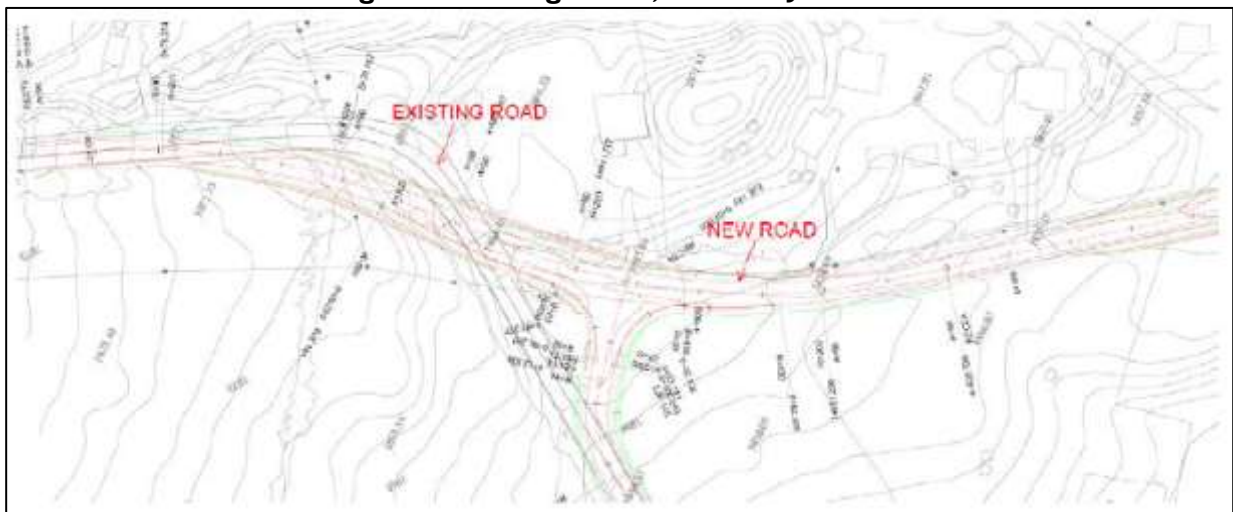
¹¹ Cultural Heritage General Action Plan. Kvesheti – Kobi Road Project. Interim Report 2. June 2021

Figure 17: Alternative Alignment, Sameba Complex



163. Lot 2 Contractor will ensure that this design follows all requirements specified in the report 'Final Cultural Heritage General Action Plan, July 2021', while also following the requirements to undertake necessary pre-construction archeological investigations in this area prior to soil stripping and excavation works (which will also need to be monitored and managed as per the requirements of the main KK project as outlined in this IEE).
164. An option to improve the ARP junction with the existing road in Gudauri has been proposed for safety reasons, as shown in Figure 18 below. Any changes in the design at this point shall only be undertaken in areas outside of the Kazbegi National Park and the Kazbegi Important Bird Area (IBA) / Key Biodiversity Area (KBA). Mapping provided by the International Union for Conservation of Nature (IUCN), Birdlife International and others indicates that this small portion of realignment does not encroach directly into these sites (see Figure 31, Figure 32 and Figure 33).

Figure 18: Realignment, Gudauri Junction



5. IEE Approach

5.1. Assessment Boundaries

165. The boundaries of the assessment have been divided depending upon the specific environmental and social characteristic to be affected. For example, the potential area of impact for noise which extends beyond the RoW, will be different to the area of impact for terrestrial soils which will be largely confined to the ARP buffer. These specific boundaries are defined individually in Section 6 below.

5.2. IEE Methodology

166. The methodology used to prepare this IEE is based on the requirements of the ADB Safeguard Policy Statement (SPS, 2009) and the joint experience of the consultants involved in the IEE. Specifically, the methodology for this assessment is based on other recent disclosed Category B projects funded by ADB.

5.2.1. Desktop Data

167. Background data and information collected by the team was obtained from published and unpublished sources, e.g., on climate, topography, geology and soils, natural resources, flora and fauna, agriculture, and socio-economic data. References to all sources used is made throughout the report.

5.2.2. Site Surveys

168. Several site inspections of the ARP area were conducted during the preparation of the KK Project EIA and during its pre-construction phases. That data has been used to help inform this IEE. The potential areas of impact have been inspected by the Consultant and areas of potential environmental significance assessed carefully. Baseline surveys and instrumental monitoring has also been undertaken (as part of the ARP and the KK Project EIA).

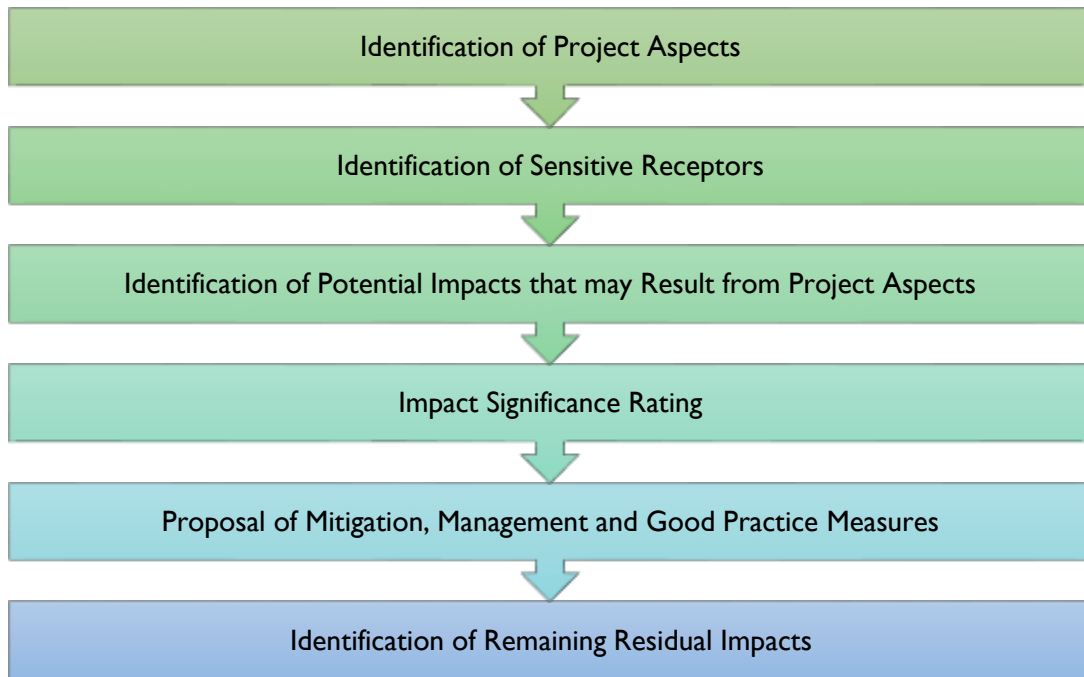
Table 17: Site Surveys Undertaken Relevant to the ARP

Topic	Survey
Air Quality	Measurement of ambient air quality
Noise	Measurement of ambient noise levels
Vibration	Measurement of vibration levels
Physical Cultural Heritage	Site walk-over
	Archeological studies
	Cultural Heritage / Monuments Physical Condition assessment
Biodiversity	Ecological Survey
	Bird Migration Survey
	Pre-construction Fauna Survey
Social	Socio-economic Survey and Census

5.2.3. Impact Assessment Methodology

169. This IEE follows a set format during the impact assessment process. As shown in the following flow chart and described further below.

Figure 19: Impact Assessment Process



Project Aspects

170. Firstly, the main environmental aspects of the Project are noted. An environmental aspect is any activity of the Project that interacts with the environment. E.g., an aspect of the Project that may impact upon air quality will be the movement of vehicles on unpaved roads through rural settlements.

Identification of Sensitive Receptors

171. Once the main aspects of the Project have been identified, any sensitive receptors within the Project area of influence are noted. Examples of sensitive receptors include residents, rivers, groundwater, birds, etc. Identification of receptors is a key part of the impact assessment process as without a receptor there will be no impact. For example, if a road generates significant noise but there are no sensitive receptors who can hear the noise, then there will be no noise impact.

Identification of Significant Environmental Aspects

172. Thirdly, the potential impacts of the identified aspects are outlined and how they could impact upon the identified receptors. In the case above, this could be the movement of a construction vehicle creating dust on an unpaved road which impacts upon local villagers.

173. The significance of an impact is determined based on the product of the consequence of the impact and the probability of its occurrence. The consequence of an impact, in turn, is a function primarily of three impact characteristics:

- magnitude
- spatial scale
- timeframe

174. Magnitude is determined from quantitative or qualitative evaluation of several criteria including:

- (i) Sensitivity of existing or reasonably foreseeable future receptors.
- (ii) Importance value of existing or reasonably foreseeable future receptors, described using the following:
 - (a) inclusion in government policy.

- (b) level of public concern.
 - (c) number of receptors affected.
 - (d) intrinsic or perceived value placed on the receiving environment by stakeholders.
 - (e) economic value to stakeholders.
- (iii) Severity or degree of change to the receptor due to impact, measured qualitatively or quantitatively, and through comparison with relevant thresholds:
- (a) Legal thresholds—established by law or regulation.
 - (b) functional thresholds—if exceeded, the impacts will disrupt the functioning of an ecosystem sufficiently to destroy resources important to the nation or biosphere irreversibly and/or irretrievably.
 - (c) normative thresholds—established by social norms, usually at the local or regional level and often tied to social or economic concerns.
 - (d) preference thresholds—preferences for individuals, groups, or organizations only, as distinct from society at large.
 - (e) reputational thresholds—the level of risk a company is willing to take when approaching or exceeding the above thresholds.

175. Spatial scale is another impact characteristic affecting impact consequence. The spatial scale of impacts can range from localized (confined to the proposed Project Site) to extensive (national or international extent). They also may vary depending on the component being considered.

176. The impact timeframe is the third principal impact characteristic defining impact consequence and relates to either its duration or its frequency (when the impact is intermittent). Impact duration can range from relatively short (less than four years) to long (beyond the life of the Project). Frequency ranges from high (more than 10 times a year) to low (less than once a year). These timeframes will need to be established for each Project based on its specific characteristics and those of the surrounding environment.

177. Once the impact consequence is described based on the above impact characteristics, the probability of impact occurrence is factored in to derive the overall impact significance. The probability relates to the likelihood of the impact occurring, not the probability that the source of the impact occurs. For example, a continuous Project activity may have an unlikely probability of impact if there are no receptors within the area influenced by that activity. The characteristics are outlined in the table below.

Table 18: Characteristics Used to Describe Impact

Characteristic	Sub-components	Terms Used to Describe the Impact
Type		Positive (a benefit), negative (a cost) or neutral
Nature		Biophysical, social, cultural, health or economic Direct, indirect or cumulative or induced
Phase of the Project		Pre-construction / Construction and operation.
Magnitude	Sensitivity of Receptor	High, medium or low capacity to accommodate change High, medium or low conservation importance Vulnerable or threatened, rare, common, unique, endemic
	Importance or value of receptor	High, medium or low concern to some or all stakeholders High, medium or low value to some or all stakeholders (for example, for cultural beliefs)

Characteristic	Sub-components	Terms Used to Describe the Impact
		Locally, nationally or internationally important Protected by legislation or policy
	Severity or degree of change to the receptor	Gravity or seriousness of the change to the environment Intensity, influence, power or strength of the change Never, occasionally or always exceeds relevant thresholds
Spatial Scale	Area affected by impact – boundaries at local and regional extents will be different for biophysical and social impacts	Area or Volume covered Distribution Local, regional, transboundary or global
Timeframe	Length of time over which an environmental impact occurs or frequency of impact when intermittent	Short term or long term Intermittent (what frequency) or continuous Temporary or permanent Immediate effect (impact experienced immediately after causative project aspect) or delayed effect (effect of the impact is delayed for a period following the causative project aspect)
Probability – likelihood or chance an impact will occur		Definite (impact will occur with high likelihood of probability) Possible (impact may occur but could be influenced by either natural or project related factors) Unlikely (impact unlikely unless specific natural or Project related circumstances occur)

Impact Significance Rating

178. The impact significance rating process serves two purposes: firstly, it helps to highlight the critical impacts requiring consideration in the approval process; secondly, it shows the primary impact characteristics, as defined above, used to evaluate impact significance. The impact significance rating system is presented in Table 19 and described as follows:

- (i) **Part A:** Define impact consequence using the three primary impact characteristics of magnitude, spatial scale and duration.
- (ii) **Part B:** Use the matrix to determine a rating for impact consequence based on the definitions identified in Part A; and
- (iii) **Part C:** Use the matrix to determine the impact significance rating, which is a function of the impact consequence rating (from Part B) and the probability of occurrence.

179. Using the matrix, the significance of each described impact is rated.

Table 19: Method for Rating Significance

PART A: DEFINING CONSEQUENCE IN TERMS OF MAGNITUDE, DURATION AND SPATIAL SCALE			
Definition		Criteria	
MAGNITUDE		Negative	Positive
	Major	<ul style="list-style-type: none"> • Large number of receptors affected • Receptors highly sensitive and/or are of conservation importance • Substantial deterioration, nuisance or harm to receptors expected • Relevant thresholds often exceeded • Significant public concern expressed during stakeholder consultation • Receiving environment has an inherent value to stakeholders 	<ul style="list-style-type: none"> • Large number of receptors affected • Receptors highly amenable to positive change • Receptors likely to experience a big improvement in their situation • Relevant positive thresholds often exceeded
	Moderate	<ul style="list-style-type: none"> • Some receptors affected • Receptors slightly sensitive and/or of moderate conservation importance • Measurable deterioration, nuisance or harm to receptors • Relevant thresholds occasionally exceeded • Limited public concern expressed during stakeholder consultation • Limited value attached to the environment 	<ul style="list-style-type: none"> • Some receptors affected • Receptors likely to experience some improvement in their situation • Relevant positive thresholds occasionally exceeded
	Minor	<ul style="list-style-type: none"> • No or limited receptors within the zone of impact • Receptors not sensitive to change • Minor deterioration, nuisance or harm to receptors • Change not measurable or relevant thresholds never exceeded • Stakeholders have not expressed concerns regarding the receiving environment 	<ul style="list-style-type: none"> • No or limited receptors affected • Receptors not sensitive to change • Minor or no improvement in current situation • Change not measurable • Relevant positive thresholds never exceeded No stakeholder comment expected
TIMEFRAME		Duration of Continuous Aspects	Frequency of Intermittent Aspects
	Short term / low frequency	<ul style="list-style-type: none"> • Less than 4 years from onset of impact 	<ul style="list-style-type: none"> • Occurs less than once a year

	Medium term / medium frequency	<ul style="list-style-type: none"> More than 4 years from onset of impact up to end of life of project (approximately 30 years) 	<ul style="list-style-type: none"> Occurs less than 10 times a year but more than once a year 		
	Long term / high frequency	<ul style="list-style-type: none"> Impact is experienced during and beyond the life of the project (greater than 30 years) 	<ul style="list-style-type: none"> Occurs more than 10 times a year 		
SPATIAL SCALE		Biophysical	Socio-economic		
	Small	<ul style="list-style-type: none"> Within the defined 'Project area' 	<ul style="list-style-type: none"> Within the defined 'Project area' 		
	Intermediate	<ul style="list-style-type: none"> Within the district in which the facilities are located 	<ul style="list-style-type: none"> Within the municipality in which the activity occurs 		
	Extensive	<ul style="list-style-type: none"> Beyond the district in which the facilities are located 	<ul style="list-style-type: none"> Beyond the municipality in which the activity occurs 		
PART B: DETERMINING CONSEQUENCE RATING					
MAGNITUDE	TIMEFRAME	SPATIAL SCALE			
		Small	Intermediate	Extensive	
Minor	Short term / low frequency	Low	Low	Medium	
	Medium term / medium frequency	Low	Low	Medium	
	Long term / high frequency	Medium	Medium	Medium	
Moderate	Short term / low frequency	Low	Medium	Medium	
	Medium term / medium frequency	Medium	Medium	High	
	Long term / high frequency	Medium	High	High	
Major	Short term / low frequency	Medium	Medium	High	
	Medium term / medium frequency	Medium	Medium	High	
	Long term / high frequency	High	High	High	
PART C: DETERMINING SIGNIFICANCE RATING					
		CONSEQUENCE			
		Negligible	Low	Medium	High
PROBABILITY (of exposure to impacts)	Definite	Not Significant	Low	Medium	High
	Possible	Not Significant	Low	Medium	High
	Unlikely	Not Significant	Low	Low	Medium
	Negligible	Not Significant	Not Significant	Not Significant	Not Significant

Mitigation, Management and Good Practice Measures

I80. Wherever the Project is likely to result in unacceptable impact on the environment, mitigation measures are proposed (over and above the inherent design measures included in the Project description). In addition, good practice measures may be proposed however these are unlikely to change the impact significance. In the case of positive impacts, management measures are suggested to optimize the benefits to be gained.

I81. The following mitigation hierarchy will be utilized in selecting practical mitigation measures for unacceptable impacts as follows (in order of preference):

- Avoid the impact wherever possible by removing the cause(s).
- Reduce the impact as far as possible by limiting the cause(s).
- Ameliorate the impact by protecting the receptor from the cause(s) of the impact.
- Provide compensatory measures to offset the impact, particularly where an impact is of high significance and none of the above are appropriate, e.g., for impacts to critical habitat.

Residual Impacts

I82. Once mitigation measures are declared and committed to, the next step in the impact assessment process is to assign residual impact significance. This is essentially a repeat of the impact assessment steps discussed above, considering the assumed implementation of the additional declared mitigation measures.

5.2.4. Models

I83. Noise and air quality models have been prepared for the ARP. The models and their findings are summarized in this IEE (sections 6.2.9, 6.4.6, Appendix B and Appendix D).

5.2.5. Stakeholder Consultations

I84. According to the ADB SPS (2009): *“The borrower/client will carry out meaningful consultation with affected people and other concerned stakeholders, including civil society, and facilitate their informed participation. Meaningful consultation is a process that:*

- (i) *Begins early in the project preparation stage and is carried out on an ongoing basis throughout the project cycle;*
- (ii) *Provides timely disclosure of relevant and adequate information that is understandable and readily accessible to affected people;*
- (iii) *Is undertaken in an atmosphere free of intimidation or coercion;*
- (iv) *Is gender inclusive and responsive, and tailored to the needs of disadvantaged and vulnerable groups; and*
- (v) *Enables the incorporation of all relevant views of affected people and other stakeholders into decision making, such as project design, mitigation measures, the sharing of development benefits and opportunities, and implementation issues.*

Consultation will be carried out in a manner commensurate with the impacts on affected communities. The consultation process and its results are to be documented and reflected in the environmental assessment report.”

I85. Stakeholder engagement has been undertaken by the RD and the findings presented in this IEE (Appendix F).

6. Description of the Environment

6.1. Introduction

186. This section presents a description of the environmental baseline conditions in the Project area, covering the following topics by using a combination of primary and secondary data:

Table 20: Data Types

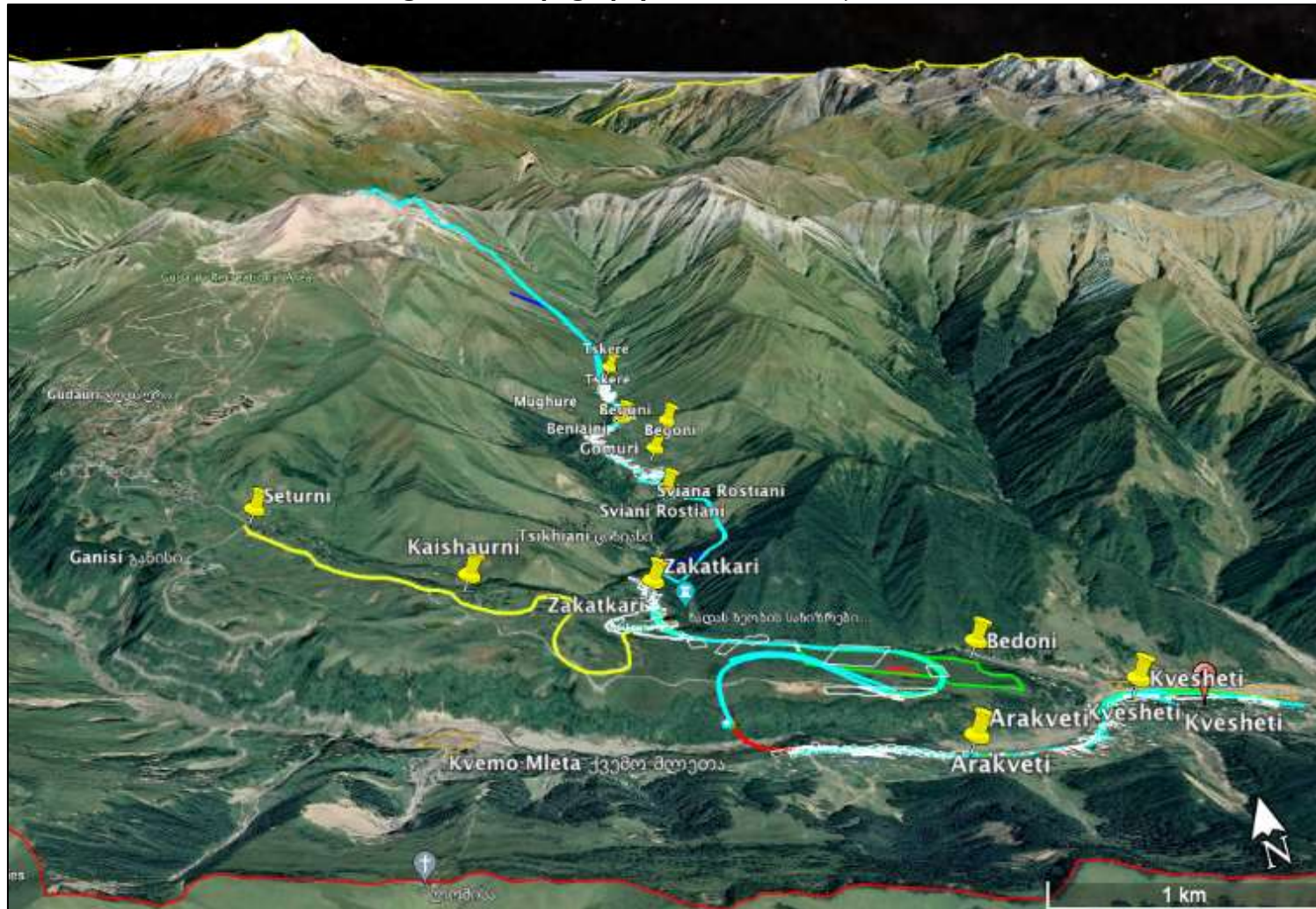
		Primary Data	Secondary Data
Physical Environment			
1	Topography	No	Yes
2	Geology and Soils	No	Yes
3	Geohazards	No	Yes
4	Surface Water	No	Yes
5	Groundwater	No	Yes
6	Water Supply	Yes	Yes
7	Climate	No	Yes
8	Climate Change	No	Yes
9	Air Quality	Yes	No
Biological Environment			
1	Protected and Notable Areas	No	Yes
2	Notable Habitat	Yes	Yes
3	Notable Species	Yes	Yes
4	State Forest Fund	No	Yes
Socio-Economic Environment			
1	Administration and Demographics	Yes	Yes
2	Local Economy	Yes	Yes
3	Tourism	Yes	Yes
4	Land Use and Landscape	Yes	Yes
5	Infrastructure	Yes	No
6	Noise / Vibration	Yes	Yes
7	Physical Cultural Resources and Cultural Landscape	Yes	Yes

6.2. Physical Environment

6.2.1. Topography

187. The KK Project area is mountainous as shown in Figure 20 below. The ARP itself is located on the Didveli Plateau which rises above and runs parallel to the Aragvi river. The ARP starts at an elevation of 1,604m above mean sea level (masl) in Zakatkari. The road elevation increases significantly over the first two kilometers, reaching 1,785 masl at Kaishaurni. Over the next three kilometers the road incline is less significant reaching 1,870 masl in Seturni. The relatively steep elevation at the start of the ARP necessitates the long 1.5km curve between Zakatkari and Kaishaurni.

Figure 20: Topography around the Project Area



Source: Google Earth

Key: Yellow Line = ARP / Turquoise Line = KK Project Road

Figure 21: ARP Elevation Profile



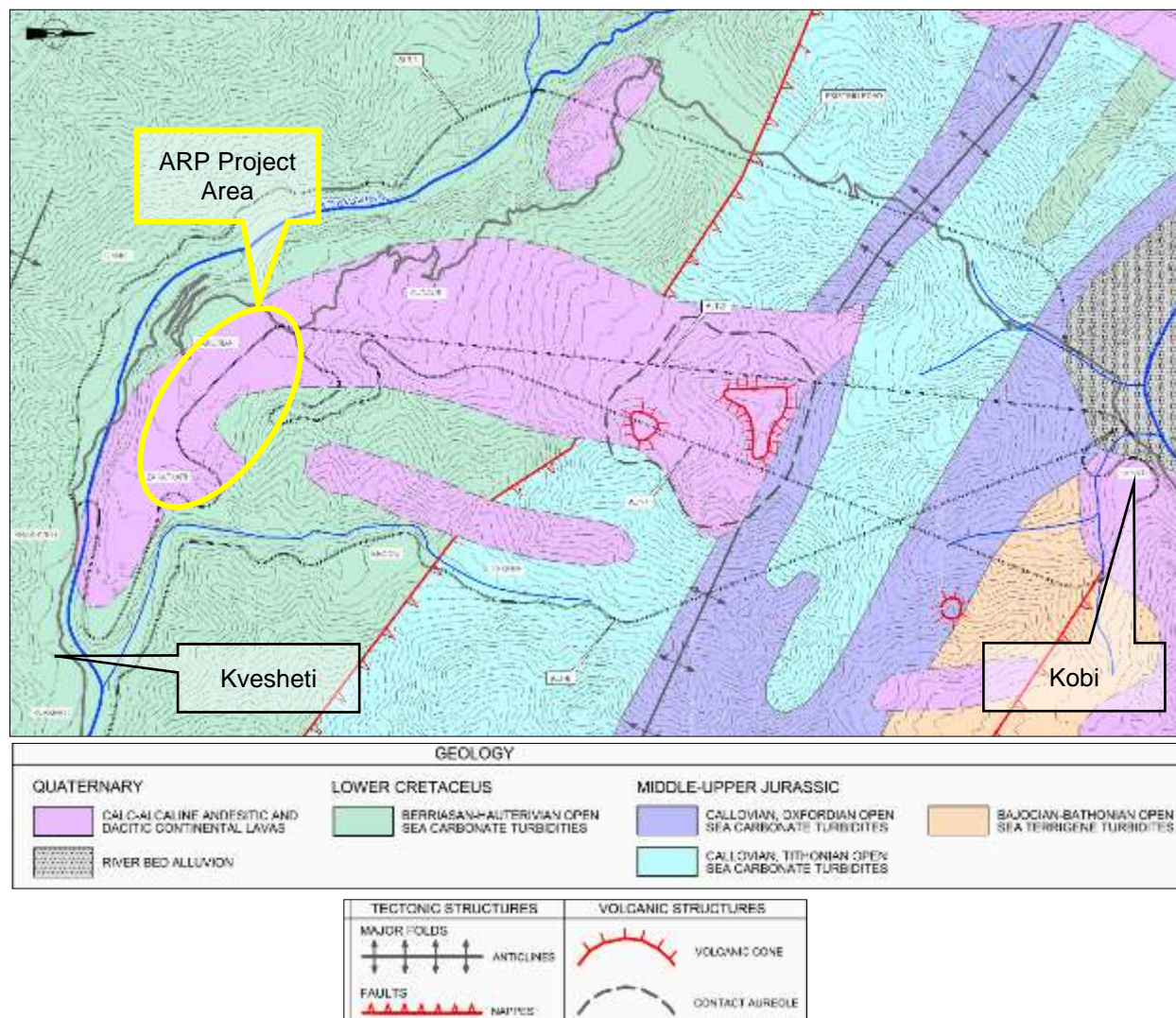
Source: Google Earth.

Note: 1604m represents the start point of the ARP in Zakatkari.

6.2.2. Geology and Soils

188. Geologically, the ARP is located within an area of quaternary volcanic rock, mainly volcanic lavas and tuffs (discordant calc-alkaline andesitic and dacitic continental lavas), as shown in the figure below.

Figure 22: Geological Map of Kvesheti-Tskere (1:500.000)



Source: Environmental Impact Assessment for the Kvesheti-Kobi Road Section. 2019

189. The soils of the Kazbegi Municipality are diverse reflecting diversity of geomorphology, geology, vegetation and climate of the area. Mountain-meadow skeleton soils and mountain-forest soils of average-acid and neutral pH dominate. Humus content is high. According to literary sources,¹² the following soil types are met: (1) deluvial-proluvial soils; (2) mountain-forest brown, medium-depth and shallow skeletal soils, occasionally with stones and boulders; (3) mountain-forest lightbrown, medium-depth and shallow skeletal soils, with stones and boulders; (4) degraded medium-depth and shallow skeletal soils; (5) degraded forest and secondary meadow soils; (6) mountain-meadow soddy-skeletal soils; (7) weakly developed primitive soils, occasionally with exposed rock; (8) eroded and semi-eroded shallow skeletal soils, and (9) strongly eroded areas, ravines, exposed rocks, stone fills and bedrock outcrops.

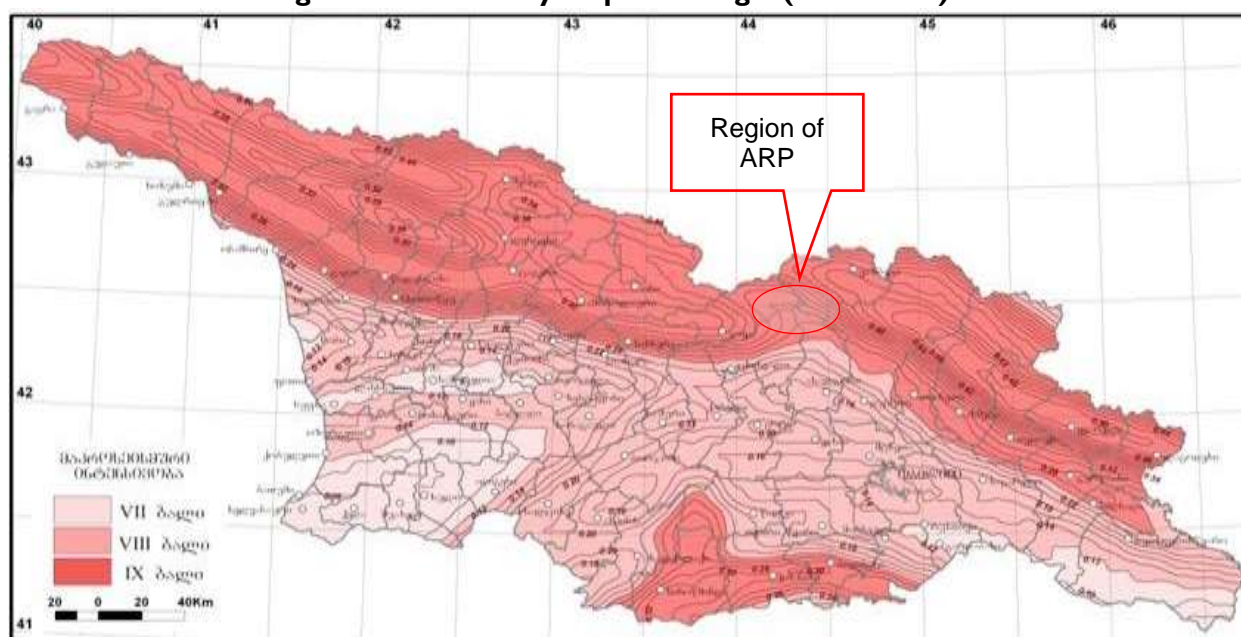
¹² Nakhutsrishvili et al. (2005).

6.2.3. Geohazards

Seismic Conditions

190. According to the Seismic Hazard Map of Building Norms and Rules effective in Georgia “Earthquake-resisting construction (SSM III, 21.10.2009 N 128, article 1477) PN 01.01-09”, the study area is in the 9-point earthquake zone (MSK 64 scale¹³) with the dimensionless coefficient of seismicity (A) equaling 0.3 to 0.39 (Kvesheti and Kobi villages) under the same document. Figure 23 illustrates the seismic conditions in Georgia. General information regarding seismicity in the project area is given in Table 21.

Figure 23: Seismicity Map of Georgia (MSK Scale)



Source: Environmental Impact Assessment for the Kvesheti-Kobi Road Section. 2019

Table 21: Seismicity, according to the construction norms and rules (Aseismic construction, #01.01.09)

Residential area	A-seismicity coefficient	Unit MSK64 scale
Zakatkari	0.3	9

Floods and Mudflows

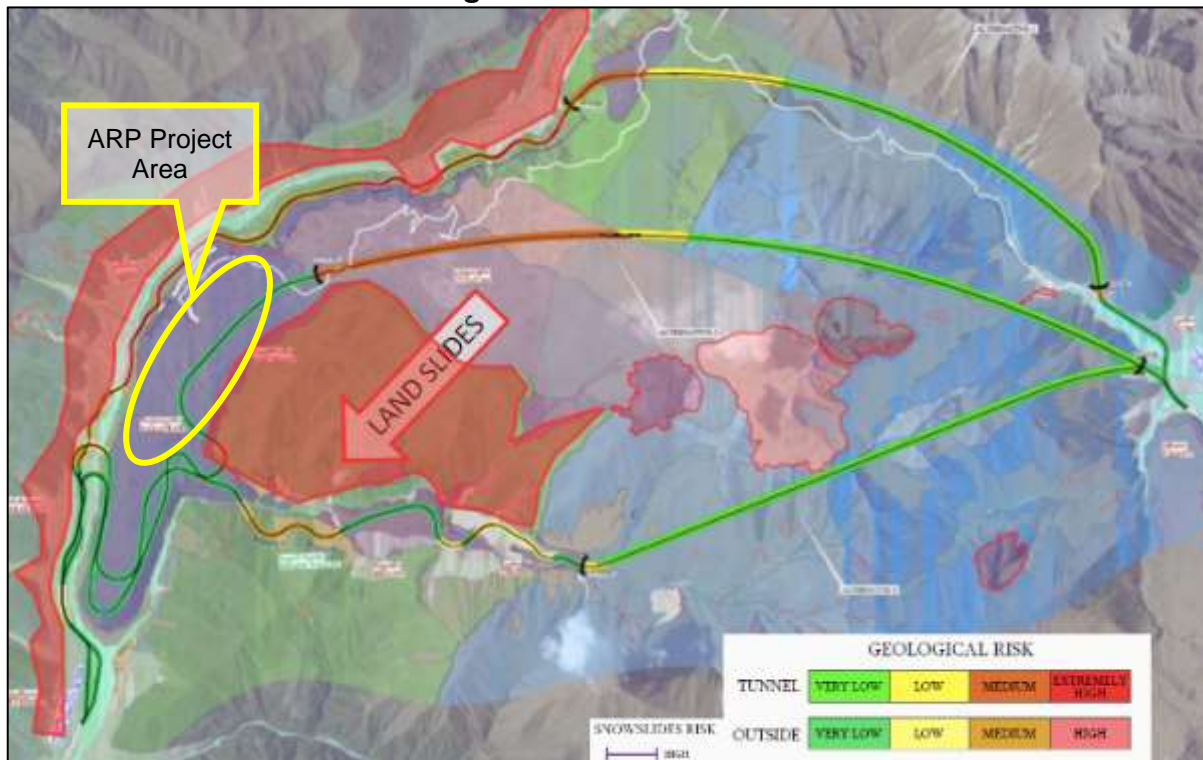
191. The topography of the ARP Project area, located on an elevated plateau, means that floods and mudflows are not a specific hazard that needs further elaboration in this IEE.

Landslides and Avalanches

192. The KK Project EIA provided landslide mapping of the region. The figure below indicates that there are no landslide risks in the ARP Project area. Further, no avalanche risk has been identified.

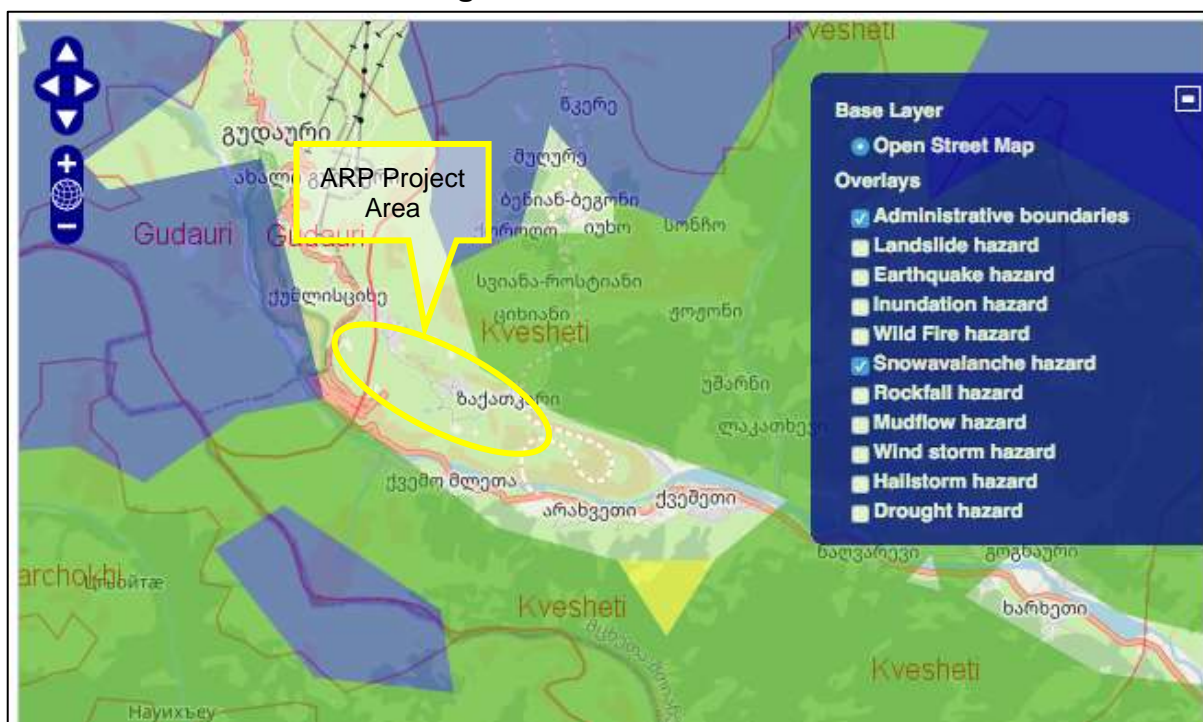
¹³ MSK-64, is a macroseismic intensity scale used to evaluate the severity of ground shaking on the basis of observed effects in an area of the earthquake occurrence. The MSK scale has 12 intensity degrees. Magnitude VIII / IX can be compared to 6 – 7 on the Richter scale.

Figure 24: Landslide Risk



Source: Environmental Impact Assessment for the Kvesheti-Kobi Road Section. 2019

Figure 25: Avalanche Risk

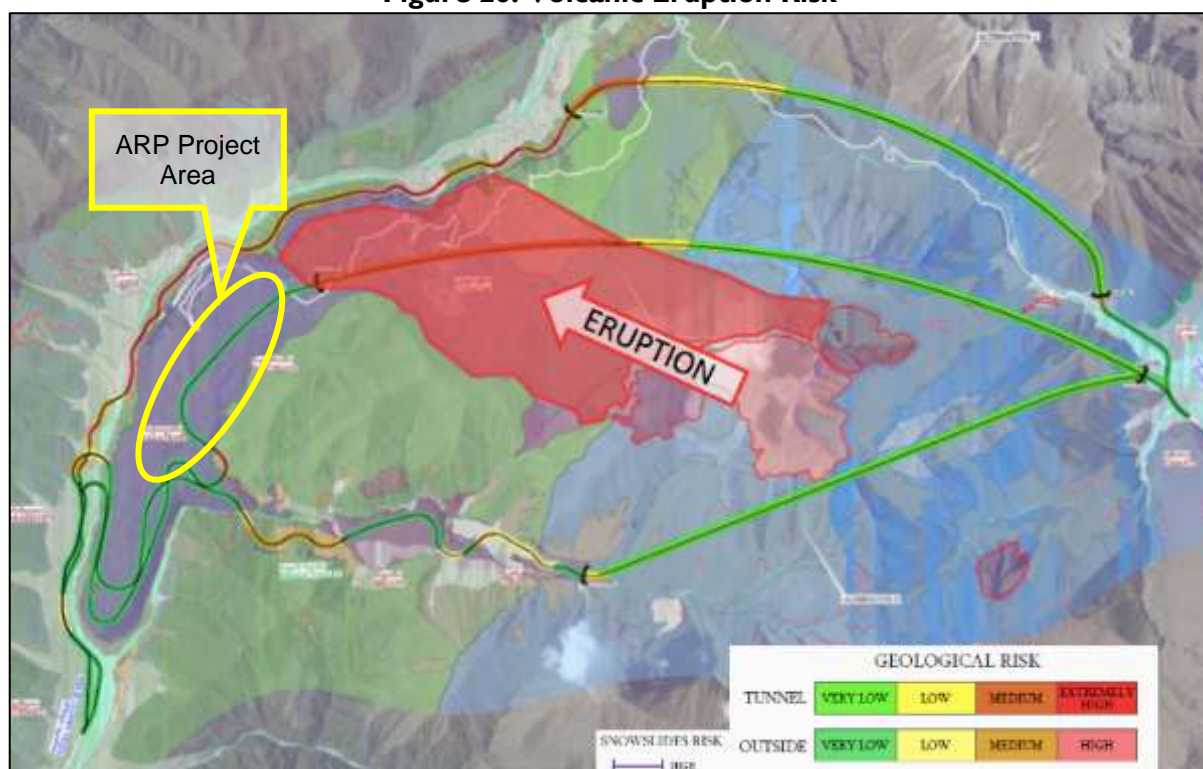


Source: Geoport of Natural Hazards and Risks in Georgia. <http://drm.cenn.org/index.php/en/hazards-and-risks/hazard>

Volcanic Eruption Risk

193. According to information provided in the KK Project EIA, there is no risk of volcanic eruption impacting the ARP.

Figure 26: Volcanic Eruption Risk



Source: Environmental Impact Assessment for the Kvesheti-Kobi Road Section. 2019

6.2.4. Surface Water

194. The only river within the immediate vicinity of the ARP is the Kvishkhevi, also known locally as simply the Khevi river. The rivers main flow is during the spring and autumn periods. Anecdotal information indicates that the river water is not used for any purposes, such as potable water, or cooking water.

195. Other major rivers such as the Aragvi and Khadistkali rivers can be found in the wider area but will not be directly affected by the ARP. Although the ARP intends to utilize some of the KK Project Lot 2 facilities, e.g., camp and batching plant, these facilities and their impacts to the afore mentioned rivers have been assessed as part of the KK Project EIA and no further analysis of these issues are required in this IEE. Wetlands are discussed below under habitat.



Figure 27: 'Khevi' River

Source: Consultants own Photo. September 2021

6.2.5. Groundwater

196. The region is rich in ground water. Within the KK Project area and the ARP Project area a system of fissure aquifers in the Mesozoic sediments and in the volcanic rocks is present. Discussions with local villagers have indicated that there is no mineral water source on the Didveli plateau.

6.2.6. Water Supply

197. The ARP villages (Seturni, Jaghmiani, Zakatkari and Kaishaurni) are supplied with drinking water from Gudauri spring source through underground water pipes connected to the water tanks in the Didveli plateau. The drinking water tank supplying villages Jaghmiani and Kaishaurni is located about 15 meters from the proposed ARP (see Figure 28).

Figure 28: Water Tank



Source: Consultants own Photo. September 2021

6.2.7. Climate

198. Dusheti municipality comprises medium and high mountain areas. Elevation ranges from 870m to 4,000 masl, therefore the climate conditions are rather diverse. In the lower areas, the climate is moderately humid with mild winter and warm lengthy summer. Average annual temperature in the low-sited areas (870-899 masl) is 9.7 °C. Precipitation level is around 750mm. In the higher-sited areas the climate is more humid, precipitation level increases and ranges from 1,200 till 1,600mm.

199. The climatic characteristics of the Project area, based on Construction Climatology (PN 01.05-08, Tbilisi 2009) are given below (all sourced from the KK Project EIA, 2019):

Table 22: Air Temperature (°C)

Location	Average monthly												Average Annual
	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	
Gudauri	-6.7	-6.1	-2.6	2.0	6.8	10.5	13.2	13.3	9.3	5.2	-4.4	-4.4	3.3

Location	Abs min	Abs max	Aver max, hottest month	Coldest month 5-day average	Coldest month average	Coldest period average	Period with average monthly T<8C		Aver T at 13:00	
							Duration day	Aver T	Coldest month	Hottest month
Gudauri	-33	27	17.1	-16	-5	-7.9	263	-1.4	-3.9	15.0

Source: Environmental Impact Assessment for the Kvesheti-Kobi Road Section. 2019

Table 23: Relative Humidity

Location	Relative air humidity, %												
	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	Aver Annual
Gudauri	72	74	76	74	76	76	76	75	78	75	72	68	78

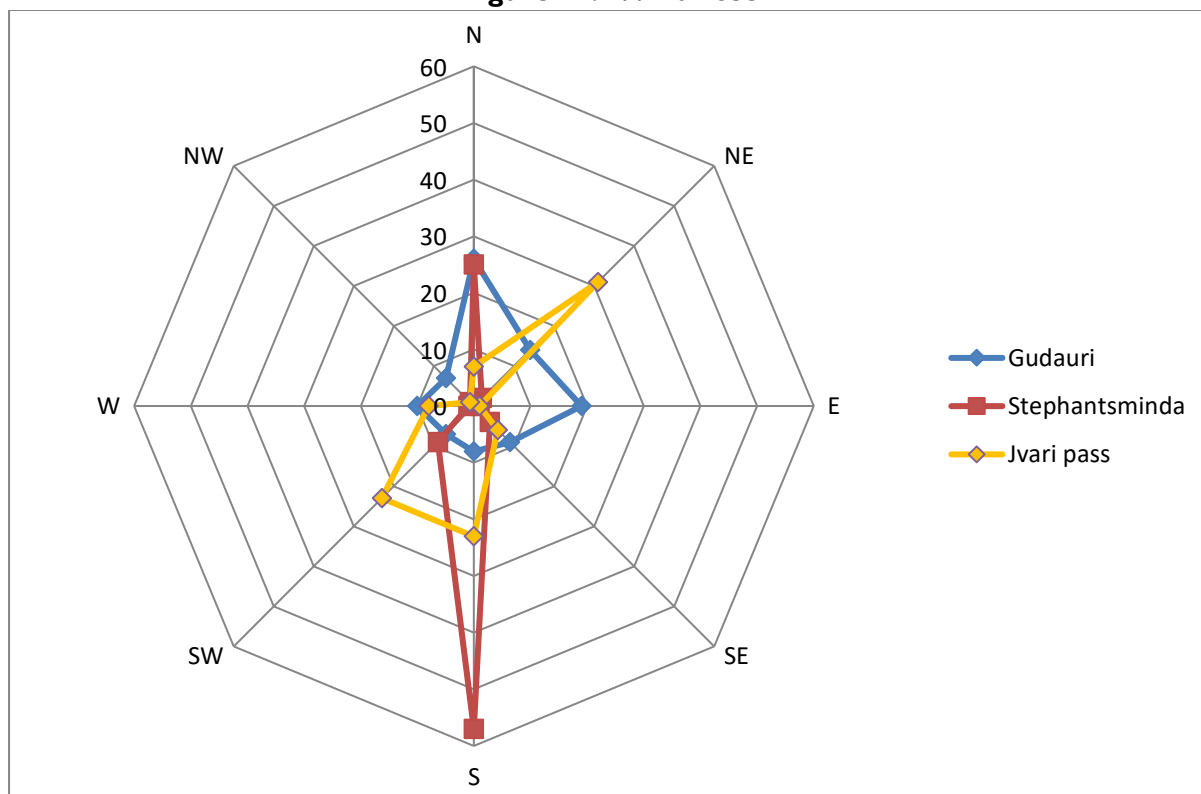
Source: Environmental Impact Assessment for the Kvesheti-Kobi Road Section. 2019

Table 24. Wind Characteristics

	Max speed once in 1,5,10,15,20 yrs, m/sec					Recurrence of direction (%) January, July							
	I	5	10	15	20	N	NE	E	SE	S	SW	W	NW
Gudauri	16	20	22	24	25	30/18	5/9	16/22	17/16	4/12	3/6	5/11	11/6
	Aver. Max & min velocity, m/sec		Wind direction and calm recurrence (%) per year										
	Jan	Jul	N	NE	E	SE	S	SW	W	NW	Calm		
Gudauri	4.3/0.5	2.8/0.2	26	14	19	9	8	7	10	7	72		

Source: Environmental Impact Assessment for the Kvesheti-Kobi Road Section. 2019

Figure 29. Wind rose



Source: Environmental Impact Assessment for the Kvesheti-Kobi Road Section. 2019

Table 25: Precipitation

Location	Precipitation per year, mm	Daily maximum, mm
Gudauri	1585	100

Source: Environmental Impact Assessment for the Kvesheti-Kobi Road Section. 2019

Table 26: Snow Cover

Location	Weight of snow cover, kPa	Days with snow cover	Water content in snow layer, mm
Gudauri	2.50	179	456

Source: Environmental Impact Assessment for the Kvesheti-Kobi Road Section. 2019

6.2.8. Climate Change

200. The KK Project Climate Risk and Vulnerability Assessment (CRVA)¹⁴ reviewed the current project design documents under the proposed KK Project, in the context of expected climate change for the area around 2050. The analysis was done based on the NASA-NEX ensemble of downscaled General Circulation Models (GCMs). The consideration based on the full ensemble for a medium stabilization scenario (RCP4.5) and a business-as-usual scenario (RCP8.5) allows for inclusion of the uncertainty in future climate in the assessment. The climate model analysis yields the following conclusions for the project area:

- Temperature increases by about 2°C (RCP4.5) to 2.7°C (RCP8.5) are to be expected.
- Minimum and maximum temperature are likely to change inconsistently, with maximum air temperatures increasing more than minimum air temperatures. This implies a larger diurnal temperature range for the future.
- Extremes related to temperatures (e.g., warm spells, extremely warm days) are likely to increase in frequency and intensity.
- Precipitation totals are likely to stay reasonably constant.
- Precipitation extremes are likely to increase in frequency and intensity. For example, maximum 1-day precipitation volumes with return periods of 25, 50 and 100 years are expected to increase by about 10%-20%.

6.2.9. Air Quality

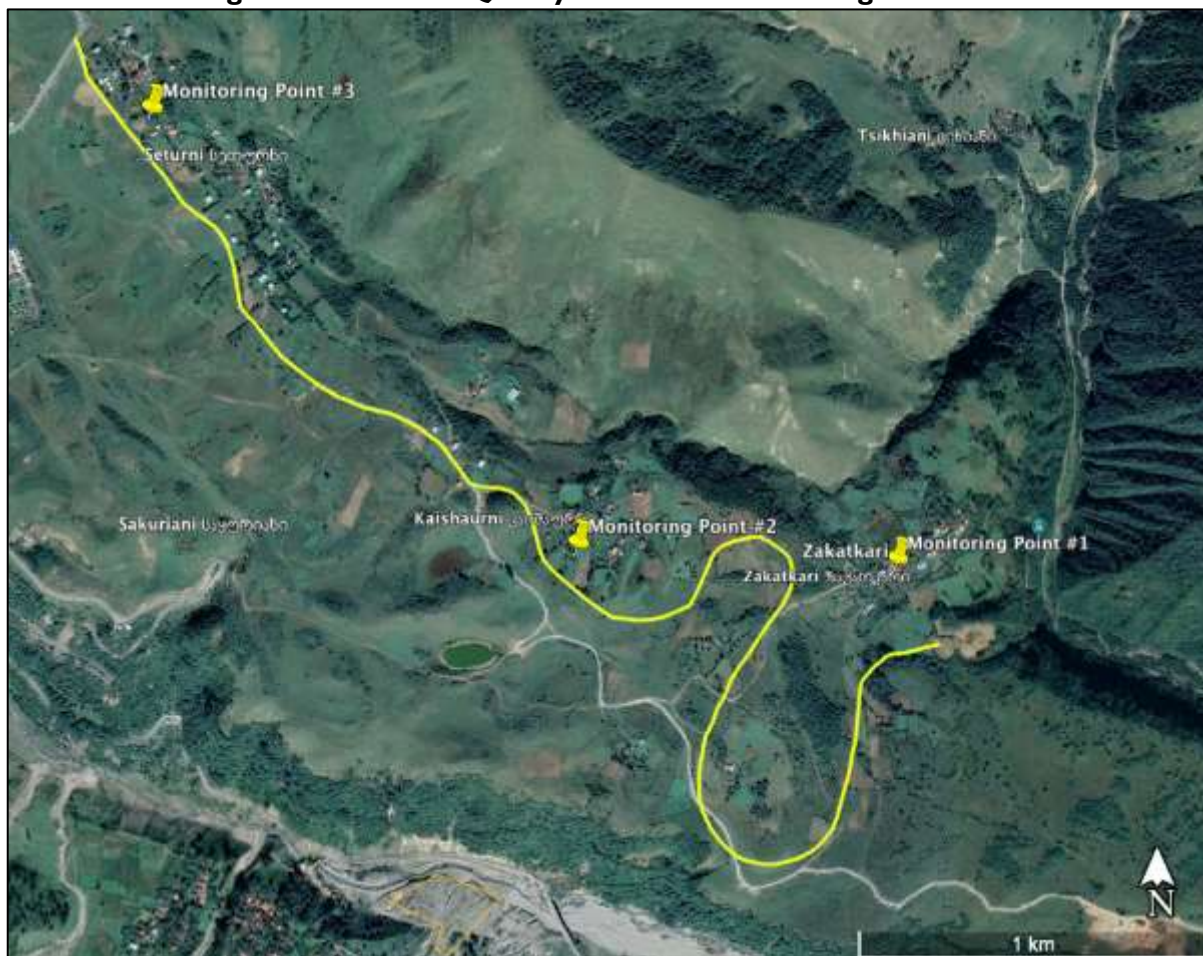
201. The ARP is in a remote rural region of Georgia. No point sources of significant emissions are present within the ARP area. The only source of emissions to air within the ARP corridor are from the occasional vehicles and from any wood burning for heating or cooking in the local villages.

202. Air quality monitoring was undertaken between 23-26 November 2021, at three locations within the ARP area to provide an overview of baseline conditions along the alignment. The locations of the monitoring are shown in the figure below (Figure 30).

203. The rationale for monitoring in these locations was because these three locations represent the locations of main groupings of sensitive receptors within the ARP area. The monitoring report is provided by Appendix E.

¹⁴ <https://www.adb.org/sites/default/files/linked-documents/51257-001-cca.pdf>

Figure 30: ARP Air Quality and Noise Monitoring Locations



Source: Google Earth

204. The results of the monitoring are provided in the table below. None of the values exceed Project standards.

Table 27: ARP Air Quality Monitoring Results

#	Location	PM10 ($\mu\text{g}/\text{m}^3$)	PM2.5 ($\mu\text{g}/\text{m}^3$)	SO ₂ (mg/m^3)	NO ₂ (mg/m^3)	CO (mg/m^3)	O ₃ (mg/m^3)
1	Zakatkari	28.39	5.70	<0.10	<0.10	<0.50	<0.05
2	Kaishaurni	36.05	10.47	<0.10	<0.10	<0.50	<0.05
3	Seturni	40.46	10.35	<0.10	<0.10	<0.50	<0.05
Project Standard		50	25	0.35	0.2	10	0.1

6.3. Biodiversity

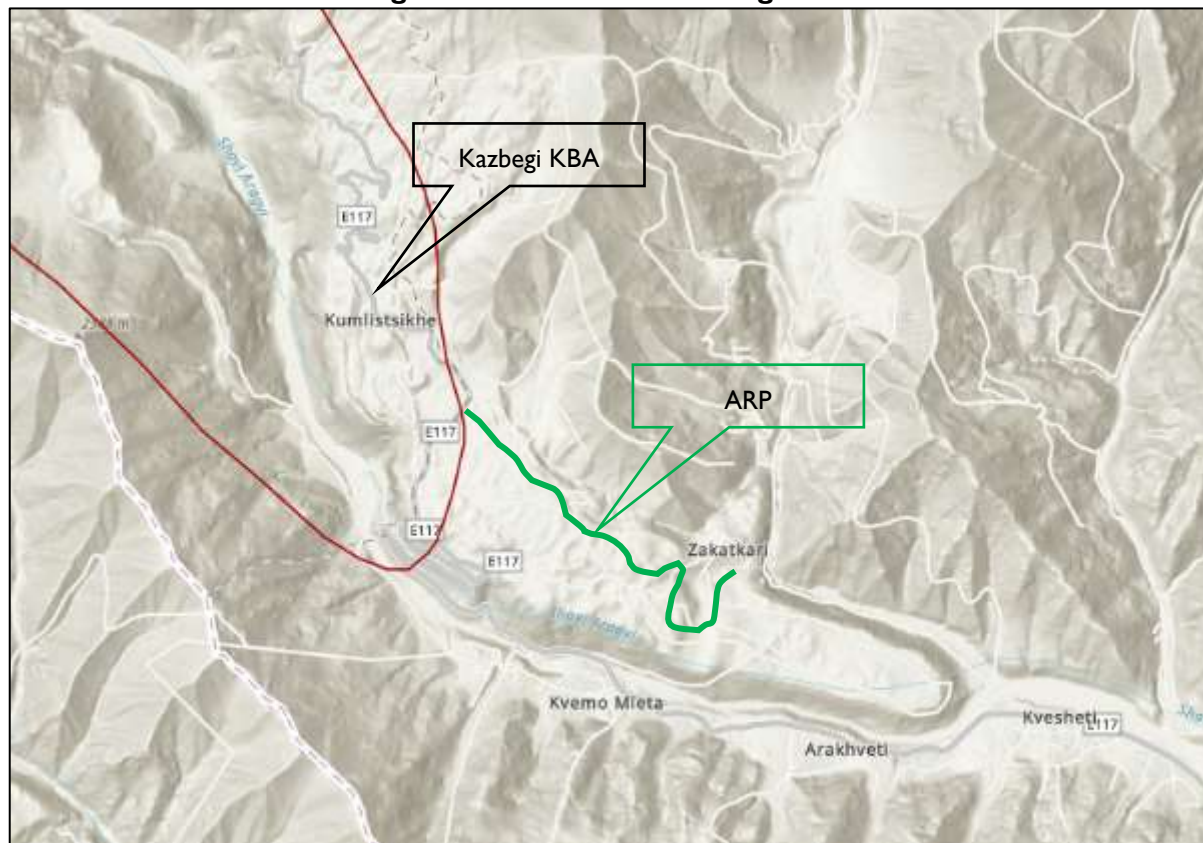
6.3.1. Protected and Notable Areas

205. **Biodiversity Hotspots** - Per the KK Project, the ARP sits within the Greater Caucasus Corridor¹⁵ biodiversity hotspot, an area of some 4.68 million hectares that cover most of the middle and high mountain areas of the Greater Caucasus Range. More details regarding this hotspot can be found in the KK Project EIA and Biodiversity Action Plan.

¹⁵ https://www.cepf.net/sites/default/files/final.caucasus.ep_.pdf

206. **Key Biodiversity Areas** – Key Biodiversity Areas (KBAs) are nationally identified sites of potentially **global** conservation significance which are identified based on the two key criteria of vulnerability and irreplaceability. The KBA delineation process suggests the exclusion of areas that have been converted to human use (e.g., urban areas, agricultural areas, and transportation corridors). The ARP, whilst very close to the Kazbegi KBA, does not cross into it, and in fact the portion of the Kazbegi KBA closest to the ARP is occupied by residential and agricultural properties.

Figure 31: Location of Kazbegi KBA



Source: <http://www.keybiodiversityareas.org/kba-data>. Accessed September 2021

207. **Important Bird Areas** - Important Bird and Biodiversity Areas (IBAs) are part of the KBA umbrella and are designated specifically because of their conservation value for bird species. Like KBAs, their identification is also based on a set of internationally agreed, standardized criteria based on the occurrence of “trigger” species that are considered vulnerable to global extinction or whose populations are otherwise irreplaceable.¹⁶

208. The **Kazbegi IBA¹⁷ (GEO21)** covers an area of almost 95,000 ha and includes the Kazbegi National Park and Protected Areas. Two trigger species have been recorded namely:

- **Caucasian Black Grouse** *Lyrurus mlokosiewiczzi* (IUCN NT) resident for which over 21 males have been recorded (category A1, A2); and
- **Corncrake** *Crex crex* (IUCN LC) with over 20 breeding pairs recorded (category A1).

209. Further details on both species are provided under “Birds” in the section below.

¹⁶ In Europe, the IBA criteria take into account the requirements of regional conservation treaties, such as the EU Birds Directive, the Ramsar Convention, the Emerald Network, the Helsinki Convention and the Barcelona Convention. Hence, IBAs are priority sites for conservation that should be protected by governments owing to their obligations under these legal instruments.

¹⁷ <https://sabuko.ge/iba/>, <http://datazone.birdlife.org/site/factsheet/kazbegi-iba-georgia>

210. This region of Georgia is also recognized for its importance as a migratory flightpath, with over 30,000 raptors a day recorded at peak migration times (including large numbers of black kite and steppe buzzards) and the autumn eagle migration often recorded as being particularly impressive.

211. The ARP, whilst very close to the Kazbegi IBA, does not cross into it, and in fact the portion of the Kazbegi IBA closest to the ARP is occupied by residential and agricultural properties.

Figure 32: Location of Kazbegi IBA



Source: <http://datazone.birdlife.org/site/mapsearch>. Accessed September 2021

212. **Nationally Designated Areas** – Georgia has over 500,000 hectares of protected areas, which cover over 7% of the country’s territory and are managed by the Georgian “Agency for Protected Areas”.¹⁸ These include:

- Strict nature reserves (IUCN Protected Area category I equivalent), with very limited public access and high level of protection (14 SNRs; 140,000 ha)
- National Parks (IUCN category II equivalent) where some recreational or traditional natural resource use may be permitted (10 NPs; 350,000 ha)
- Managed Nature Reserves (IUCN IV-VI), formerly hunting refuges. Poorly protected hunting and fishing and foraging may be permitted. No logging or drainage. (19 in total, 60,000 ha)
- National monuments (40 in total) small areas of rare and unique features. Limited use may be permitted.
- Protected Landscapes (2; 37,700 ha) managed by local municipality seek to support conservation objectives e.g., through promoting ecotourism.
- Multipurpose areas – none designated to date.

213. Georgia has also begun to designate areas under the “Emerald Network” approach to Protected Areas set up by the contracting parties to the Bern Convention.¹⁹ This network is intended to help ensure the conservation and protection of those habitats and species listed under Appendices I and II of the Convention and to link Areas of Special Conservation Interest (ASCIs).²⁰

¹⁸ www.apa.gov.ge

¹⁹ Convention on the Conservation of European Wildlife and Natural Habitats.

²⁰ This is as part of the EC program on “Establishment of the Conserved Area Emerald Network in South Caucasus and Central and East Europe”.

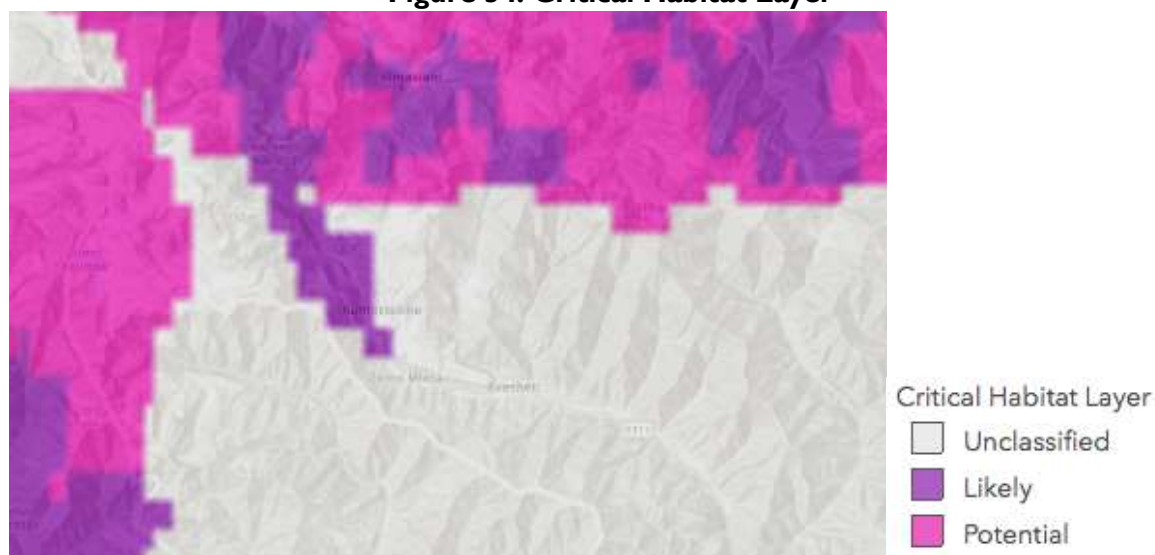
217. As per the IBA / KBA, the ARP is not located within the Park, its nearest point being several hundred meters away to the west of the existing road to Gudauri.

218. **Summary of Protected and Notable Areas** – The following summarizes the overall position with regard to the potential for Critical Habitat (CH) and Priority Biodiversity Features (PBF) arising from designated regions of conservation importance:

Table 28: Summary of Protected and Notable Habitats

Designation	Name	Proximity	Potential CH / PBF	Recommendation
Biodiversity Hotspots (WWF: priority place)	Greater Caucasus Corridor	Overlap	No	This does not trigger critical habitat, although critical habitat sites might be present within this regional unit. Special attention should be paid to endemic species at a site level.
Bird Migration Flyways	Central Asian and east Asia/East Africa	Overlap	No	This does not trigger critical habitat, although critical habitat sites might be present within this regional unit.
Key Biodiversity Areas (KBAs)	Proposed Kazbegi KBA	Adjacent	No	The ARP is not located within the KBA. Road works
Important Bird & Biodiversity Areas (IBAs)	Kazbegi / Khevi IBAs	Adjacent	No	The ARP is not located within the IBA. Road works
Emerald Network	Kazbegi National Protected Areas	Adjacent	No	The ARP is not located within the KBA. Road works
National Park	Kazbegi National Protected Areas	Adjacent	No	The ARP is not located within the KBA. Road works

Figure 34: Critical Habitat Layer



Source: UNEP - <https://data.unep-wcmc.org/datasets/44>. Accessed September 2021

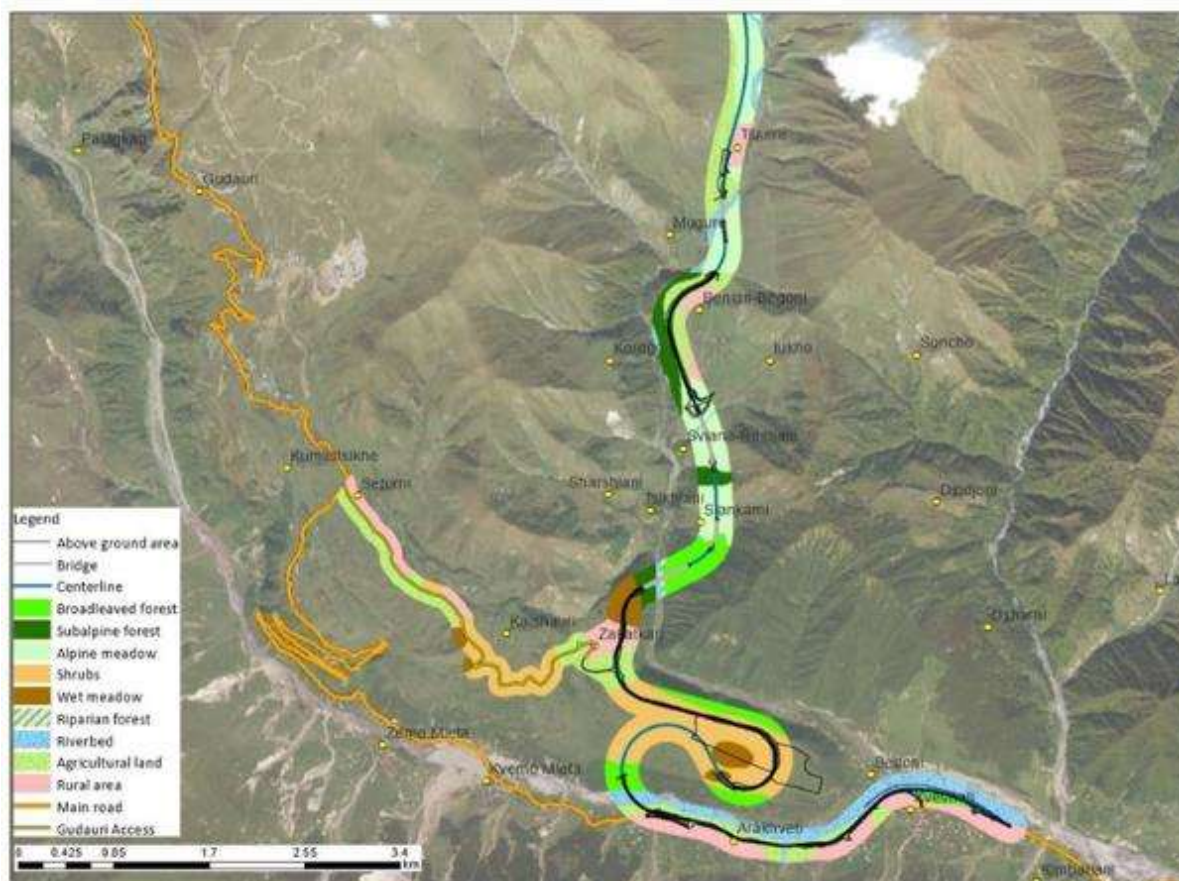
6.3.2. Notable Habitat

219. As part of the KK Project, a Supplementary Ecological Survey was undertaken in 2019. The survey included portions of the Didveli plateau, mainly along the existing track from Zakatkari to

the main road to Gudauri. The survey identified several habitats (as shown in the figure below), in the Didveli plateau:

- Agricultural land
- Shrubs
- Rural Areas
- Wet Meadow

Figure 35: Habitats Recorded in the Supplementary Ecological Survey, 2019



Source: Supplemental Ecological Survey. 2019. DG Consulting

220. The EUNIS habitat codes corresponding to those habitats identified within the ARP portion of the survey are presented in the below (agricultural areas and rural areas are not coded).

Table 29: EUNIS codes of habitats presented within the ARP portion of the survey area

Recorded habitat	EUNIS Code No.	EUNIS Code Name
Wet meadow	E5.	Woodland fringes and clearings and tall forb stands
Shrubs	F3.II.	Medio-European rich-soil thickets

Source: Supplemental Ecological Survey. 2019. DG Consulting

221. Wet meadow is natural habitat. According to the Supplementary Ecological Survey (2019), 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 be considered as sensitive because of the confirmed presence of orchid *Dactylorhiza urvilleana*. This species is rare in the Caucasus region. Other herbaceous plants were mostly of common species.

Figure 36: Wet Meadows



Source: Google Earth

Figure 37: Wet Meadow (B)



Source: Consultants own Photo, October 2021

Figure 38: Wet Meadow (A)



Source: Consultants own Photo, October 2021

222. Shrubs, agricultural areas, and rural areas are considered modified habitat. Modified Habitats are defined as “areas that may contain a large proportion of plant and/or animal species of non-native origin and/or where human activity has substantially modified an area’s primary ecological functions and species composition. Modified habitats may include areas managed for agriculture, forest plantations, reclaimed coastal zones and reclaimed wetlands.” Most of the areas affected by the scheme are considered modified habitat.
223. Several other habitats were also present on the Didveli plateau, including fragments of degraded broadleaved forest and shrubs of *Pyrus caucasica*, *Rhododendron luteum* and *Rosa sp.* However, these areas of habitat are located on the steep sides of the plateau and will not be impacted by the ARP.
224. The ARP will pass through shrub habitat for approximately 3km, after which it follows the existing track which comprises agricultural land and rural areas. Accordingly, the ARP traverses modified habitat for its extent. Habitat mapping by the United Nations Environment Programme confirms this (see Figure 39).

Figure 39: Habitat Mapping



Source: UNEP - <https://data-gis.unep-wcmc.org/portal/home/webmap/viewer.html?layers=29259063bad54c099ab01637011d31f1>. Accessed September 2021

225. Two wet meadows close to Kaishaurni have been identified, but at a distance of more than 150m from the alignment and they are not anticipated to be directly affected by the ARP. Given a construction corridor of 20m, it is anticipated that approximately 10 ha of modified habitat will be impacted. Whilst modified habitats still have the potential to support notable species (see chapter 6.3.3), none are considered notable.

6.3.3. Notable Species

Notable Flora

226. The KK Project EIA concluded that overall no Critically Endangered or Endangered flora species (either IUCN RL or Georgian RL) have been recorded from the KK Project area. All species identified as potentially present within the KK Project area to be affected are considered common across the region and this is considered also to be the case for the ARP area. Whilst none of the species recorded within the Project area are expected to trigger Critical Habitat or Priority Biodiversity Feature designations, specific additional surveys will be done for endemic plants prior to construction commencing.

227. The Supplemental Ecological Survey (2019) did however note the presence of *Dactylorhiza urvilleana* across the Didveli plateau. Interestingly, this species was not observed during pre-clearance surveys undertaken as part of the Lot 2 construction works on the Didveli plateau. A range of other species were encountered during these pre-clearance surveys, none of which has specific conservation status.

Notable Fauna: Birds

228. Birds in the ARP area are discussed under the headings of ‘residents’ and ‘passage’ species.

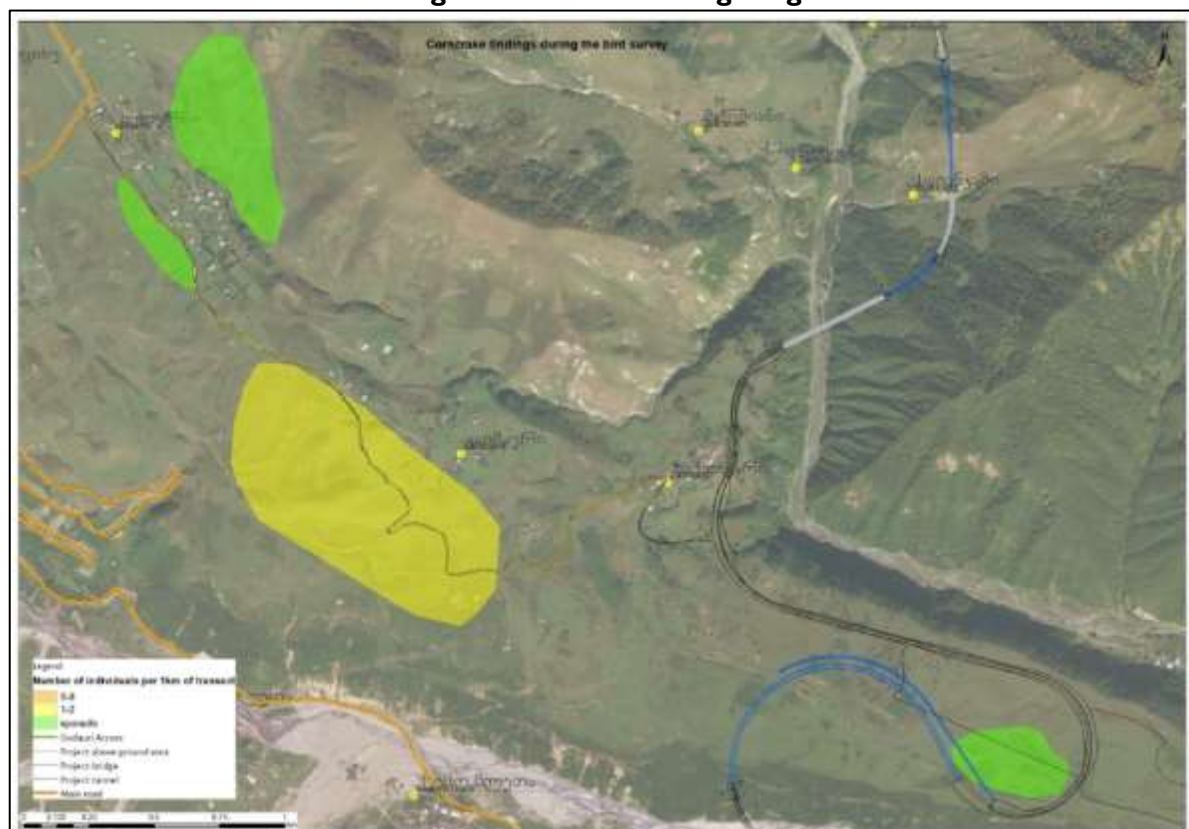
229. **Resident Species:** The Caucasus Eco-region supports over 400 species of resident birds, of which 35 are included on the Georgian Red List. These include a number of KBA and IBA trigger species namely: Caucasian Blackgrouse (*Tetrao mlokosiewiczi*); Caucasian snowcock (*Tetraogallus caucasicus*); Great rosinch (*Carpodacus rubicilla*); Gldenstdt’s Redstart (*Phoenicurus*

erythrogaster) and Corncrake (*Crex crex*). Other species of note known to breed in the Kazbegi National Park include golden eagle, lammergeyer, griffon vulture, Egyptian vulture and black vulture.

230. According to the KK Project EIA, out of the above mentioned IBA trigger species, only three could potentially be present in the KK / ARP area. Further analysis indicated that, in fact, only one of these species is known to be present in the ARP area:

- Caucasian snowcock (*Tetraogallus caucasicus*). According to the KK Project EIA, following consultations with national experts, this species is not expected to be present at the lower elevations affected by the KK Project (and thereby the lower elevations of the ARP).
- Caucasian black grouse (*Tetrao mlokosiewiczzi*). According to the KK Project EIA, consultations with national experts indicate that the species may be found occasionally close to Kobi and not within other portions of the KK Project area, including the ARP area.
- Corncrake (*Crex crex*). Significant populations are present in the Kazbegi valleys. The Supplemental Ecological Survey (2019) identified the Corncrake at several locations on the Didveli plateau, as shown in the figure below.

Figure 40: Concrake Sightings



Source: Supplemental Ecological Survey, 2019. DG Consulting

231. Anecdotal evidence had indicated that a single pair of Egyptian Vultures may nest in some years near the proposed KK Project Tunnel 1 portal in Kvesheti (on the southern cliffs of the Didveli plateau) and in other years may nest elsewhere in the broader Project vicinity. However, no evidence of the Vulture has been found since a sighting in 2018.

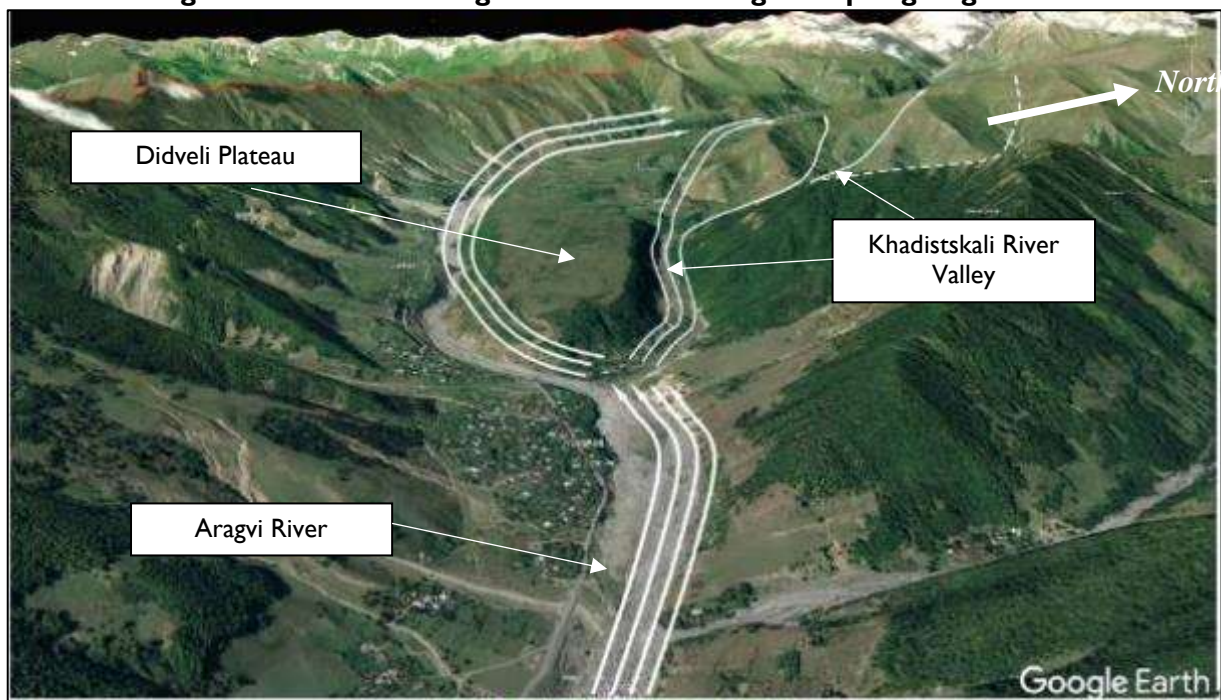
232. For all other species of interest, such as the Black (Cinereous) Vulture (*Aegypius monachus*), Griffon vulture (*Gyps fulvus*), Bearded vulture (Lammergeyer) (*Gypaetus barbatus*), Golden eagle (*Aquila chrysaetos*), Long-legged Buzzard (*Buteo rufinus*), the Lesser Kestrel (*Falco naumanni*), Saker Falcon (*Falco cherrug*) and the Peregrine Falcon (*Falco peregrinus*), the findings of the KK Project EIA are applicable to this IEE and no further discussion of these species is warranted.

233. **Passage Species** - The Caucasus is recognized 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 recognized 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 reported to pass the mountains via the Jvari Pass avoiding higher mountains. The importance of this flyway has been one of the reasons for the designation of the Kazbegi IBA.

234. As part of the KK Project, several bird surveys were undertaken during Autumn 2018, Spring 2019 and Autumn 2019. A range of migrating species were observed during the surveys. Overall, for the Booted Eagle, Black Kite, Honey Buzzard, Common Buzzard and majority of others, the results indicate that during the spring migration:

- Most 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 Terigi valley. Only a very small number of birds continue to follow Khada valley and cross the Caucasus at high altitudes over the mountains.
- 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.

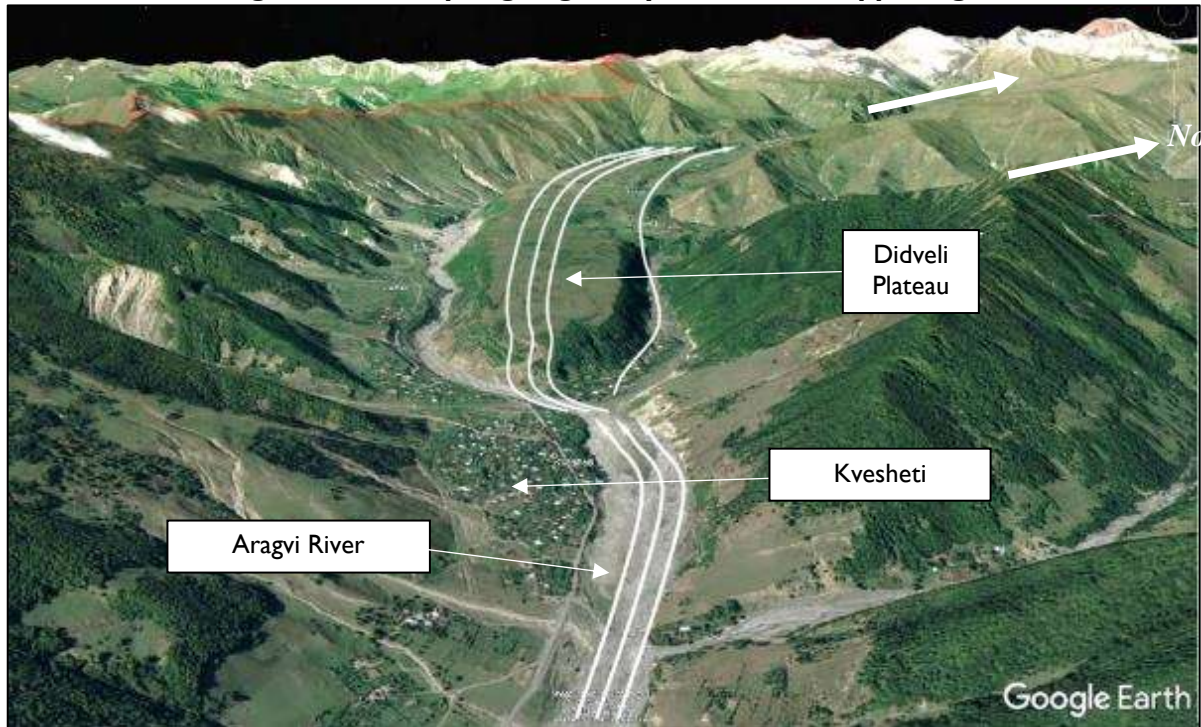
Figure 41: The main migration routes during the Spring migration



Source: Supplemental Ecological Surveys. Bird Migration Survey Autumn 2019. DG Consulting

235. 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. Most 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 42).

Figure 42: The spring Migratory routes for Steppe Eagle



Source: Supplemental Ecological Surveys. Bird Migration Survey Autumn 2019. DG Consulting

236. Pre-construction surveys undertaken by the KK Project Lot 2 Contractor on the Didveli plateau during spring 2021 identified several bird species between Seturni and Zakatkari. No special status species were observed, and all species were IUCN Least Concern (LC) and not found on the Red List of Georgia.

Notable Fauna: Large Mammals

237. The KK Project EIA noted that several large mammal species are present in the region. These include three KBA trigger species (Eastern Caucasian Tur (*Capra cylindricornis*); Caucasian Chamois (*Rupicapra rupicapra*); and Brown Bear (*Ursus arctos*)); and a further five “notable” species (Georgian Red List/ IUCN Red List CR, EN or VU, Habitats Directive).

- Caucasian Chamois (*Rupicapra rupicapra*) (*ssp caucasica*) (IUCN: LC; GRL: EN). The species has not been recorded within the ARP area and is considered unlikely to be present because of hunting pressure.
- Eastern Caucasian Tur (*Dahestanian Tur Capra cylindricornis*) (IUCN: NT; GRL: EN). It has not been recorded within the ARP area and is considered unlikely to be found there.
- Brown Bear (*Ursus arctos*) (IUCN: LC; GRL: EN; HD: II, IV)
- Eurasian Lynx (*Lynx lynx*) (IUCN: LC; GRL: CR; Special Concern; HD: II, IV).
- Eurasian Otter (*Lutra lutra*) (IUCN: NT; GRL: VU; HD: II, IV). There is no suitable habitat for this species within the immediate ARP area.
- Gray Wolf (*Canis lupus*) (IUCN: LC; Not GRL; HD: II, IV)

238. No large mammals were identified during pre-construction surveys undertaken by the KK Project Lot 2 Contractor on the Didveli plateau during spring 2021.

Notable Fauna: Bats

239. The Project area is considered to contain suitable habitat for some 19 of Georgia’s 30 bat species. Most of these species are listed by IUCN and nationally as of “Least Concern” status with the exception of the following notable species:

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

240. Bat surveys were undertaken as part of the Supplementary Ecological Survey (2019) in parts of the Didveli plateau, including close to Zakatkari and Kaishaurni. The survey, undertaken on 20/06/2019, noted that ‘high bat activity was observed’ and the following species were identified:

- Common pipistrelle (*Pipistrellus pipistrellus*)
- Serotine bat (*Eptesicus serotinus*)
- Noctule (*Nyctalus noctula*)
- *Nyctalus sp*
- *Myotis sp*
- Daubentons’ bat (*Myotis daubentonii*)

241. During autumn surveys (01/10/2019), the bat activity near the village Kaishauri was high again, although only one bat species - Common Pipistrelle Bat (*Pipistrellus pipistrellus*) was recorded at this location. Pre-construction surveys undertaken by the KK Project Lot 2 Contractor on the Didveli plateau during spring 2021 identified two bat species between Seturni and Zakatkari, Common pipistrelle (*Pipistrellus pipistrellus*) and Noctule (*Nyctalus*), both of which are IUCN LC and not found on the Red List of Georgia.

Notable Small Mammals

242. The Project area is expected to support many species of small mammals including two KBA trigger species (Long-clawed mole (*Prometheomys schaposchnikowi*) and Kazbegi Birch Mouse (*Sicista kazbegica*)); and two others²³ that are included in the Georgian Red List and/or listed in the IUCN Red List as CR, EN or VU.

- Long-clawed mole (*Prometheomys schaposchnikowi*) (IUCN: LC; GRL: VU). Sole representative of a monotypic genus which is endemic to the region. Found in the Alpine zone in tall grass meadows on slopes with long-standing snow cover but also found on meadows inside forest and on arable land. Avoids steep slopes and rocky places. Recorded from isolated montane areas and has a fairly small range, but there are no major threats, and the species has been found in degraded areas such as arable land.
- Kazbegi Birch Mouse (*Sicista kazbegica*) (IUCN: EN, GRL:VU). This mouse is endemic to the Kazbegi region and found across the area. It lives in mixed forest (1,500-2,300 masl) and subalpine meadows with tall grass and is locally common. Little is known about it, but it is reported to spend much of the day in shallow burrows, and eats insects, fruits, and seeds. Habitats are reported to be threatened by over-grazing.
- Caucasian Squirrel (*Sciurus anomalus*) (LC; VU). Still relatively abundant where found, the species lives mostly in mixed and deciduous forest. IUCN range maps indicate it may be resident in the study area.
- Grey dwarf hamster (*Cricetulus migratorius*) (LC; VU). This species has a very wide range and is abundant in at least parts of its range. No major threats are known at the global level. It originally occurred in dry grasslands, steppes and semideserts. Now, it also inhabits agricultural land and gardens, sometimes even living in houses. Arid areas with relatively sparse vegetation are

²³ Four species of insectivores and five species of rodents that are endemic to the Caucasus occur in and around the Kazbegi Park, primarily associated with birch forest and grassland habitats.

preferred, and forests and damp habitats are avoided. IUCN range maps indicate it may be resident in the study area.

243. A number of non-Georgian Red List and IUCN LC species are also listed by IBAT as potentially present in the Project area ²⁴.

Notable Reptiles and Amphibians

244. The Caucasus support some 77 species of reptiles and 14 species of amphibian, of which 28 reptiles and 4 amphibians are regional endemics. Within the Project area, there are few records of herpetofauna, although IBAT records that the following species of note may be present:

- Tessellated Water Snake (*Natrix tessellate*) (IUCN LC; HD Annex IV). A largely aquatic species that appears not to be globally threatened is common in much of its range. It is threatened by loss or modification of wetland habitats in parts of its range, for example through river channelization. It is often killed by road traffic, particularly in the mating season and was recorded as present in the project area.
- Dinnik’s Viper (*Vipera dinniki*) (IUCN: VU; GRL: VU). Extent of occurrence is less than 20,000 km², its distribution is severely fragmented, and there is continuing decline due to persecution, over-collecting and overgrazing of its habitat. It inhabits the upper-forest zone, stream borders, shrub forests, subalpine and alpine meadows, rocky scree, talus slopes and montane moraines. An endemic species recorded from across the upper-forest zone, stream edges, shrub forests, subalpine and alpine meadows, rocky scree, and montane moraines of the Caucasus. A potential resident within the Project area, little is known about this species, which will eat small rodents, lizards, frogs and the young of ground nesting birds. It is however threatened by persecution, over-collecting and overgrazing of its habitat.
- European Tree Frog (*Hyla arborea*) (IUCN: LC; HD IV). A widespread lowland species that has been recorded up to 2,300 masl and is common in suitable habitats in parts of its range. Generally associated with open, well-illuminated broad-leaved and mixed forests, bush and shrublands, meadows, gardens, vineyards, orchards, parks, lake shores and low riparian vegetation.

245. Other species recorded in IBAT as IUCN Least Concern, Near Threatened or Data Deficient (but not GRL listed or in the Habitats Directive Annex II or IV) include the following²⁵:

Table 30: Other Recorded Species Potentially Present in the Project area

Reptiles		Amphibians	
Caucasian lizard	<i>Darevskia caucasica</i> ,	Marsh Frog	<i>Pelophylax ridibundus</i>
Spiny-Tailed Lizard,	<i>Darevskia rudis</i>	Brusa Frog.	<i>Rana macrocnemis</i>
Caspian Green Lizard	<i>Lacerta strigata</i>	Caucasian toad	<i>Bufo verrucosissimus</i> (NT)
Meadow Lizard	<i>Darevskia praticola</i> (NT)	Northern Banded Newt	<i>Ommatotriton ophryticus</i> (NT)
Dahl’s Whip Snake	<i>Platyceps najadum</i>	Varying Toad	<i>Bufo variabilis</i> (DD)
Transcaucasian Rat Snake	<i>Zamenis hohenackeri</i> ,		

246. Pre-construction surveys undertaken by the KK Project Lot 2 Contractor on the Didveli plateau during spring 2021 identified only one reptile, the Caucasian Lizard (*Darevskia Caucasia*) - IUCN LC and absent from the Red List of Georgia.

²⁴ Several of these are Caucasian endemics, including : Brandt’s hamster (*Mesocricetus brandti*), Red-backed vole, *Myodes glareolus ponticus*, Radde’s Shrew (*Sorex raddei*) Shelkownikov’s Water Shrew (*Neomys schelkownikovi*) and Gudauri Snow Vole *Chionomys*.

²⁵ Grass Snake (*Natrix natrix*) has also been recorded on site.

Notable Invertebrate

247. Many of species of invertebrates are likely to inhabit the ARP area. Whilst data on invertebrates in Georgia is generally poor, no species were identified in the KK Project EIA that are listed as critically endangered or endangered by IUCN, and KK Project field surveys did not identify any species nationally red listed. One species, the River Orb Mussel (*Sphaerium rivicola*), is listed as Vulnerable, and two others (*Potamon ibericum* and *Sphaerium solidum*) are listed as Near Threatened. This, however, is likely to reflect a paucity of recording rather than the real situation, for example.

248. Pre-construction surveys undertaken by the KK Project Lot 2 Contractor on the Didveli plateau during spring 2021 identified four species between Seturni and Zakatkari. No special status species were observed, and all species were IUCN LC and not found on the Red List of Georgia.

Notable Fish

249. The ARP will not impact directly on any surface waters or fish species. Any indirect impacts, e.g., those resulting from construction camps, are considered within, and assessed by the KK Project EIA²⁶.

6.3.4. State Forest Fund

250. The State Forest Fund (SFF) is a state-managed/controlled forest area under the management of the MoEPA but is not a protected area. Though it is not protected, for the purpose of controlling its use, the MoEPA requires all trees to be taken off the SFF registration or “de-listed” before they can be cut. Mapping prepared as part of the KK Project EIA and for the KK Project Lot 2 Biodiversity Management Plan indicates that the ARP will not impact upon State Forest Fund (see Figure 43).

²⁶ Environmental Impact Assessment for GEO: North–South Corridor (Kvesheti-Kobi) Road Project/December 2018
<https://kveshetikobiroad.ge/wp-content/uploads/2020/09/Environmental-Impact-Assessment.pdf>

Figure 43: State Forest Fund in the Project Area



Source: Kvesheti – Kobi Biodiversity Management Plan. China Railway 23rd Bureau Group. Ltd. 2020

6.4. Socio-Economic Environment

251. The following section of this chapter is based on information from the official Georgian statistics for the region and the data collected through the Socioeconomic Survey and Census²⁷ undertaken during the preparation of the Addendum to the KK Project LARP. The data presented is specific to the ARP area.

6.4.1. Administration and Demographics

252. The ARP is part of the Lot 2 of the KK Project, and it is in Dusheti municipality. The main town in Dusheti municipality has a population of 25,659.

Table 31: Population in Project Municipalities

Municipality	Male	Female	Total
Dusheti	12,785	12,874	25,659

Source: Municipality administration

²⁷ The socioeconomic survey (SES) in the area covered by the ARP was conducted from 20 November 2018 to 3 December 2018. The SES aimed to sample 100% of all affected households. The resettlement team completed the socioeconomic study with 50 (78.25%) out of 64 households. The owners of 14 AHs have not been located as they do not live at the locations where the land and other assets are acquired. In total, the Project impacts 64 households with 183 members (94 male and 89 female). During the SES of AHs, representatives of 50 AHs (183 APs) were interviewed. Out of these, 13 (26%) were heads of households. There were 4 persons per surveyed household on average.

253. In terms of impacts to land plots, the ARP impacts three villages – Seturni, Jaghmiani,²⁸ and Zakatkari. There are 168 people (81 males and 87 females) living in these villages. Kaishaurni village will also be impacted by the ARP, but no land plots in this village will be affected.

Table 32: Population in Affected Persons' Villages

Village	Total	Male	Female
Seturni	55	27	28
Jaghmiani	56	24	32
Zakatkari	57	30	27
Total	168	81	87

Source: Addendum to the Land Acquisition and Resettlement Plan. June 2019.

254. In total, there are 50 project affected households (AHs) with 94 males and 89 females. There are 10 female-headed households. More than two thirds (35 AHs, 70%) of surveyed households have nuclear families. Extended families comprise 30% of all surveyed families. The household size of the surveyed population ranges from one to eight persons in a household. A total of 26 AHs (52%) have up to 4 members in a household. All affected persons (APs) are Georgians who are Orthodox Christian.

Table 33: Type of Families

Family Type	Number of AHs	Percentage (%)
Nuclear	35	70%
Extended	15	30%
Total	50	100%

Source: Addendum to the Land Acquisition and Resettlement Plan. June 2019.

255. The age distribution of the surveyed population for the ARP shows that the 18-35 age group was the most represented (23%). When the two age groups, 0-7 and 8-17 are combined, minors account for 14% of the surveyed population. The 36-45 and 46-55 age group accounts for 15% each, while 56-65 age groups account for 13%. The 66 and above age group accounts for 20% of the surveyed population. When the groups 18-65 years of age are combined, the working age population amounts to 75.96%.

Table 34: Age

Age	All AH members			
	Male	Female	Total	Age group%
0 - 7	6	2	8	4%
8-17	9	10	19	10%
18 - 35	25	17	42	23%
36 - 45	11	17	28	15%
46 - 55	17	10	27	15%
56 - 65	9	14	23	13%
66 or more	17	19	36	20%
Total	94	89	183	100%

²⁸ Jaghmiani is situated adjacent to Kaishaurni and, for the purpose of this report, they are often referred to simply as Kaishaurni, except where specific issues relating to Jaghmiani are discussed, e.g., those relating to affected households.

256. Married APs account for 46% of all APs. A total of 9% of APs are widowed and 3% divorced. Unmarried APs and minors account for 36%.

Table 35: Marital Status

Marital status	Male	Female	Total	
	No	No	No	%
Married	43	43	86	46%
Unmarried	43	24	67	36%
Widowed	3	14	17	9%
Divorced	4	1	5	3%
Total	93	82	175	

Source: Addendum to the Land Acquisition and Resettlement Plan. June 2019.

257. The following table shows a high level of literacy among the surveyed population. Almost a half (45%) APs have completed secondary education and 28% obtained a university degree. A further 14% obtained vocational education. There is one illiterate AP among the surveyed population.

Table 36: Education Level of APs

Education level	Male	Female	Total	
	No	No	No	%
No education	0	1	1	1%
Nursery	6	0	6	4%
Primary school	1	2	3	1%
Incomplete secondary	3	4	7	4%
Secondary education	44	37	81	45%
Technical/other college	13	15	28	14%
Incomplete higher	3	3	6	3%
University degree	24	27	51	28%
Total	94	89	183	100%

Source: Addendum to the Land Acquisition and Resettlement Plan. June 2019.

258. Migration in the area has significantly decreased in recent years in contrast to the Khada Valley. On the contrary, families return to the APR area, part of them only seasonally - from early spring to late autumn, and winter is still spent in Tbilisi, but some of them permanently. This was significantly facilitated by preferential tariffs for the mountainous regions, such as electricity and natural gas tax breaks, as well as increased employment opportunities at the Gudauri winter resort.

6.4.2. Local Economy

259. A great majority (82%) of surveyed household has a latrine and 36% has a hot water system. Mobile phones are used by 88% surveyed households. Televisions and satellite antennas are available in 94% and 80% of the AHs respectively. Electric or gas stoves are available in 42 AHs (84%). Refrigerators and washing machines are owned by 68% and 66% of households, respectively. Utilities such as computer and an Internet connection are available in 20% and 22% respectively. There were no other assets listed by the APs.

Table 37: Households Assets and Amenities

Items	No of AHS	%
Latrine	41	82%
Hot water system	18	36%
TV	47	94%

Items	No of AHS	%
TV antenna/dish	40	80%
Computer	10	20%
Internet	11	22%
Mobile phone	44	88%
Electric/Gas stove	42	84%
Refrigerator	34	68%
Washing machine	33	66%
Total	50	100%

Source: Addendum to the Land Acquisition and Resettlement Plan. June 2019.

260. A pharmacy is available only in Gudauri which does not operate every day; the choice of medicines is limited and prices are higher than usual. The locals must ask public bus drivers to buy medicines for them in Tbilisi.

261. APs who live in the ARP villages permanently keep some cattle. The APs sow potatoes and cabbage which can be cultivated successfully under such climatic conditions. The vegetables are used for the households' own consumption, and nobody reported selling vegetables. The villagers cultivate cherries, wild pears, sour plums, plums, apples, and hazelnut. All harvested fruit is used for personal consumption.

262. Hay is the main product produced in these villages. Grass is left to grow on some lands so that the villagers can harvest enough hay for the winter. Hay is also used for their own livestock, and in these villages, there was no sale of hay reported.

263. Employment and income data were collected from 158 APs. All data is self-reported. Pensioners are represented with 27%. Work in the private sector and work as a civil servant, are accounting for 25% and 11% respectively. Housewives make up 6%. The unemployment rate among the surveyed APs is 19%. (Table 38).

264. A household level data shows that 17 (39%) households stated pension as their primary source of income. Salary and wages are primary source of income for 22 (50%) AHs. Agriculture, rent, and remittance are primary source of income for one household in each category. The data shows that, out of 44 households which provided the data, 10 AHs (23%) have some secondary source of income. Pensioners are most likely to have a secondary source of income (16%) (Table 39).

Table 38: Type of Employment

Type of employment	Number	%
Civil servant	18	11%
Private sector employee	39	25%
Self-employed	10	6%
Farmer	1	1%
Unemployed	30	19%
Pupil/Student	9	6%
Pensioner	42	27%
Housewife	9	6%
Other	0	0%
Total	158	

Source: Addendum to the Land Acquisition and Resettlement Plan. June 2019.

Table 39: Primary Source of Income

Source of Income	Primary income (No of AHs)	%	Secondary income (No of AHs)	%
Salary/wages	22	50	2	5
Business	2	5	0	0
Agriculture	1	2	1	2
Rent	1	2	0	0
Remittance	1	2	0	0
Pension and Government allowances	17	39	7	16
Total	44 (Without double counting)	100	10	23

Source: Addendum to the Land Acquisition and Resettlement Plan. June 2019.

265. Data on income is self-reported and was obtained from 44 surveyed households. The data on households' monthly income ranges from 100 to 1,500 Gel per household. Most of the respondents (32%) have income between 300 and 600 Gel. A quarter of households (25%) have their monthly income between 600 and 1,500 Gel per month. An income less than 300 Gel per month was reported by 16 % of surveyed households while 27% have monthly income above 1,500 Gel. The average household income amounts to 974.62 Gel per month. This contrasts with data from the KK Project EIA where 70% of survey respondents' incomes were less than 600 GEL per month.

266. Income and expenses were self-reported by surveyed persons. The average monthly expenditure for a household was around 862.60 Gel per month. It was difficult to get itemized information on monthly expenses for food, clothing, schooling, healthcare, etc., so total monthly expenditures were obtained from the respondents instead. The self-reported monthly income and expenditure for each of the surveyed household, are presented in the following table:

Table 40: Self-reported Monthly Income and Expenses

Monthly income (Gel)	No of AHs	%	Monthly expenses (Gel)	No of AHs	%
<300	7	16	<300	9	20
301-600	14	32	301-600	13	30
601-1,500	11	25	601-1,500	12	27
>1,500	12	27	>1,500	10	23
Total	44	100		44	100

Source: Addendum to the Land Acquisition and Resettlement Plan. June 2019.

267. A total of 15 AHs (30%) reported having a bank or a microfinance organizations loan. Information about the purpose of their bank loans was unavailable. The APs reported slightly more income per month than expenditures per month. Women mainly work as housekeeper in hotels and tourist centres. They also sell knitwork and dairy products to hotels in Gudauri.

6.4.3. Tourism

268. According to a recent report by the ADB,²⁹ Gudauri winter resort is crucial for the local community in terms of employment. Locals mainly work at hotels and in construction. However,

²⁹ Source: North-South Corridor (Kvesheti-Kobi) Road Project. Community Needs Assessment and Technical Inputs for Community Development and Landscape Conservation Planning. ADB. January 2021

the employment is seasonal. Lack of stable jobs is a significant challenge for the local population. The report notes that the locals have different views about the development of tourism potential in the villages. For example, they think that development of tourism in Bedoni village is less likely because the village is not attractive enough". In contrast, other villages like Zakatkari, stand out because of their ancient towers and temples, as well as nice landscapes, which attract many tourists even as they are now. One-day hiking is still popular and the proximity to Tbilisi plays a significant role too.

269. The major impediment to tourism development is the absence of adequate infrastructure, especially guesthouses. In general, there are no hotels and food facilities in the villages. However, many tourists ask for places to stay overnight and for food facilities. Tourist trails are also not marked. There are no touristic signs after the deviation from the main road. There is also no tourist transportation service, even by horse, or infrastructure for people with disabilities.

270. According to recent reports by ADB, should there be a normal road connecting Zakatkari and Seturni and guest houses, it is likely that some of Gudauri tourists will choose Zakatkari as an overnight spot.

6.4.4. Land Use and Landscape

271. Land use in the ARP area is dominated by pastureland and the small residential villages identified above (see Figure 44). There are no commercial activities in this location but there are several gas pipeline facilities and electricity transmission / distribution towers / poles that traverse the heavily modified landscape along with an important fibre optic internet cable to Gudauri. In terms of landscape, the Didveli plateau provides some interesting vistas towards Kudebi Mountain, the Khada valley and south over the Aragvi river valley; however, portions of the plateau landscape are affected by the energy infrastructure located here (see Figure 44 and Figure 45). The topic of cultural landscape is addressed below as part of item 6.4.7 - Physical Cultural Heritage.

Figure 44: Didveli Plateau, looking east



Source: Consultants own Photo, September 2021

Figure 45: Didveli Plateau, approximately KM 1



Source: Consultants own Photo, September 2021

6.4.5. Infrastructure

Accommodation

272. Accommodation in the Project area is typically constructed of stone and/or wood and in villages, co-located with animal shelters, vegetable gardens and other structures. Figure 46 illustrates the typical types of properties that can be found in the ARP area. None of the villages have a centralized sewage system. The population uses septic pits, which are generally located in the yards, far from the houses.

Figure 46: House on Didveli Plateau



Source: Consultants own Photo, October 2021

Energy and Water Supply

273. All ARP villages have electricity, gas, and a supply of drinking water in house or in front of the houses. In winter, residents generally leave taps on to avoid freezing of water in the pipes. Due to the latter, scarcity of water is observed; furthermore, leaving taps open causes additional damage to internal roads of the villages due to the absence of storm water and sewerage systems.

274. There is mobile phone reception in the village and some TV programs are available.

275. The Didveli plateau is host to a number of energy supply networks. They include:

- JSC Energo-pro 6/10kV Electricity Distribution Lines
- JSC Energo-pro 110kV Electricity Transmission Lines
- JSC Georgian Oil and Gas Corporation Pipelines
- SOCAR Georgia Gas Pipelines

276. Only the 6/10kV electricity distribution lines serve the residents of the project area. All other infrastructure is transiting the plateau.

Waste Management and Sanitation

277. There are one landfills in the municipality managed by the Solid Waste Management Company of Georgia. Waste collection is responsibility of municipal utilities. In 2017, under an EBRD-funded project, waste management equipment (trucks, containers) was provided. There are no hazardous waste disposal facilities in the area.

278. Participants in Focus Group Discussions for the KK Project EIA reported that each village has a centralized waste collection point for non-compostable wastes, which is collected weekly by the

Municipal Waste Management Company and deposited in the above referenced landfill. Some households have compost used on vegetable plots. Sanitation is provided through septic tanks.

Transport Infrastructure

279. Within the ARP area, transport infrastructure is limited to some gravel tracks that traverse the Didveli Plateau. There is no paved road in the project area and no public transport.

Figure 47: Track crossing Didveli Plateau (Jaghmiani village)



Community Facilities

280. There is a primary school in Seturni village and there is only one pupil attending the school. Schools, medical facilities, and shops are available only in Gudauri. Children from Zakatkari and Jaghmiani villages are going in school in Gudauri which is 5-6 kilometers away. From Zakatkari village, transportation is possible only by off-road vehicles during heavy snow. Transportation services are not provided for the pupils of Zakatkari village. Since it is very difficult (and in some cases even impossible) for children to be taken to school every day, seasonal migration has occurred, where some of the families who have school-age children move to other places in winter.³⁰

281. There are first aid and pharmacy services in Gudauri. For all other than basic medical services, people are traveling to Tbilisi.

6.4.6. Noise

282. The ARP is in a remote rural region of Georgia. No sources of significant levels of noise are present within the ARP area. Noise monitoring is being undertaken at three locations within the ARP area to determine the baseline conditions. The locations of the monitoring are shown in Figure 30. The rationale for monitoring in these locations was because these three locations represent the locations of the main sensitive receptor groups within the ARP area.

³⁰ Source: North-South Corridor (Kvesheti-Kobi) Road Project. Community Needs Assessment and Technical Inputs for Community Development and Landscape Conservation Planning. ADB. January 2021

283. The environmental noise measurement method ISO 1996-2 was followed for environmental noise measurements. IEC 61672- 1 class I sound level meters were used for the measurements. Sound level meters were placed at the monitoring locations. The methodology for the noise monitoring activity is provided in Appendix B which includes the noise monitoring report. The results of the monitoring exercise at these three locations are provided in the table below.

Table 41: Processed Averaged Noise Measurement Results

Point	Location	L _{dn} (dBA)		
		L _d (07.00-22.00)	L _n (22.00-07.00)	L _{dn}
1	Zakatkari	43.0	41.0	47.7
2	Kaishaurni	39.2	31.3	40.1
3	Seturni	35.7	33.2	40.1

Source: North-south Corridor Kvesheti – Kobi Road Project. Environmental Noise Modelling Report. 2022

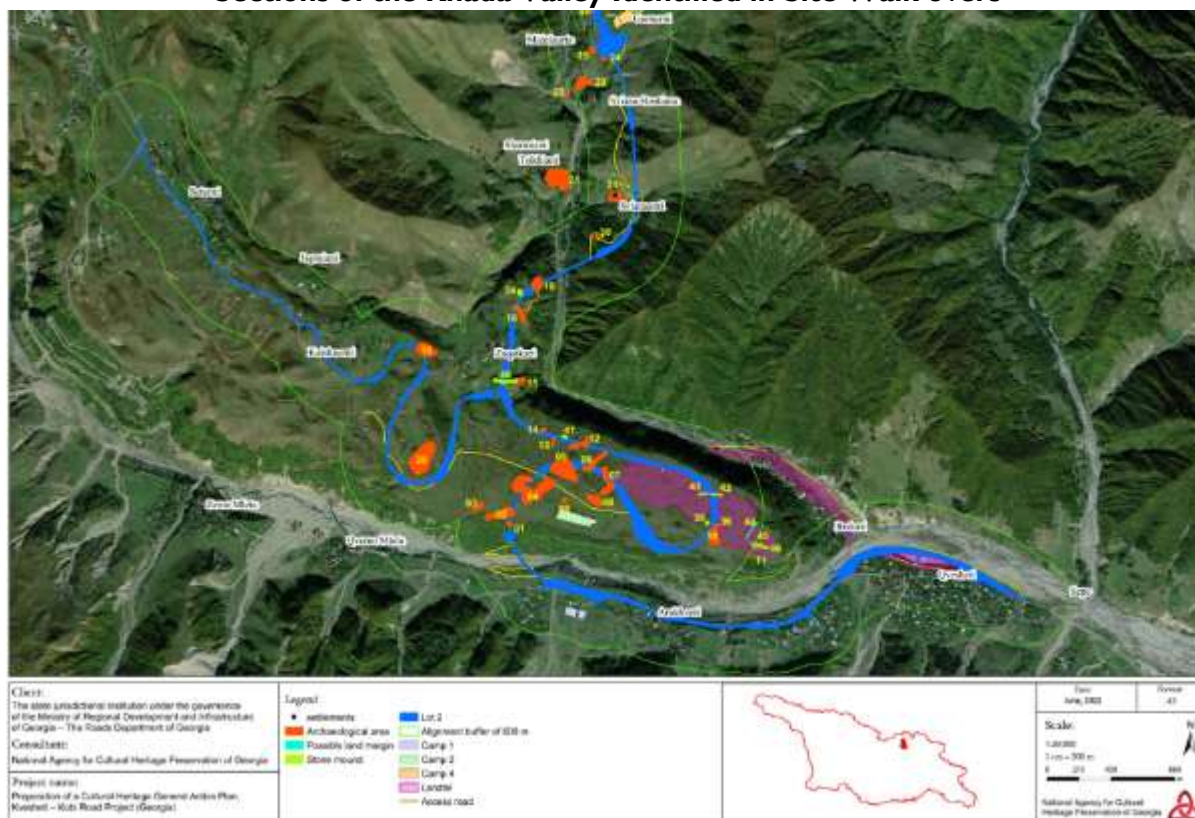
6.4.7. Physical Cultural Resources

284. Several surveys relating to physical cultural resources (PCR) have been undertaken in the KK Project area and the ARP area as part of the preparation of the KK Project. The following section provides a summary of the findings of the various PCR surveys undertaken as part of the Cultural Heritage General Action Plan for the Kvesheti – Kobi Road Project which was prepared by the National Agency for Cultural Heritage Preservation (NACHP) of Georgia in June 2021.

Field Archaeological Surface Surveys (Site Walk-over Surveys)

285. The aim of the field archaeological surface surveys was to carry out visual inspection of the areas designated for arranging various KK project sections, including major roads, auxiliary roads, tunnels, bridges, campsites, concrete plants, and landfill sites, and to reveal the sites bearing features of cultural heritage, as well as archaeological sites and areas. The surveys also assessed the area of the ARP. Group members fully covered the various areas according to the orientation routes marked in advance and inspection with 15-meter intervals. Every single archaeologically important property and area revealed through surface surveys was described, their geographical coordinates were recorded, and detailed photo fixation was carried out. The following provides an overview of the two archeological objects encountered in the ARP corridor which are shown on Figure 48, Figure 49 and Figure 50 below.

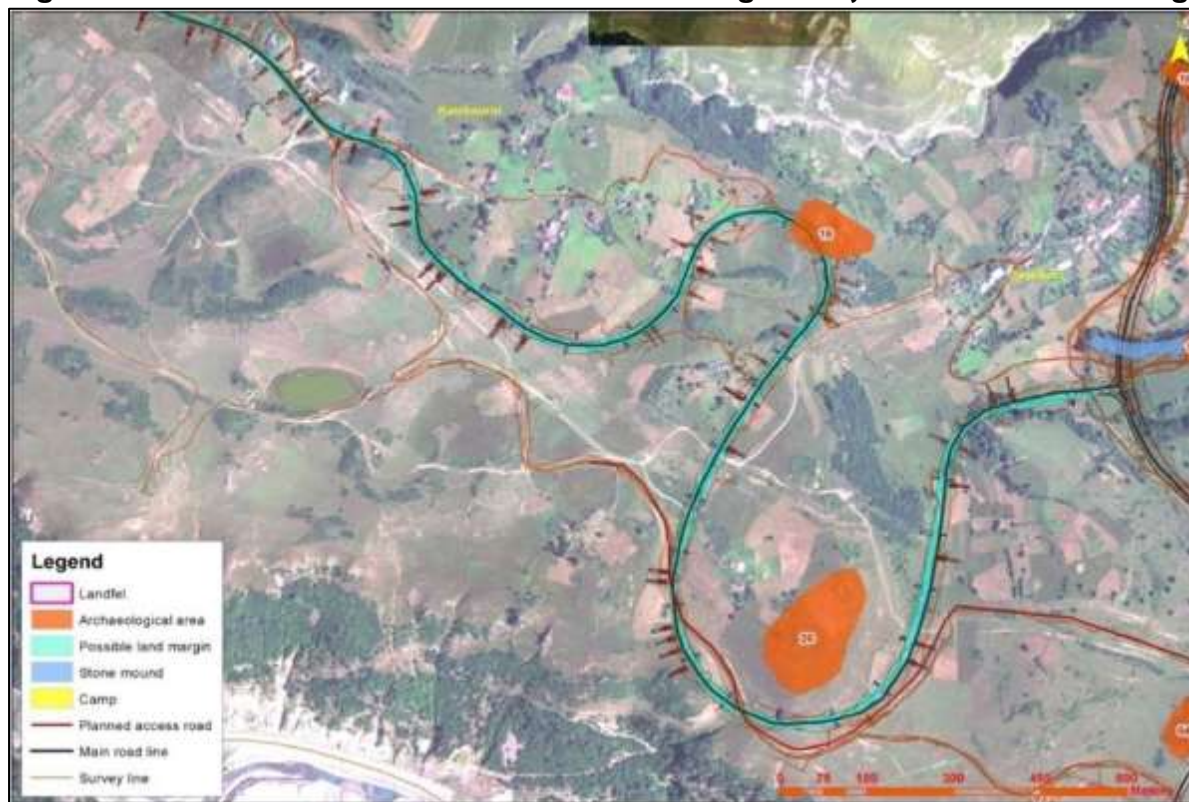
Figure 48: Distribution of Archeological Objects in the Plateau (Didveli) and Southern Sections of the Khada Valley Identified in Site Walk overs



Source: Cultural Heritage General Action Plan for the Kvesheti – Kobi Road Project. Interim Report June 2021

286. *Sameba complex (GISID:11655; FieldID:19)*, including the tower and the adjacent structures are perfectly visible on the surface of the ground. Remains of the wall of these structures are built with dry masonry of semi-treated, uneven, big-size stones. In this section, the project road line reaches the complex on the west, crosses its part, and turns to the south-west. The major outlying part of the complex was falling within the ARP road section (re-alignment works have subsequently been completed).

Figure 49: Presumable Distribution Area of Archeological Objects at Kaishaurni Village



Source: Cultural Heritage General Action Plan for the Kvesheti – Kobi Road Project. Interim Report June 2021

Figure 50: Presumed Distribution Area of the Sameba Complex



Source: Cultural Heritage General Action Plan for the Kvesheti – Kobi Road Project. Interim Report June 2021.

Note: Based on the findings of this survey the road has been realigned to avoid this area of high archaeological potential.

Figure 51: Archeological Object FieldID: 19 Sameba Complex



Source: Consultants own Photo, October 2021

Figure 52: Archeological Object FieldID: 19 Sameba Complex



Source: Consultants own Photo, October 2021

287. Further, the road goes along a sloping terrain, towards the south-west, approaches a hillock and runs around its slope. The section of the hillock in question (FieldID:20) overlaps the section

of the ARP where a large number of ceramic fragments and a processed lump of obsidian were collected at the bottom of the hillock. Visual inspection of the slopes and the sections of the old road running on them did not reveal archaeological or immovable properties. Presumably, the material must have been washed down from the settlement-site located on the top of the hillock. In this section, building activities must be conducted under archaeological supervision. Afterwards, the ARP goes in the direction of the north and joins the KK project road.

288. The survey concludes that the area of objects FieldID:19 falls in the section of the main project road, and in case of starting building activities, it is necessary to carry out detailed archaeological investigation (which was done in 2021 by NACHP). Further, FieldID: 19 is located very close to construction area, and permanent vibration monitoring is recommended to avoid negative impacts.

Site Archaeological Studies Report

289. Archaeological surveys were carried out from 1 October to 18 October 2021. The studies were completed by the staff from the NACHP under the leadership of Konstantine Pitskhelauri. A number of trenches were excavated in the ARP area, as shown in Figure 53 below.

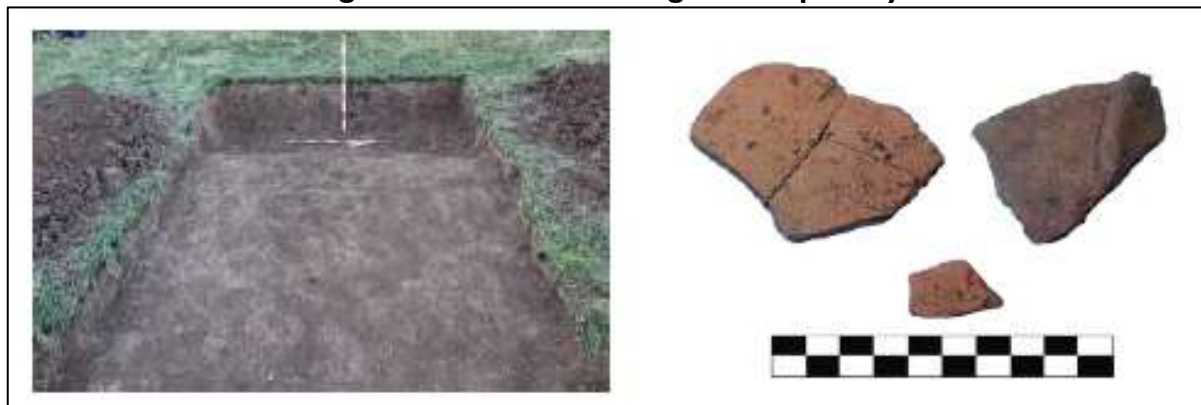
Figure 53: Archeological Test Trenches



290. The findings from the ARP area test trenches are presented as follows:

291. **Trench N14** was cut in the second section of the ARP leading to Gudauri. The reason for cutting the trench was the hill to the north of this project road, on top of which the settlement is located. Fragments of pottery were collected because of visual survey on the slope. Several red-baked pottery fragments were found in and under the field layers of the trench, including a fragment of the bottom of one pot Medieval by texture and form. The incision and the entire trench showed that a cultural layer did not spread to the surface and the above-mentioned ceramic fragments were dumped from the settlement at different times.

Figure 54: Trench NI4 fragment of pottery



Source: Cultural Heritage General Action Plan for the Kvesheti – Kobi Road Project. Interim Report June 2021

292. **Trench NI5** (GPS coordinates: X0460224 Y4698781) was cut from the KK road (from the village of Zakatkari), in the area of the road to Gudauri, on the southern slope of the Trinity Tower (Sameba). Here a 3X4 m² area was uncovered and cleared a layer of rubble stones, in which small fragments of pottery were found (they were considered to have fallen from the Sameba (Trinity) Tower fence). To reexamine the stratigraphy, a 1X1.6 sq.m and 0.2 m deep trench was placed at the south-western edge of the ditch. The construction works envisaged by the project in the mentioned area could be allowed only after detailed archeological research in this location.

Figure 55: NI5 test trench fragments of pottery



Source: Cultural Heritage General Action Plan for the Kvesheti – Kobi Road Project. Interim Report June 2021

293. **Trench NI6** (GPS coordinates: X0460132 Y4698862) was cut on the western slope of the Sameba (Trinity) Tower in an area of 2X4 m², where the cultural layers were not confirmed. However, as a recommendation, the hill on which the Sameba (Trinity) Tower is located should be fully archaeologically examined.

294. **Trench NI7** (GPS coordinates X460154 Y4698827) was cut on the lower terrace of Kaishaurni village Sameba (Trinity) Fortress, in the corridor of the Gudauri section of the project road. Sameba (Trinity) Fortress complex is a combination of a back tower and a settlement spread around it. The settlement has a number of terraces on opposite sides of the horizon. Most of them - three terraces - are located on the east side. On the south and north sides, the buildings are making only one terrace.

Figure 56: N17 Test Trench and Ceramic Materials



Source: Cultural Heritage General Action Plan for the Kvesheti – Kobi Road Project. Interim Report June 2021

295. In addition to the abovementioned buildings, on the south and west sides, there is a terrace used for agriculture. Trench N17 was placed on the lower south terrace, where the road to Gudauri section should pass. Remains of a dry masonry of rough medium-sized rock, facing south to north, appeared under the humus. The height of the identified wall could be up to 50 cm in the incision. The wall is an extension of another wall that is already visible to the south of it from

above the ground. The thickness of this wall is on average 45 cm. Apparently it must have been a terrace retaining wall and through these investigations was shown to be medieval and not of the recent times. In this incision, a few insignificant fragments of black-fired pottery and pottery ears were found on the wall stones. The latter is also fired and black, is made of clay with mixtures, flat-sectioned and has a round ear. The ear is very similar to the ears of developed medieval pots, although similarly shaped ears were also characteristic of earlier ancient pottery.

296. **Trench N51** (GPS coordinates: X460111 Y4697915), dimensions 1.2 x 1.5 m, depth 0.25m. The reason for making the trench was the ceramic material revealed as a result of superficial survey on the territory adjacent to it. The shards must have been washed down from the settlement-site situated on the top of the hill. Trenching led to the sterile layers where no trace of cultural layer was evident.

297. **Trench N52** (GPS coordinates: X460092, Y4697933) was dug in the corridor of the project road running towards Gudauri. This trench was used to double check the area of distribution of archaeological layers of Nakoshkari Gora (hill) located on the territory of Village Kaishaurni. Southern, Western and Eastern sides of the hill are slopes ending in a relatively levelled terrace. Trench N14 was dug in the eastern part of the terrace, whose surface yielded just several fragments of pottery slid from the upper part of the hill. Trench N52 (1 x 2 x 0.3 m) was also dug on the lower terrace (presence of cultural layers on the slope was excluded by visual prospecting). There is bed soil immediately under the turf layer and, therefore, no cultural layer is evidenced here. The same result was received from trench N51 dug on the east of N52 on the same terrace. Thus, the trenches made on this hill and also below Sameba tower of Kaishaurni that around almost all the towers, surveys showed that wherever there is a defensive tower, there emerge residential and household structures immediately around the tower and they are laid out over maximum three terraces and always face the valley.

298. **Trench N53 and N54** (GPS coordinates: X459477, Y4698917; X459480, Y4698907) were dug in the corridor of the project road leading to Gudauri, on the outskirts of Village Kaishaurni, at the bottom of a natural hill, on the top of which stone concentration and artificial depressions are observed. The trenches are sterile, which means that no cultural layers are found on the slopes and the bottom of the hill.

299. The surveys conclude that any kind of earthwork must not be allowed in the corridor of the original ARP alignment on the lower terrace of Sameba castle in Village Kaishaurni (Sameba tower complex is a unity of the backed tower and the settlement spread out around it) (GPS coordinates: X460154, Y4698827) unless archaeological research is conducted in this section and its environs.

[Report on the Inventory of the Cultural Heritage](#)

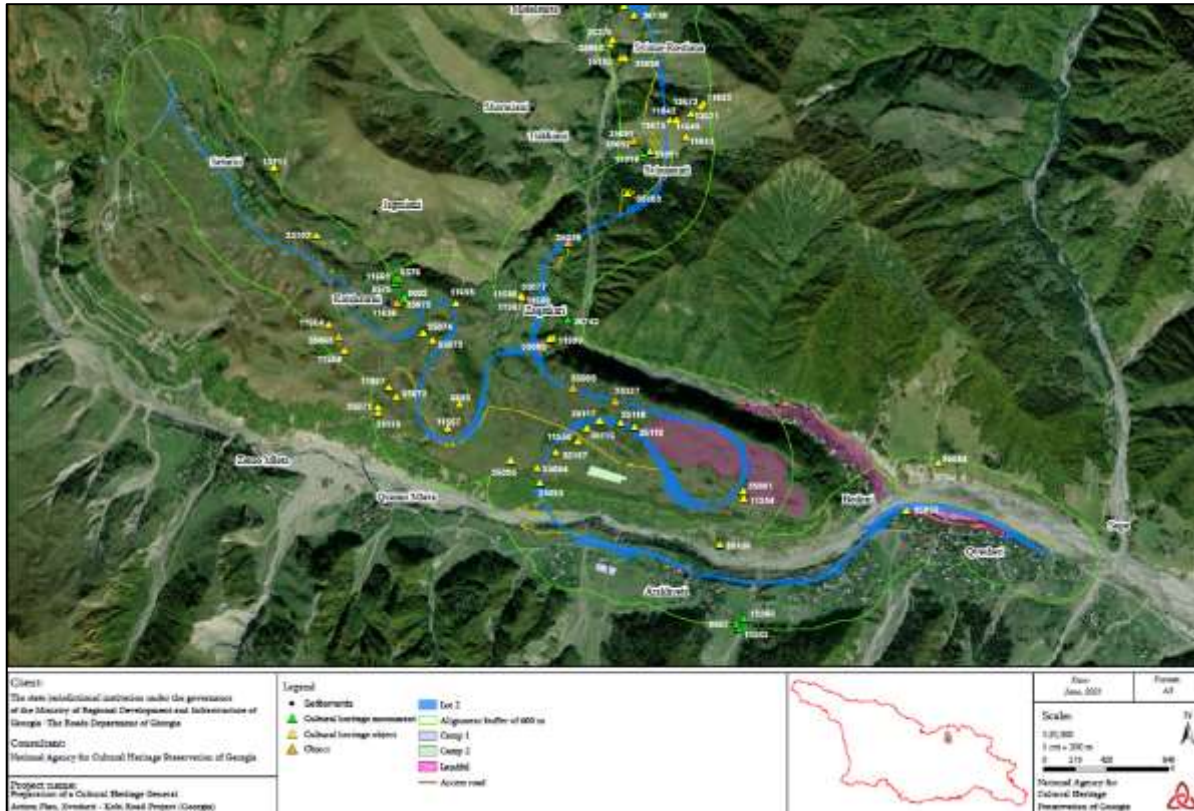
300. The NACHP working group visited various villages and conducted inventory/re-inventory works. Field activities were preceded by intensive desk work during which field charts were elaborated on the basis of the GIS system of cultural heritage data management and reviewing archive data. The NACHP experts concluded that, in total, 213 objects/monuments were identified during the inventory; 104 of them are located in the project area of KK Project highway, in particular in the 300-meter buffer zone (600 meters in total).

301. There are CH objects on the territory of Didveli plateau which the ARP intends to pass close to. The NACHP report recommends that, during construction works, it must be taken into consideration that these objects are not affected, and therefore, carefully monitored (GIS 6603 (Kaishaurni – Suntni Castle), 11557 (Kaishaurni ruins of a backed tower), 35073 (Kaishaurni – settlement site in Murghulbi district), 35074 (Kaishaurni niche of the virgin and site of former church)).

302. The NACHP note that the project foresees to construct the ARP 25 meters from Sameba tower (GIS # 11655) located on the territory of Village Kaishaurni. Proximity of the monument to the road should be taken into consideration in order to avoid causing damage to the tower and the feasible archaeological layers around it during construction works.

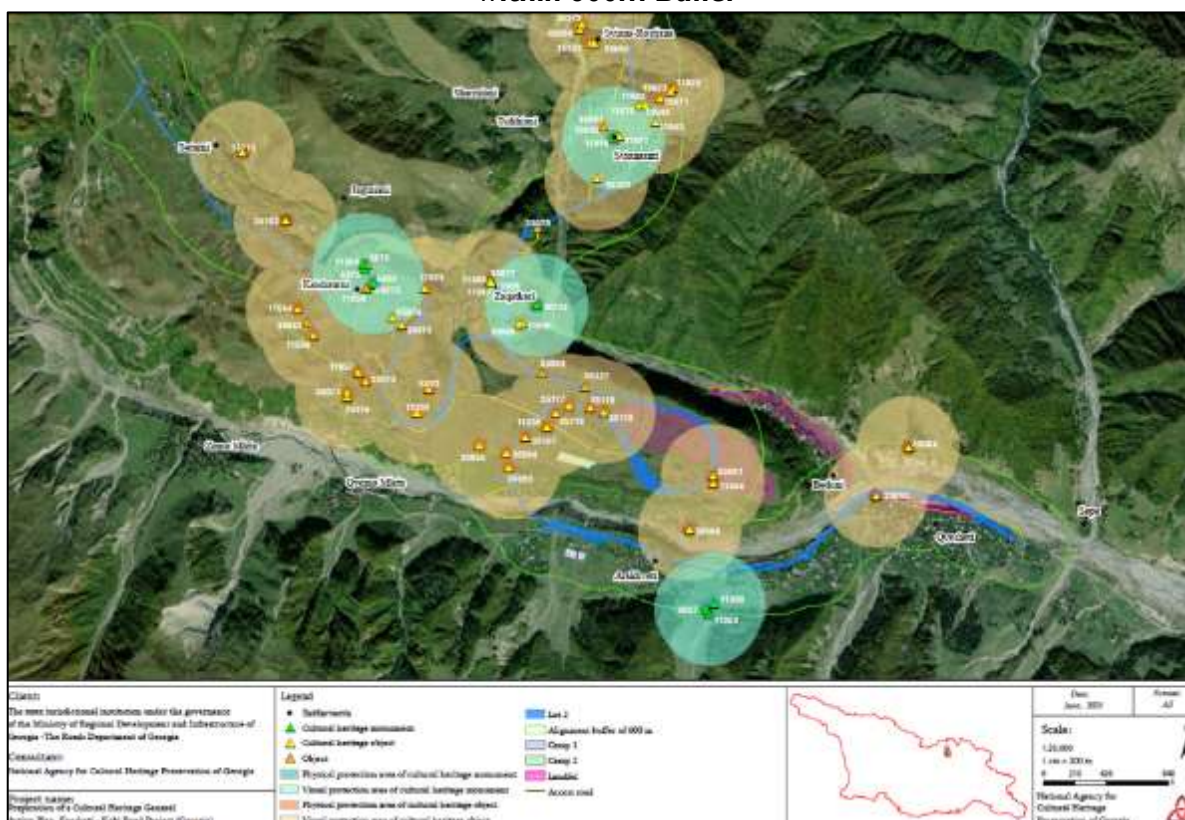
303. Based on this recommendation re-alignment of ARP was done and currently the distance between the project road and Sameba tower is 97 m.

Figure 57: Cultural Heritage Monuments within 600m Buffer



Source: Cultural Heritage General Action Plan for the Kvesheti – Kobi Road Project. Interim Report June 2021

Figure 58: Cultural Heritage Monuments and Objects and their Protection Zones within 600m Buffer



Source: Cultural Heritage General Action Plan for the Kvesheti – Kobi Road Project. Interim Report June 2021

Cultural Landscape

304. The NACHP have noted that the KK project road (and the ARP) passes through several river valleys, including Tetri Aragvi, Khadistskali, Narvani and Baidara river. The villages of Kvesheti, Arakhveti, Seturni, Kaishaurni Jaghmiani, Zakatkari, Sviana-Rostiani, Kobi and others are located in the valleys of these rivers. There are also many old settlements that are of archeological value. These valleys, with their natural-cultural characteristics, in accordance with international standards, represent historically established cultural landscapes. According to international practice, cultural landscapes are of special value. Distinctive examples are even recognized as universal heritage. The cultural landscape along the route of the project road is distinguished by its uniqueness.³¹

³¹ Cultural Heritage General Action Plan, Kvesheti Kobi Road Project. Interim Report 2. June 2021

7. Environmental Impacts and Mitigation Measures

7.1. Preamble

305. This portion of the report identifies the environmental and social impacts of the Project and proposes mitigation measures to eliminate the impacts, or where this is not possible, reduce their significance.

7.2. Physical Resources

7.2.1. Air Quality

306. This section discusses emissions of atmospheric pollutants and greenhouse gases during construction and operation of the Project and associated mitigation measures to be adopted.

Aspects of the ARP that have the potential to Emit Atmospheric Pollutants and Greenhouse Gases

#	Aspect	Yes	No	Assessment Boundary
Construction Phase				
1	Earthworks (including cut and fill)	X		350 m from the boundary of the work zones. ³² 500 m from the project site entrance and access roads. ³³
2	Construction vehicles	X		
3	Mobile construction plant	X		
4	Stationary construction plant	X		
5	Construction camps	X		
6	Pavement construction	X		
Operational Phase				
1	Traffic movements	X		500 m from the boundary of the road alignment.

Sensitive Receptors

307. During the construction phase, sensitive receptors will mainly be residents affected by dust, and to a lesser degree by combustion emissions. It is possible that some agricultural crops and local apiary could also be affected by dust. During the operational phase, the main receptors will be residents and potentially any organic crops grown in the Project area.

Potential Impacts

Construction Phase

308. Release of Exhaust Gases - During construction, the release of combustion gases will mostly be from vehicles transporting materials and equipment to site and potentially from mobile sources such as mobile generators in the construction camp site. These may increase concentrations of atmospheric pollutants (NO_x, PM, CO and SO₂) locally to a limited extent and over a short time. Construction vehicles will be mobilized from the Zakatkari camp. Combustion emissions generated between the camp and construction zones are an unavoidable consequence of the construction phase.

³² According to the screening guidance of the UK's Institute of Air Quality Management (IAQM) for construction dust, detailed assessment relating to dust generation is required where there is a 'human receptor' within 350m of the boundary of the site.

³³ In accordance with the UK's IAQM Guidance on the Assessment of Dust from Demolition and Construction, detailed assessment of vehicle movements should only be required where 'human' receptors are located within 50m of the route used by construction vehicles on public roads, up to 500m from the project site entrance.

309. Dust - The principal sources of dust and particulate emissions during construction will be:
- Excavations and earthworks,
 - Particulate dispersion from operation of the batching plant;
 - Vehicle movements on unpaved, or compacted surfaces; and
 - Particulate dispersion from uncovered truckloads.
310. Dust resulting from excavations and earthworks typically comprises large diameter particles, which settle rapidly and close to the generation source. According to the screening guidance of the UK's Institute of Air Quality Management (IAQM) for construction dust, detailed assessment relating to dust generation is required where there is a 'human receptor' within 350m of the boundary of the site.
311. In the case of this Project and with respect to the screening criteria above, there are residents within 350m of the Project site boundary. As such, there is the potential for impacts relating to dust emissions because of construction works upon these receptors. However, the magnitude of dust impacts from construction works will depend on the wind speed and wind direction as well as levels of precipitation at the project site.
312. In addition to vehicle movements on unpaved surfaces, dust generation from truck movements and particulate dispersion from uncovered truckloads would only occur where mitigation measures are not effectively implemented at the site, or by contractors bringing materials to the site. Uncovered trucks may be subject to losses of material where the containment is not effective (e.g., spills), or where wind or other air turbulence may disturb the contents and result in dispersion of materials. Such impacts have the potential to degrade local air quality in the immediate area of such movements.
313. In accordance with the UK's IAQM Guidance on the Assessment of Dust from Demolition and Construction, detailed assessment of vehicle movements should only be required where 'human' receptors are located within 50m of the route used by construction vehicles on public roads, up to 500m from the project site entrance.
314. In the instance of this Project, there are residential and commercial receptors within 50m of the route to be used by construction vehicles and, as a result, there is potential for impacts relating to dust generation or particulate emissions as a result of increase vehicle movement on these routes.
315. Odor - In addition, construction equipment and vehicles may create odorous emissions, which would also be a potential nuisance to the communities adjacent to work sites. There is also the potential for release of odor to the immediate surrounding areas from inappropriate containment and coverage associated with wastewater holding/septic tanks at construction camps. Any such impacts are likely to be temporary and limited to the proximity to the construction site boundaries.
316. Emissions of Volatile Organic Compounds (VOC) - Small quantity of fuels, paints, solvents, and other volatile substances are likely to be required during the construction phase, which will be stored in secure areas within the construction camps. If not adequately contained, such substances have the potential to result in the dispersion of volatile emissions to the immediate air shed. Given that the storage of such volatile substances will be in small quantities, any potential impacts will be temporary and limited to the immediate surrounding area, likely to be within the Project site or in close proximity to the construction boundaries. No significant impacts are anticipated.

317. Batching Plant, Asphalt Plant and Borrow Pit Emissions – Air emissions from these sources are discussed in separate sections below.

Operational Phase

318. The main source of air pollution during the operational phase will be vehicles moving on the highway. The main pollutants are Carbon Monoxide (CO); Nitrogen Dioxide (NO₂) and particulate matter (PM_{2.5} and PM₁₀).³⁴

319. An assessment of impact on air quality during operation of the highway was carried out using CadnaA software (see Appendix E for the full model results). Traffic data provided by the ADB was used as a basis for calculation. The model results were based on 2049 traffic volumes to simulate the worst-case scenario.

320. The model concluded that the limit value for all particulate matter emissions (PM₁₀ and PM_{2.5}) is not expected to be exceeded. Further, all modelled gas emissions are well below Project standards in 2049. The following tables summarizes the peak values identified by the model for each of the modelled emissions in 2049.

Table 42: Peak Particulate Matter Values (2049)

Location	PM ₁₀		PM _{2.5}	
	Daily	Annual	Daily	Annual
	µg/m ³	µg/m ³	µg/m ³	µg/m ³
Zakatkari	0.20	0.05	0.11	0.03
Kaishaurni	0.16	0.03	0.09	0.02
Seturni	0.17	0.04	0.09	0.2
Project Standard	50	20	25	10

Table 43: Peak Gas Emissions Values (2049)

Location	NO ₂ Hourly	NO ₂ Annual	CO Maximum daily 8 hours mean value
	µg/m ³	µg/m ³	mg/m ³
Zakatkari	0.07	0.005	0.0005
Kaishaurni	0.09	0.003	0.0006
Seturni	0.06	0.004	0.0004
Project Standard	200	40	10

Impact summary and assessment of significance

321. ^[SEP] Table 44 provides an assessment of the significance of potential air quality impacts before implementation of the proposed mitigation measures that are discussed in the rest of this section.

³⁴ The model concluded that Since O₃ and SO₂ emissions are predicted to be at negligible levels in the emission calculations made by using the COPERT Tool, they were not evaluated within the scope of model studies.

Table 44: Potential Impacts to Air Quality

Phase	Potential Impact	Receptors	No. of Receptors Affected	Sensitivity of Receptors	Level of Public Concern	Risk of Exceeding Legal Threshold	Magnitude	Timeframe	Spatial Scale	Consequence	Probability	Significance
C	Release of exhaust gases	Nearby communities and workers	L	M	L	L	MOD	ST	SMA	LOW	DEF	L
C	Dust	Nearby communities and workers	L	H	M	M	MAJ	ST	SMA	MED	DEF	M
C	Odor	Nearby communities	L	L	L	-	MIN	ST	SMA	LOW	POSS	L
C	VOCs	Nearby communities and workers	L	M	L	L	MOD	ST	SMA	LOW	DEF	L
O	Traffic Emissions	Nearby communities	L	M	M	L	MOD	LF	SMA	LOW	UN	L

Key: C: Construction / O: Operation / H: High / M: Medium / L: Low / MAJ: Major / MOD: Moderate / MIN: Minimum / H/F: High Frequency / M/F: Medium Frequency / L/F: Low Frequency / LT: Long term / MT: Medium Term / ST: Short term / SMA: Small / MED: Medium / DEF: Definitely / POSS: Possible / UNLIKE: Unlikely. Cells shaded in blue are positive impacts.

Mitigation and Management Measures

Planning

322. Management Planning – The KK Project Lot 2 Contractor will update the **Air Quality Management Plan**. The plan shall provide details of mitigation measures, specific location, and schedule where such measures shall be implemented to minimize impacts to sensitive receptors due to the presence of construction works and transport of construction materials, and other project-related activities.

323. Emissions from rock crushers, concrete production facilities and other emissions generating facilities must be calculated and agreed with the MoEPA and this is completed as part of the KK Project. In addition, to help manage impacts to air quality the KK Project Lot 2 Contractor has also prepared, as part of his SSEMP:

- Traffic Management Plan.
- Occupational and Community Health and Safety Plan.
- Emergency Response Plan.

324. These plans will be updated by the KK Lot 2 Contractor to include the ARP.

Pre-construction / Construction Phase

325. Dust and Combustion Emissions – The KK Project Lot 2 Contractor shall follow all requirements per the KK Project EIA.

326. Odor - The following measures shall be applied:

- Adequate and sufficient sanitary facilities for site workers must be provided.
- Effective cleaning and maintenance of toilets to be undertaken to avoid odor dispersion and cleaning records/inspection sheets displayed in the toilets.

- All septic tanks must be sealed and fully functioning.
- Septic tanks must be operated and maintained according to manufacturer recommendations.
- Sanitary waste will be removed from site by licensed contractors and disposed in waste treatment facilities approved by the local government.
- Ensure all fuel storage areas are at least 50 m downwind from any residential property.

327. VOCs

- Hazardous materials stored and used on site with potential gas emissions (e.g., Volatile Organic Compounds) will be located in well-ventilated, but secure low-risk areas, away from major transport routes and away from the site boundary (where possible).
- Volatile fuels and chemicals (including hazardous wastes) will be stored in sealed containers. On site storage of large quantities of volatile fuels will be avoided, equally prolonged exposure to direct sun and heat will be avoided.
- Fires and material burning will not be allowed on the Project site.
- Chemical storage areas will be purpose built and well maintained. A data log of all chemicals with Material Safety Data Sheets (MSDSs) will be provided at the storage facility within easy access.

Operational Phase

328. No specific mitigation measures within the framework of this Project are recommended.

Residual Impacts

Table 45: Air Quality Residual Impacts

Phase	Potential Impact	Potential Impact Significance	Residual Impact	Residual Impact Significance
C	Release of exhaust gases	Low	A number of mitigation and management measures are proposed for air quality. In addition, the measures outlined in other sections of this report relating to access roads, camps, plant, etc. shall also reduce the potential for air quality impacts occurring. As such, if the mitigation measures are implemented as per the EMP, the residual impacts of the Project construction phase will not be significant, or in the case of dust, of low significance.	Not Significant
C	Dust	Medium		Low
C	Odor	Low		Not significant
C	VOCs	Low		Not significant
O	Exhaust gases and particulate matter	Low		The potential impact significant pre-mitigation is driven more by the sensitivity of receptors and their perception of the issue. Modeling has however, indicated that there will be no significant impacts to air quality on sensitive receptors during the operational phase of the Project.

Monitoring

329. The following table provides the air quality monitoring requirements required other than those already outlined in the KK Project EIA for Lot 2.

Table 46: Air Quality - Monitoring Requirements

Monitoring	Parameters	Frequency	Location	Responsibility	Costs
Construction					

Monitoring	Parameters	Frequency	Location	Responsibility	Costs
Sanitary Facilities and Hazardous Materials Stores	Odor and VOCs	Daily olfactory observations – as part of maintenance and inspection checks. Daily inspection of hazardous materials storage areas for any leaks or emission of VOCs	All sanitary facilities. All hazardous material, chemical and fuel stores.	Contractor	Part of Contractors staff costs
Ambient air quality	PM10, PM2.5, CO, NOx, SO2	Monthly and in response to complaints from residents.	Seturni, Kaishaurni	Contractor	None, part of existing contractual obligations

7.2.2. Climate Change

330. This section discusses potential impacts climate change may have on the Project during construction and operation phases and associated mitigation measures to be adopted. The section summarizes the findings prepared as part of the Projects Climate Risk Vulnerability Assessment (CVRA) which is disclosed on the ADB website.³⁵ The section also discusses the issue of greenhouse gases generated by the ARP.

Key Sensitivities and Receptors

The KK Project CVRA indicated that the following were at risk from climate change:

- Bridges. An increase in the intensity and frequency of heavy precipitation events could lead to increased water levels influencing the bridges. Increased frequency of landslides and mud flows could affect bridge structures. There are no bridges planned in the ARP.
- Drainage systems. Increased intensity and frequency of heavy precipitation events could exceed drainage capacity.
- Road pavement. An increase in the diurnal temperature range and freeze-thaw cycles could lead to more rapid surface material disintegration.
- Roads along steep slopes. An increase in heavy precipitation events combined with stronger temperature fluctuations can lead to an increase in landslides and avalanches damaging road sections. No steep slopes where landslides or avalanches may occur can be found in the ARP.
- Retaining walls and avalanche protections structures. An increase in heavy precipitation events and temperature fluctuations may lead to an increase in landslides, mudflows and avalanches increasing maintenance for these structures. No areas where avalanches, landslides or mudflows have been identified in the ARP area.

Potential Impacts Caused by the ARP

331. As part of the KK Project EIA construction phase, GHG emissions were estimated at 24,289 tCO₂ for a road approximately 23km long and 13m wide. On a pro-rata basis, not accounting for the reduced width of the ARP, GHG emissions would be approximately 8,000 tCO₂.

332. GHG emissions from traffic using the road have been calculated using the traffic forecasts presented in Section 3.4.9. ARP related traffic in 2043 (20 years after start of operational period) are estimated to generate 15,000 tons of CO₂ per annum. However, this figure could reduce

³⁵ <https://www.adb.org/sites/default/files/linked-documents/51257-001-cca.pdf>

dramatically over the coming years as the performance of cars improve and the fleet moves towards electric power.

Potential Impacts Caused by the ARP

333. According to the CVRA, the increase in extreme precipitation events is considered as the most important climate risk for the project road. The CVRA noted that stress tests were carried out by the project design consultant team using +10% and +20% increased precipitation input for return periods used in the engineering design. The tests indicated that a small proportion of the transversal and longitudinal drainage systems might have insufficient capacity to cope with the increased precipitation extremes. These should be identified, and their dimensions increased appropriately.

334. No specific mitigation measures were proposed for road pavement as the CVRA concluded that “a new pavement structure with specific benefits in freeze-thaw circumstances has been used.”

Mitigation and Management Measures

335. Identify drainage systems that might have insufficient capacity and increase dimensions accordingly.

Residual Risks

336. None identified.

Monitoring

337. None required.

7.2.3. Soils and Geology

338. This section discusses potential impacts on soils and geology during construction and operation of the Project and associated mitigation measures to be adopted.

Aspects of the ARP that have the potential to impact soils and geology

#	Aspect	Yes	No	Assessment Boundary
Construction Phase				
1	Earthworks (including cut and fill)	X		Construction buffer zone
2	Construction vehicles	X		Construction buffer zone and access roads
3	Mobile construction plant	X		Construction buffer zone
4	Stationary construction plant	X		Construction buffer zone
5	Construction camps		X	The ARP will use KK Project camp sites that have been assessed as part of the KK Project EIA and have existing Management Plans reviewed and approved by the KK Project Engineer.
6	Pavement construction		X	None required.
Operational Phase				
1	Traffic movements	X		10m buffer from the roadside.

Key Sensitivities

339. All site works will occur within the alignment buffer zone which is a width of 100m. Key sensitivities will be any productive soils within this buffer zone and the owners of any affected land. The Khevi river is not considered to be located close enough to the ARP to be affected by siltation from erosion run-off.

Potential Impacts

Pre-construction / Construction Phase

340. Potential impacts to soils on pre-construction and construction stages include:

- Damage and/or loss of topsoil – the impact may occur in case the topsoil is not removed; mixed with subsoil and/or other material during and after removal. Impact on topsoil outside the boundaries of the project buffer may also happen – the topsoil not subject to removal may be compacted by heavy vehicles, scattered during transportation to temporary stockpiling site as well as lost by wind and water erosion when in stockpiles. The quality of topsoil may deteriorate if the stockpiles are not managed properly.
- Erosion – It is possible, that without adequate protection measures soil erosion could occur on cut slopes and embankments. According to design cuts slopes will be protected (anchored concrete walls, rock walls, etc.) from erosion.
- Special borrow pits for materials to build the embankments are initially not foreseen, because the potential reserves from the proposed cuttings and excess materials from KK project Lot 2 works satisfy the necessary amounts for creating the embankments. However, if they are required, they will need to follow the requirements set out in Appendix B of the KK Project EIA.
- Induced changes in the ARP area leading to commercial development are conceivable, thereby decreasing soil availability for agricultural purposes.
- Contamination due to spills or hazardous materials – Potential soil contamination is a possibility resulting from poorly managed fuels, oils and other hazardous liquids used during the project works as well as poorly managed waste (solid and liquid waste streams) at construction zones.

Operational Phase

341. Potential impacts to soils during operation include:

- Soil pollution by heavy metals in a narrow band on either side of the road. Pollutants settling in soil within the RoV may impair vegetation growth and increase the risk of erosion.
- Erosion and flooding caused by blockage of the drainage system.
- Pollution with ice breaking salt. Use of ice breaking salt may lead to increase of sodium and chlorine ions in surface runoff and, respectively, in the soils. This will affect ion exchange process, reduce water permeability and aeration ability and lead to increase of alkalinity.

Impact summary and assessment of significance


342.  Table 47 provides an assessment of the significance of potential impacts to soil and geology before implementation of the proposed mitigation measures that are discussed in the rest of this section.

Table 47: Potential Impacts to Soils and Geology

Phase	Potential Impact	Receptors	No. of Receptors Affected	Sensitivity of Receptors	Level of Public Concern	Risk of Exceeding Legal Threshold	Magnitude	Timeframe	Spatial Scale	Consequence	Probability	Significance
C	Soil erosion on unstable slopes caused by poor construction works.	Nearby communities / Project infrastructure	L	M	L	-	MOD	M/F	SMALL	MED	POSS	M
C	Soil contamination via spills and leaks of hazardous liquids from construction camps.	Nearby communities / Soil	L	M	L	L	MOD	M/F	SMALL	MED	POSS	M
C	Loss of Topsoil	Nearby communities	L	M	L	-	MOD	M/F	SMALL	MED	DEF	M
O	Soil erosion caused by poorly designed erosion protection measures, drainage, etc.	Nearby communities / Project infrastructure	L	M	L	-	MOD	MT	SMALL	MED	UN	L

Key: C: Construction / O: Operation / H: High / M: Medium / L: Low / MAJ: Major / MOD: Moderate / MIN: Minimum / H/F: High Frequency / M/F: Medium Frequency / L/F: Low Frequency / LT: Long term / MT: Medium term / ST: Short term / MED: Medium / DEF: Definitely / POSS: Possible: / UNLIKE: Unlikely. Cells shaded in blue are positive impacts.

Mitigation and Management Measures

Planning

343. The KK Project Lot 2 Contractor has, as part of his SSEMP, prepared a Topsoil Management Plan, Recultivation/Land Restoration Plan and a Spill Management Plan. These plans have been reviewed and approved by the RD PIU and the KK Project Engineer. All these documents cover the relevant impacts and mitigation measures identified in this IEE and as such they can be used on the ARP. Other plans, already prepared as part of the KK Project Lot 2 SSEMP which will help reduce impacts to soils include:

- Construction Camp Management Plan.
- Spoil Disposal Plan.
- Waste Management Plan.

344. As per the KK Project, during the construction phase the Contractor will be responsible for preparing method statements for any temporary roads (although not considered likely in the context of this project) and temporary storage areas (although these are unlikely given the proximity of the works to the KK Project construction camp at Zakatkari). If required by the Engineer, these method statements will include sections relating to the protection of soils and management of soil erosion in these areas. The method statements shall be submitted to the Engineer and RD for review and approval. All method statements must be prepared and approved before any works can start in the planned areas. The method statements shall also include a record of consultations undertaken with neighboring land users and road users including their agreements for the use of these areas, roads. The method statement shall also clearly illustrate the conditions

of the site prior to its clearing and use, so that it can be re-instated, as far as possible, to its former conditions.

Pre-construction / Construction Phase

345. During the construction phase, the KK Project Lot 2 Contractor will be responsible for implementing all mitigation measures outlined in the KK Project EIA.

Residual Impacts

Table 48: Soils and Geology Residual Impacts

Phase	Potential Impact	Potential Impact Significance	Residual Impact	Residual Impact Significance
C	Soil erosion on unstable slopes caused by poor construction works.	Medium	The mitigation measures proposed will ensure that residual impacts are not significant.	Not significant
C	Soil contamination via spills and leaks of hazardous liquids from construction camps.	Medium	The mitigation measures proposed will ensure that residual impacts are not significant.	Not significant
C	Loss of Topsoil	Medium	The mitigation measures proposed will ensure that residual impacts are not significant.	Not significant
O	Soil erosion caused by poorly designed erosion protection measures, drainage, etc.	Low	The erosion protection measures outlined above will limit the potential for impacts occurring into the operational phase of the Project.	Not significant

Monitoring

346. Daily inspections of the proposed mitigation measures along the ARP corridor will be undertaken by the Contractor. No additional monitoring requirements are necessary.

7.2.4. Hydrology

347. This section discusses potential impacts on hydrology during construction and operation of the Project and associated mitigation measures to be adopted.

Aspects of the ARP that have the potential to affect hydrology

#	Aspect	Yes	No	Assessment Boundary
Construction Phase				
1	Earthworks		X	N/A
2	Construction vehicles		X	N/A
3	Mobile construction plant		X	N/A
4	Stationary construction plant		X	N/A
5	Construction camps	X		Within 50 m of the camp site
6	Pavement construction		X	N/A
Operational Phase				
1	Traffic movements		X	N/A

Key Sensitivities and Receptors

348. Several surface water features have been identified in the ARP area, two wet meadows, the Khevi river and the Aragvi River.

- Wet meadows – these are discussed below under the heading of ‘Biodiversity’.
- Khevi River - According to anecdotal information, none of the residents in the Didveli plateau use the water from the Khevi river. The distance of the road from the river (between 100 and 200m) makes it very unlikely that it would be impacted by project works. Further, no crossings of the river are necessary and no water abstraction from the river is planned.
- Aragvi River – Lot 2 Contractors’ Camp 2 on the Didveli plateau extracts water from the Aragvi river. Permits are in place for this activity.

349. No groundwater users have been identified to date in the ARP area. Any impacts caused by the construction camp at Zakatkari are discussed as part of the KK Project EIA.

Potential Impacts

Pre-construction / Construction Phase

350. No impacts to surface water have been identified that have not been assessed as part of the KK Project EIA. No groundwater users have been identified that could be impacted by ARP activities. General groundwater pollution impacts are mitigated by the mitigation measures applied to soils.

Operational Phase

351. None identified.

Mitigation and Management Measures

All Phases

352. None required other than those already being applied to the KK Project.

Residual Impacts

353. None identified.

Monitoring

354. None required other than those already being applied to the KK Project.

7.2.5. Geohazards

355. The Project will not result in, or induce additional geohazards, but it may potentially be affected by geohazards. This section therefore discusses potential impacts geohazards may have on the Project during construction and operation phases and associated mitigation measures to be adopted.

Key Sensitivities

356. The key Project sensitivities are the road infrastructure itself.

Potential Impacts

357. As noted in Section 6.2.3, the only geohazard identified that could impact upon project infrastructure are earthquakes. However, no bridges or tunnels are planned as part of the ARP. Therefore, no specific design measures are required for the ARP, other than ensuring the road is constructed according to national design codes.

Mitigation and Management Measures

Design Phase

358. Designs shall take into account all national design codes.

Pre-construction / Construction / Operational Phases

359. No project specific mitigation is warranted.

Residual Impacts

360. None.

Monitoring

361. Other than ensuring that the design codes are followed, no other monitoring is required.

7.3. Biodiversity

362. This section discusses potential impacts on biodiversity during construction and operation of the Project and associated mitigation measures to be adopted.

Aspects of the Project that have the potential to Impact Biodiversity

#	Aspect	Yes	No	Assessment Boundary
Construction Phase				
1	Earthworks	X		Project buffer
2	Construction vehicles	X		Project buffer (including access roads)
3	Mobile construction plant		X	N/A
4	Stationary construction plant	X		Within plant boundary
5	Construction camps	X		Within camp boundary
6	Pavement construction		X	N/A
Operational Phase				
1	Traffic movements	X		Within right of way

Sensitive Receptors

363. This IEE has identified a number of sensitive receptors under the following sub-headings:

- Protected and Notable Areas – including Kazbegi KBA / IBA, Kazbegi National Park
- Notable Habitat – Wet meadows located on the Didveli Plateau
- Notable Species – Including the Corncrake (*Crex crex*)

Potential Impacts

364. The KK Project EIA identified a number of generic potential impacts relating to biodiversity. These generic impacts are also directly applicable to the ARP. Impacts specific to the ARP are discussed as follows:

- Protected and Notable Sites – The ARP never enters or overlaps any of the identified sites. As such, direct impacts to these sites are not anticipated. It should be noted that the existing road does enter into the Kazbegi KBA / IBA and is adjacent to the Kazbegi National Park. The ARP will help remove nearly all road traffic from these areas, a significant benefit of the ARP.
- Notable Habitat – The ARP alignment avoids both wet meadows identified in this IEE. The wet meadows are more than 150m from the alignment but adjacent to construction access roads. The remaining portions of the ARP area are classified as modified habitat.
- Notable Species – As noted by the KK Project EIA, a large number of species are present within the broader project area. None of these are expected to trigger Critical Habitat or Priority Biodiversity Features in line with PR6. Potential impacts to notable species include direct mortality, fragmentation of habitats, visual and noise disturbance and impacts from pollution.

Impact summary and assessment of significance

365. Table 49 provides an assessment of the significance of potential biodiversity impacts before implementation of the proposed mitigation measures that are discussed in the rest of this section.

Table 49: Potential Impacts to Biodiversity

Phase	Potential Impact	Receptors	No. of Receptors Affected	Sensitivity of Receptors	Level of Public Concern	Risk of Exceeding Legal Threshold	Magnitude	Timeframe	Spatial Scale	Consequence	Probability	Significance
C/O	Encroachment	Protected and notable sites	L	H	H	-	MAJ	L/F	SMA	MED	UN	L
C	Degradation of habitat	Wet meadows	L	H	H	-	MAJ	LT	SMA	HIGH	POSS	H
C/O	Habitat disturbance, mortality	Special status species	M	H	H	-	MAJ	LT	SMA	HIGH	POSS	H

Key: C: Construction / O: Operation / H: High / M: Medium / L: Low / MAJ: Major / MOD: Moderate / MIN: Minimum / H/F: High Frequency / M/F: Medium Frequency / L/F: Low Frequency / LT: Long term / MT: Medium term / ST: Short term / SMA: Small / MED: Medium / DEF: Definitely / POSS: Possible: / UNLIKE: Unlikely. Cells shaded in blue are positive impacts.

Mitigation and Management Measures

366. The KK Project EIA provided an extensive set of mitigation and management measures for Lot 2, and these will continue to be applied to the ARP. These include specific measures for the protection of special status species that can be found in the broader project area and requirements from pre-work surveys. Measures relating to special status biodiversity have been included in a Biodiversity Action Plan which will also be applicable to the ARP and is currently being implemented as part of the KK Project.

367. Regarding ARP specific issues, the Wet Meadows will be fenced off for the duration of construction and signs erected to ensure that workers do not enter these areas. Ecological surveys also identified the presence of Corncrake within the ARP alignment close to Kaishaurni. As wider

habitat for Corncrake is extensive across the Didveli plateau and the footprint of the road is limited, loss of habitat is unlikely to have a significant impact on the species. However, to ensure that individuals are not harmed, or a breeding cycle is not lost (adult survival is under 30%), habitat removal within the RoW must be undertaken outside the breeding season (Mid-May to End of August). This will ensure that no nests are lost, and that species are only displaced from the project area to breed elsewhere. In addition to this, pre-construction survey of habitat to be removed by the ECoW will be undertaken.

368. Recultivation and habitat restoration will be undertaken post construction, this should ensure native grasses and other species are used to recreate the same habitat which was present prior to the start of the project.

Residual Impacts

369. Only a few measurable impacts are anticipated after mitigation. None of these are considered significant, given their scale. For example, the largest measurable impact is loss of c.1.4 ha of small/soft sediment. This is a widespread habitat near the Project site, nationally, and regionally, and is not of particularly high value for biodiversity. As such, this minor loss of habitat is not considered significant.

Table 50: Residual Biodiversity Impacts

Phase	Potential Impact	Potential Impact Significance	Residual Impact	Residual Impact Significance
C/O	Protected and notable sites	Low	General measures already adopted by the Lot 2 Contractor should ensure that residual impacts to these sites are not significant	Not significant
C	Wet meadows	High	Fencing off the wet meadows and regular inspections by the Lot 2 Ecological Clerk of Works should ensure that these sites are protected and that there are no significant residual impacts.	Not significant
C/O	Special status species	High	The mitigation measures provided for Corncrake will reduce impact significance to low.	Low

Monitoring

370. None, other than the routine monitoring by the Ecological Clerk of Works and the pre-construction survey of vegetation to be cleared prior to construction and the monitoring of habitat to be re-cultivated.

7.4. Economic Development

7.4.1. Economy and Employment

Aspects of the ARP that have the potential to Impact Upon the Economy and Employment

#	Aspect	Yes	No	Assessment Boundary
Construction Phase				
1	Earthworks	X		Villages within the Didveli Plateau
2	Construction vehicles		X	N/A
3	Mobile construction plant		X	N/A
4	Stationary construction plant	X		Villages within the Didveli Plateau

#	Aspect	Yes	No	Assessment Boundary
5	Construction camps	X		Villages within the Didveli Plateau
6	Pavement construction	X		Villages within the Didveli Plateau
Operational Phase				
1	Traffic movements	X		Villages within the Didveli Plateau

Key Sensitivities

371. In terms of economy and employment, the ARP will be constructed by the KK Project Lot 2 contractor and his existing staff. It is possible the Contractor may require additional staff for the road, but numbers are not expected to be high and therefore it is considered unlikely that villagers have high expectations in terms of employment opportunities on the ARP. In the same vein, ARP will be managed out of KK Project Lot 2 camps and ancillary facilities, therefore key sensitivities relating to economic impacts in this regard have already been assessed as part of the KK Project EIA.

Potential Impacts

Pre-construction / Construction Phase

372. In the construction phase, it is possible that the following beneficial impacts may occur although as noted above such impacts may be relatively limited:

- Increase in available jobs and incomes.
- Enhanced skills among local workforce.

373. The following adverse impacts specific to the ARP may occur:

- Un-met employment expectations.
- Resentment between local people who are employed by the KK Project and the lack of opportunities for employment on the ARP.
- Frustration and resentment if local workers perceive that foreign workers are receiving better pay or conditions for exactly the same job.
- Accidents to livestock resulting in loss of income/adverse livelihood impact. This is discussed further below under Community Health and Safety.
- Subsistence farmers taking up jobs and land being neglected making it difficult to re-start farming when jobs cease following retrenchment.

Operational Phase

During the operational phase, it is possible that opening of the road will lead to commercial development on the plateau, e.g., guest houses and restaurants. The plateau could even become an extension of Gudauri. This aspect could bring considerable economic benefits to the local community and is discussed further below under the heading of Induced Impacts.

Impact summary and assessment of significance


374.  Table 51 provides an assessment of the significance of potential impacts to the local economy and employment before implementation of the proposed mitigation measures that are discussed in the rest of this section.

Table 51: Potential Impacts to Local Economy and Employment

Phase	Potential Impact	Receptors	No. of Receptors Affected	Sensitivity of Receptors	Level of Public Concern	Risk of Exceeding Legal Threshold	Magnitude	Timeframe	Spatial Scale	Consequence	Probability	Significance
C	Increased jobs	Local communities	L	H	H	-	MAJ	ST	SMALL	MED	POSS	M
C	Enhanced skills	Local communities	L	M	M	-	MOD	LT	INTER	HIGH	DEF	H
C	Unmet employment expectations	Local communities	L	H	H	-	MAJ	ST	SMALL	MED	POSS	M
C	Loss of key workers to the project	Local communities	L	M	M	-	MOD	ST	SMALL	LOW	POSS	L

Key: C: Construction / H: High / M: Medium / L: Low / MAJ: Major / MOD: Moderate / MIN: Minimum / H/F: High Frequency / M/F: Medium Frequency / L/F: Low Frequency / LT: Long term / MT: Medium term / ST: Short term / INTER: Intermediate / MED: Medium / DEF: Definitely / POSS: Possible / UNLIKE: Unlikely. Cells shaded in blue are positive impacts.

Mitigation and Management Measures

375. **Employment** - Targets for local recruitment from the local communities on the Didveli plateau will be agreed with the KK Project Lot 2 Contractor and RD. The Project will seek to manage employment expectations by explaining the number and type of opportunities in advance to local communities. Applications for employment will only be considered if submitted via the official application procedure. Recruitment procedures will be transparent, public, and non-discriminatory and open with respect to ethnicity, religion, sexuality, disability, or gender. Clear job descriptions will be provided in advance of recruitment and will explain the skills required for each post. Job vacancies will be advertised in the local communities through appropriate and accessible media.

Residual Impacts

Table 52: Economy, Employment and Livelihoods Residual Impacts

Phase	Potential Impact	Potential Impact Significance	Residual Impact	Residual Impact Significance
C	Unmet employment expectations	Medium	Although efforts will be made to manage employment expectations, it is likely that members of the local community who are not selected for job are likely to be disappointed with the selection process. However, the numbers are likely to be relatively small and therefore the impacts are of high significance	Low
C	Loss of key workers to the project	Low	No specific mitigation measures have been provided for this issue, which is an unavoidable consequence of the project. However, the initial impacts are considered to be of low significance and therefore residual impacts will also be low.	Low

Monitoring

376. No specific monitoring is required other than that outlined in the EMP.

7.4.2. Gender

Potential Gender Issues

377. Construction work on the KK Project Lot 2 has generated around 205 jobs, of which 20 are occupied by women. This equates to a percentage of 9,75% female staff which is not uncommon in a traditionally male dominated sector. Most of the jobs occupied by women include office assistant, translator, cleaner, cook and cook assistants. Inspections of KK Project Lot 2 camps have indicated that there are specific facilities available for women workers including female toilets and bathrooms.³⁶

378. The potential for sexual exploitation, abuse and harassment (SEAH) does exist (as with any similar construction project) within the workforce, although no specific reports of sexual harassment on the KK Project have been reported to date.

Impact summary and assessment of significance

379. Table 53 provides an assessment of the significance of potential gender impacts before implementation of the proposed mitigation measures that are discussed in the rest of this section.

Table 53: Potential Gender Impacts

Phase	Potential Impact	Receptors	No. of Receptors Affected	Sensitivity of Receptors	Level of Public Concern	Magnitude	Timeframe	Spatial Scale	Consequence	Probability	Significance
C/O	SEAH	Contractors Staff	L	H	M	MAJ	ST	SMA	MED	POSS	M

Key: C: Construction / O: Operation / H: High / M: Medium / L: Low / MAJ: Major / MOD: Moderate / MIN: Minimum / H/F: High Frequency / M/F: Medium Frequency / L/F: Low Frequency / LT: Long term / MT: Medium term / ST: Short term / SMA: Small / MED: Medium / DEF: Definitely / POSS: Possible / UNLIKE: Unlikely. Cells shaded in blue are positive impacts.

Mitigation and Management Measures

380. A stand-alone Gender Action Plan has been prepared as part of the KK Project. However, it is recommended that the plan is updated to include specific training on SEAH to all contracted employees and provide Grievance Redress Mechanism to report SEAH and other concerns.

Residual Impacts

Table 54: Gender Residual Impacts

Phase	Potential Impact	Potential Impact Significance	Residual Impact	Residual Impact Significance
C	SEAH	Medium	Training of the workforce and development of the Gender Action Plan should help mitigate	Low

³⁶ This data relates to international staff only.

Phase	Potential Impact	Potential Impact Significance	Residual Impact	Residual Impact Significance
			Impacts. However, such incidents cannot be completely ruled out through an EIA. Therefore, any such incidents should be followed up with instant dismissal and reporting to the relevant authorities to take legal action.	

Monitoring

381. No specific monitoring is required other than that outlined in the EMP.

7.4.3. Social Infrastructure (including Utilities)

Aspects of the ARP that have the potential to Impact Upon Social Infrastructure

#	Aspect	Yes	No	Assessment Boundary
Construction Phase				
1	Earthworks	X		Within 100m of the road alignment
2	Construction vehicles		X	N/A
3	Mobile construction plant		X	N/A
4	Stationary construction plant		X	N/A
5	Construction camps		X	N/A
6	Pavement construction		X	N/A
Operational Phase				
1	Traffic movements		X	N/A

Key Sensitivities

382. As identified in Section 3.2 and Section 6.4.5, a number of utilities are located within the ARP corridor. One school has been identified in Seturni with one pupil.

Potential Impacts

383. Construction works, specifically earthworks, have the potential to impact upon the gas pipelines at chainage I+520, I+700 and at chainage 0+520 where the road alignment directly crosses these pipelines. No other utilities are anticipated to be directly impacted by the ARP. Some minor noise and air quality impacts may occur to the school in Seturni. These are discussed under the sections relating to air quality and noise.

Impact summary and assessment of significance

384. The table below provides an assessment of the significance of potential impacts before implementation of the proposed mitigation measures that are discussed in the rest of this section.

Table 55: Potential Impacts to Social Infrastructure

Phase	Potential Impact	Receptors	No. of Receptors Affected	Sensitivity of Receptors	Level of Public Concern	Magnitude	Timeframe	Spatial Scale	Consequence	Probability	Significance
C/O	Damaging gas pipes	Gas pipes and end users	H	H	M	MAJ	ST	SMA	MED	UN	L

Key: C: Construction / O: Operation / H: High / M: Medium / L: Low / MAJ: Major / MOD: Moderate / MIN: Minimum / H/F: High Frequency / M/F: Medium Frequency / L/F: Low Frequency / LT: Long term / MT: Medium term / ST: Short term / SMA: Small / MED: Medium / DEF: Definitely / POSS: Possible / UNLIKE: Unlikely. Cells shaded in blue are positive impacts.

Mitigation and Management Measures

385. The location of the gas pipes means that realignment of the ARP to avoid these pipelines is probably not possible. As such, designs should ensure that the pipelines can remain in-situ while at the same time all safety codes for gas transmission are respected. Close coordination between the RD, Transmission Service Operator (TSO), Engineer and Contractor will be required during the final design and construction phases of the Project.

386. In addition, the KK Project Lot 2 Contractor will be responsible for updating his emergency response plan to include working in the vicinity of the gas pipelines. The ERP should include a specific section relating to awareness and training of the workforce operating in this area.

Residual Impacts

Table 56: Social Infrastructure Residual Impacts

Phase	Potential Impact	Potential Impact Significance	Residual Impact	Residual Impact Significance
C	Damaging gas pipes	Low	As long as designs account for the safe passage of the gas pipelines and the ERP is updated, residual impacts are not expected to be significant.	Not significant

Monitoring

387. No specific instrumental monitoring is required other than that outlined in the EMP.

7.4.4. Population and Immigration

388. This topic is discussed below under the heading of ‘Induced Impacts’

7.4.5. Land Acquisition and Compensation

389. This section discusses the issue of land acquisition and compensation and associated mitigation measures to be adopted.

Aspects of the Project that have the potential to cause Land Acquisition and Compensation

#	Aspect	Yes	No	Assessment Boundary
Construction Phase				
1	Earthworks	X		ARP Buffer
2	Construction vehicles		X	N/A
3	Mobile construction plant		X	N/A
4	Stationary construction plant	X		ARP Buffer
5	Construction camps	X		ARP Buffer
6	Pavement construction		X	N/A
Operational Phase				
12	Traffic movements	X		N/A

Sensitive Receptors and Potential Impacts

390. Construction of the ARP will affect 79 households and with 183 affected persons. 3 of the affected households are vulnerable. There will be no physical resettlement. Full details can be found on the Addendum to the Land Acquisition and Resettlement Plan, January 2023.

Impact summary and assessment of significance

391. ^[SEP] Table 57 provides an assessment of the significance of potential land acquisition and compensation impacts before implementation of the proposed mitigation measures that are discussed in the rest of this section.

Table 57: Potential Impacts

Phase	Potential Impact	Receptors										
			No. of Receptors Affected	Sensitivity of Receptors	Level of Public Concern	Risk of Exceeding Legal Threshold	Magnitude	Timeframe	Spatial Scale	Consequence	Probability	Significance
C / O	Land Acquisition	Landowners and users. School	M	H	H	H	MAJ	LT	SMALL	MED	DEF	M

Key: C: Construction / O: Operation / H: High / M: Medium / L: Low / MAJ: Major / MOD: Moderate / MIN: Minimum / H/F: High Frequency / M/F: Medium Frequency / L/F: Low Frequency / LT: Long term / MT: Medium term / ST: Short term / MED: Medium / DEF: Definitely / POSS: Possible / UNLIKE: Unlikely. Cells shaded in blue are positive impacts.

Mitigation and Management Measures

392. Land Use (permanent and temporary) - The key mitigation for land use is implementation of the LARP which has been prepared for ARP and summarized above. Regarding temporary land take:

- For construction camps and other plant sites – Shall be managed according to the requirements of the KK Project EIA.
- For temporary Impact on land plot - Shall be managed according to the requirements of the KK Project EIA.

393. For any other unforeseen impacts during construction, including temporary impacts, the impact will be identified and assessed according to the requirements of the KK Project EIA. In addition,

adequate livelihood assistance for loss of hay and grazing grounds, if any, will be assessed and provided during implementation.

Residual Impacts

Table 58: Land Acquisition and Compensation Residual Impacts

Phase	Potential Impact	Potential Impact Significance	Residual Impact	Residual Impact Significance
C	Land Acquisition	Medium	Residual impacts are anticipated to be low if the LARP is implemented correctly. A GRM has been prepared to manage complaints received during this process.	Low

Monitoring

394. No specific monitoring is required other than that outlined in the EMP.

7.4.6. Waste Management and Spoil Disposal

395. This section discusses the impacts of waste management during construction and operation of the Project and associated mitigation measures to be adopted.

Aspects of the Project that have the potential to generate waste and spoil material

#	Aspect	Yes	No	Assessment Boundary
Construction Phase				
1	Earthworks	X		Within 50 m of the alignment and spoil disposal sites
2	Construction vehicles	X		Within 50 m of the alignment and access roads
3	Mobile construction plant	X		Within 50 m of the alignment and access roads
4	Stationary construction plant	X		Within 50 m of the plant
5	Construction camps	X		Within 50 m of the camp
6	Pavement construction	X		Within 50 m of the alignment
Operational Phase				
1	Traffic movements	X		Within 50 m of the alignment

Key Sensitivities

396. The key sensitive receptors are the residents living close to alignment, camp sites and spoil disposal sites. Workers handling hazardous wastes are also sensitive receptors.

Potential Impacts

Pre-construction / Construction Phase

397. Excavated Spoil Material – Approximately 134,000m³ of excavated spoil material will need to be removed from the site. However, fill needed for the road is 285,000m³ meaning there will be a mass balance of -151,000m³. The process of spoil removal can still cause a range of impacts and spoil from the RoW will still likely need to be disposed which could impact sensitive receptors if located poorly or the disposal site is poorly engineered. For example, dumping the material on slopes could result in erosion and possibly landslides. However, where necessary, it is considered

likely that the KK Project Lot 2 Contractor will use the spoil disposal sites already planned and approved under the KK Project.

398. Domestic and Non-hazardous Waste – Waste materials, if not properly managed, could litter the areas surrounding work zones and camp sites.

399. Hazardous Waste – Some small volumes of hazardous waste will be generated at the work sites, e.g., empty oil cans, oily rags, etc. Poor management of these wastes could result in health impacts to workers, and the local community.

Operational Phase

400. During operation, roadside litter may accumulate along the road. This type of litter generally comprises food waste, plastic and paper wrappers, plastic water bottles, etc., This roadside litter is extremely unsightly and can become caught up in rivers, trees and bushes making the waste difficult to remove. Uncollected roadside waste may attract vermin, entrap or poison animals in their habitats. Litter is also a road hazard that may occasionally contribute to accidents.

Impact summary and assessment of significance

401. ^[SEP] Table 59 provides an assessment of the significance of potential waste management and spoil disposal impacts before implementation of the proposed mitigation measures that are discussed in the rest of this section.

Table 59: Waste and Spoil Disposal Potential Impacts

Phase	Potential Impact	Receptors	No. of Receptors Affected	Sensitivity of Receptors	Level of Public Concern	Risk of Exceeding Legal Threshold	Magnitude	Timeframe	Spatial Scale	Consequence	Probability	Significance
C	Domestic waste	Nearby communities / Wildlife	L	M	M	-	MOD	H/F	SMALL	MED	DEF	M
C	Construction Waste	Nearby communities / Wildlife	L	M	M	-	MOD	H/F	SMALL	MED	DEF	M
C	Hazardous Waste	Nearby communities / Wildlife	L	H	M	-	MOD	M/F	SMALL	MED	DEF	M
C	Spoil Material	Nearby communities / Wildlife	L	M	H	-	MAJ	LT	SMALL	MAJ	DEF	H
O	General waste	Nearby communities / Wildlife	L	H	M	-	MOD	H/F	SMALL	MED	DEF	M

Key: C: Construction / O: Operation / H: High / M: Medium / L: Low / MAJ: Major / MOD: Moderate / MIN: Minimum / H/F: High Frequency / M/F: Medium Frequency / L/F: Low Frequency / LT: Long term / MT: Medium term / ST: Short term / MED: Medium / DEF: Definitely / POSS: Possible / UNLIKE: Unlikely. Cells shaded in blue are positive impacts.

Mitigation and Management Measures

Planning

402. The KK Project Lot 2 Contractor will apply his Waste Management Plan to the ARP. In addition, the Contractor will update its Spoil Disposal Plan to account for any additional spoil generated by the ARP.

Construction Phase

403. The KK Project Lot 2 Contractor shall apply all mitigation and management measures specified by the KK Project EIA to the ARP, including those for spoil disposal.

Operational Phase

404. The RD shall apply all mitigation and management measures specified by the KK Project EIA to the ARP.

Residual Impacts

Table 60: Waste and Spoil Material Residual Impacts

Phase	Potential Impact	Potential Impact Significance	Residual Impact	Residual Impact Significance
C	Improper management and disposal of non-hazardous waste	Medium	The applicable mitigation and management measures will ensure that residual impacts are not significant.	Not significant
C	Improper management and disposal of hazardous waste	Medium	Storage and disposal of hazardous waste at an appropriately licensed waste facility will ensure that there are no significant residual impacts	Not significant
C	Disposal of spoil material	High	Managing spoil material as part of the existing spoil disposal plan will help reduce the significance of impacts so that any remaining residual impacts are of low significance.	Low
O	General waste	Medium	The applicable mitigation and management measures will ensure that residual impacts are not significant.	Not significant

Monitoring

405. None, other than that outlined in the EMP.

7.4.7. Construction Camps and Ancillary Facilities

406. The ARP will utilize existing construction camps and ancillary facilities, such as batching plants, already in place, or planned as part of the KK Project Lot 2. The impact assessment and mitigation measures outlined in the KK Project EIA are therefore applicable in their entirety to the ARP. This included specific measures for these sites and the preparation of site-specific management plans as part of the Lot 2 Contractors Site-Specific Environmental Management Plan (SSEMP).

407. Further, as part of the KK Project, an assessment of the existing ‘Temporary Facilities’ under Lot 2 has been undertaken by the Lot 2 Engineer and any corrective actions for these existing sites have been submitted to the Lot 2 Contractor for action. Given the above, no further requirements for the assessment of construction camps and ancillary facilities are required under this IEE.

7.4.8. Access and Access Roads

408. This section discusses potential impacts on access during construction and operation of the Project and associated mitigation measures to be adopted.

Aspects of the ARP that have the potential to affect Access

#	Aspect	Yes	No	Assessment Boundary
Construction Phase				
1	Earthworks	X		Entire Didveli Plateau
2	Construction vehicles	X		
3	Mobile construction plant		X	
4	Stationary construction plant	X		
5	Construction camps	X		
6	Pavement construction	X		
Operational Phase				
1	Traffic movements	X		Entire Didveli Plateau

Key Sensitivities and Receptors

409. The key sensitive receptors within the ARP area are the residents of the Didveli plateau, farmers and livestock herders.

Potential Impacts

Pre-construction / Construction Phase

410. Two of the main impacts resulting from Project works will be short term road diversions and some temporary blocking of access to properties during the construction phase. Construction of the first portion of the ARP involves works on greenfield land, and as such the access impacts here will be restricted to the residents of Zakatkari and possibly to farmers and livestock herders trying to cross this area or reach farmland. The second portion of the road, from Kaishaurni, follows the existing road and here careful attention needs to be paid to ensure that access to the properties and land in this area remains open, or that access restrictions are only temporary.

411. No additional access roads are perceived for the construction of this access road itself.

Operational Phase

412. Review of the design documents provided by IDOM and the RD for the preparation of this IEE have shown 24 access points to properties and land along the alignment (see Figure 6, Figure 7 and Figure 8) which will allow residents access to their properties. However, current designs do not show the presence of any road crossings for livestock, and this could lead to potential vehicle / livestock collisions during the operational phase. No pedestrian crossings are provided but the presence of the majority of the residential properties to the north of the ARP means that the number of people crossing the road on a daily basis would be very low.

Impact summary and assessment of significance

413. Table 60 provides an assessment of the significance of potential impacts before implementation of the proposed mitigation measures that are discussed in the rest of this section.

Table 61: Potential Impacts to Access

Phase	Potential Impact	Receptors	No. of Receptors Affected	Sensitivity of Receptors	Level of Public Concern	Risk of Exceeding Legal Threshold	Magnitude	Timeframe	Spatial Scale	Consequence	Probability	Significance
C	Road diversions	Nearby communities	L	M	M	-	MOD	ST	SMA	LOW	DEF	L
C / O	Blocking access	Nearby communities and livestock	L	M	M	-	MOD	ST	SMA	LOW	POSS	L
O	Accidents	Nearby communities and livestock	L	M	M	-	MOD	ST	SMA	LOW	UN	L

Key: C: Construction / O: Operation / H: High / M: Medium / L: Low / MAJ: Major / MOD: Moderate / MIN: Minimum / H/F: High Frequency / M/F: Medium Frequency / L/F: Low Frequency / LT: Long term / MT: Medium term / ST: Short term / SMA: Small / MED: Medium / DEF: Definitely / POSS: Possible / UNLIKE: Unlikely. Cells shaded in blue are positive impacts.

Mitigation and Management Measures

Planning

414. The KK Project Lot 2 Contractor shall update his Traffic Management Plan to ensure that the ARP is included.

Construction Phase

415. During the construction phase, the Lot 2 Contractor shall follow all conditions of the KK Project EIA relating to provision of access, detours, etc.

Residual Impacts

416. None identified.

Monitoring

417. None required other than those already being applied to the KK Project.

Operational Phase

418. During the operation of the road, signage will be put in place to warn road users of the presence of livestock and pedestrians, and the speed limit will be limited to 60 km/h with signage also provided upon leaving the main highway.

Residual Impacts

419. None identified.

Monitoring

420. During operation of the road, the RD will monitor for accident blackspots and, if necessary, may introduce road furniture to mitigate and manage impacts.

7.5. Social and Cultural Aspects

7.5.1. Community Health and Safety

421. This section discusses potential health and safety impacts to the local community during construction and operation of the Project and associated mitigation measures to be adopted.

Aspects of the ARP that have the potential to affect Local Community

#	Aspect	Yes	No	Assessment Boundary
Construction Phase				
1	Earthworks	X		50m from the alignment
2	Construction vehicles	X		50m from the alignment and access roads
3	Mobile construction plant	X		50m from equipment and access roads
4	Stationary construction plant	X		50m from plant
5	Construction camps	X		50m from camps
6	Pavement construction	X		50m from the alignment
Operational Phase				
1	Traffic movements	X		50m from the alignment

Note: these assessment boundaries do not account for noise and air quality issues which are discussed in separate sections.

Key Sensitivities and Receptors

422. The key sensitive receptors within the ARP area are residents of the villages on the Didveli plateau and livestock herders

Potential Impacts

Construction Phase

423. During the construction phase, the Project will be adding a mix of light, and heavy and slow-moving vehicles onto the road network. This will include vehicles transporting workers, trucks carrying heavy equipment between work areas and haul trucks moving spoil. The potential impacts include the increased risk of collisions and road transport accidents (potentially resulting in injury, death, or fuel or cargo spillage) and subsequent harm to animals, local shepherds, and communities.

424. Local residents and livestock could also be prone to accidents at work sites, for example, falling into excavated areas, tampering with work equipment, etc. As such, it is important to ensure that local residents are warned of any potentially dangerous areas and that these locations are appropriately demarcated or fenced off.

Operational Phase

425. Figures on regional road safety are described in the KK Project EIA, most of which are due to collisions for unidentified reasons or wrong maneuvers. Most of the road traffic accidents (including fatalities and collisions with pedestrians) are occurring in the area which will be avoided through the construction of the Project.

426. The increased flow of traffic across the plateau during the operational phase may, however, lead to traffic accidents involving livestock. Section 7.4.8 of this report has assessed this issue and made recommendations for livestock crossings at locations to be confirmed with the local community.

Impact summary and assessment of significance

427. Table 60 provides an assessment of the significance of potential impacts to local community before implementation of the proposed mitigation measures that are discussed in the rest of this section.

Table 62: Potential Impacts to Community

Phase	Potential Impact	Receptors	No. of Receptors Affected	Sensitivity of Receptors	Level of Public Concern	Risk of Exceeding Legal Threshold	Magnitude	Timeframe	Spatial Scale	Consequence	Probability	Significance
C	Accidents involving humans and livestock	Nearby communities / Livestock	L	H	H	-	MAJ	L/F	SMALL	MED	POSS	M

Key: C: Construction / H: High / M: Medium / L: Low / MAJ: Major / MOD: Moderate / MIN: Minimum / H/F: High Frequency / M/F: Medium Frequency / L/F: Low Frequency / LT: Long term / MT: Medium term / ST: Short term / MED: Medium / DEF: Definitely / POSS: Possible: / UNLIKE: Unlikely. Cells shaded in blue are positive impacts.

Mitigation and Management Measures

428. The KK Project Lot 2 Contractor shall follow the conditions of the Community Health and Safety Plan and the mitigation and management measures prepared as part of the KK Project EIA and shall extend the road safety awareness program to villages across the plateau. In addition, during the construction phase, the KK Project Lot 2 Contractor will be responsible for ensuring that all potentially hazardous work zones are sign-posted and demarcated with bunting.

Residual Impacts

Table 63: Community Residual Impacts

Phase	Potential Impact	Potential Impact Significance	Residual Impact	Residual Impact Significance
C	Accidents involving humans and livestock	Medium	Implementation of the KK Project EIA mitigation measures and ensuring hazardous worksites are demarcated should reduce the potential for accidents involving the local community. However, accidents cannot be entirely ruled out. Residual impacts are considered to be low significance.	Low

Monitoring

429. None required other than those already being applied to the KK Project.

7.5.2. Workers’ Rights and Occupational Health and Safety

430. The KK Project EIA prepared a detailed assessment of workers’ right and occupational health and safety (OHS). All these measures are currently being applied by the KK Project Lot 2 Contractor and no other specific assessment of OHS issues and workers’ rights are required as part of the ARP with the exception of COVID-19.

431. The KK Project Lot 2 Contractor will be responsible for ensuring that all national guidelines relating to COVID-19 are followed. The recommendations relate to:

- Self-isolation
- Social Distancing
- Good Hygiene
- Use of masks.

432. The Lot 2 Contractor will also provide:

- COVID-19 appropriate PPE.
- Testing of all staff arriving in country.
- Provision of health clinic staffed full time at construction camps.
- Handwashing facilities and sanitizers.
- Quarantine accommodation.

7.5.3. Lighting

433. The ARP is, in effect, an extension of the KK Project road and therefore all potential impacts associated with street lighting, work zone lighting and camp site lighting noted in the KK Project EIA are applicable to the ARP. No additional mitigation measures are needed above and beyond what is required under the KK Project.

7.5.4. Noise and Vibration

434. This section discusses the impacts of noise and vibration during construction and operation of the Project and associated mitigation measures to be adopted.

Aspects of the Project that have the potential to generate noise and vibration

#	Aspect	Yes	No	Assessment Boundary
Construction Phase				
1	Earthworks	X		500m from the alignment
2	Construction vehicles	X		500m from access routes
3	Mobile construction plant	X		500m from equipment
4	Stationary construction plant	X		500m from plant
5	Construction camps	X		500m from camps
6	Pavement construction	X		500m from the alignment
Operational Phase				
1	Traffic movements	X		500m from the alignment

Sensitive Receptors

435. Sensitive receptors are the local population living within the vicinity of the assessment boundary. Wildlife can also be adversely affected by high noise levels. Cultural objects and monuments can also be affected by vibration, and this issue is discussed below under the heading of Physical Cultural Heritage and Cultural Landscape.

Potential Impacts

Pre-construction / Construction Phase

Construction Vibration

436. A vibration model has been completed for the KK road and the ARP. The model categorized structures (according to their building class) in the Project area and analyzed soil structure. Each receptor was then carefully mapped. A model was then developed based on a worst-case scenario – percussive piling. No piling is anticipated on the ARP, but it will be employed on the KK Road. The model concluded that only one property on the ARP would be at risk of cosmetic damage based on vibration generated by percussive piling. This residential property is within 17m of the project road. However as noted above, no piling is planned and therefore no cosmetic damage to properties along the ARP is likely to occur (Peak Particle Velocity (PPV) is 38mm/s at 7.62m for percussive piling – this compares with 5.33mm/s at 7.62 meters for vibratory rollers which are considered to be the equipment with highest vibration values used on the ARP). The full vibration model can be found in Appendix H.

Construction Noise

437. The KK Project EIA concluded that construction traffic and equipment could generate noise levels in neighboring residential areas, including Zakatkari, between 65 and 80dBA. Similar noise levels can be anticipated in the villages along the ARP alignment.

Operational Phase

Operational Noise

438. A traffic noise model has been prepared for the Project. The noise model was developed using the CadnaA acoustic modelling software for two cases, namely, baseline-existing noise model and future operation noise models for 1st, 5th, 10th and 15th year scenarios. The specific objectives of the model were to:

- Determine the existing background noise levels
- Assess noise impacts on sensitive receptors
- Suggest mitigation measures and determine the residual impacts

439. While determining the AOI for operations, maximum speeds of 130 km/h for vehicles and 110 km/h for heavy vehicles were assumed. In addition, to allow the selection of an adequate area for all cases to be evaluated, it was assumed that the terrain was flat and that there was no noise attenuation due to topography. The noise model shows that noise levels decrease below 40 dBA within 1300 meters of the road. For that reason, a corridor of 1500 meters from both sides of the motorway is considered as the AOI for operations.

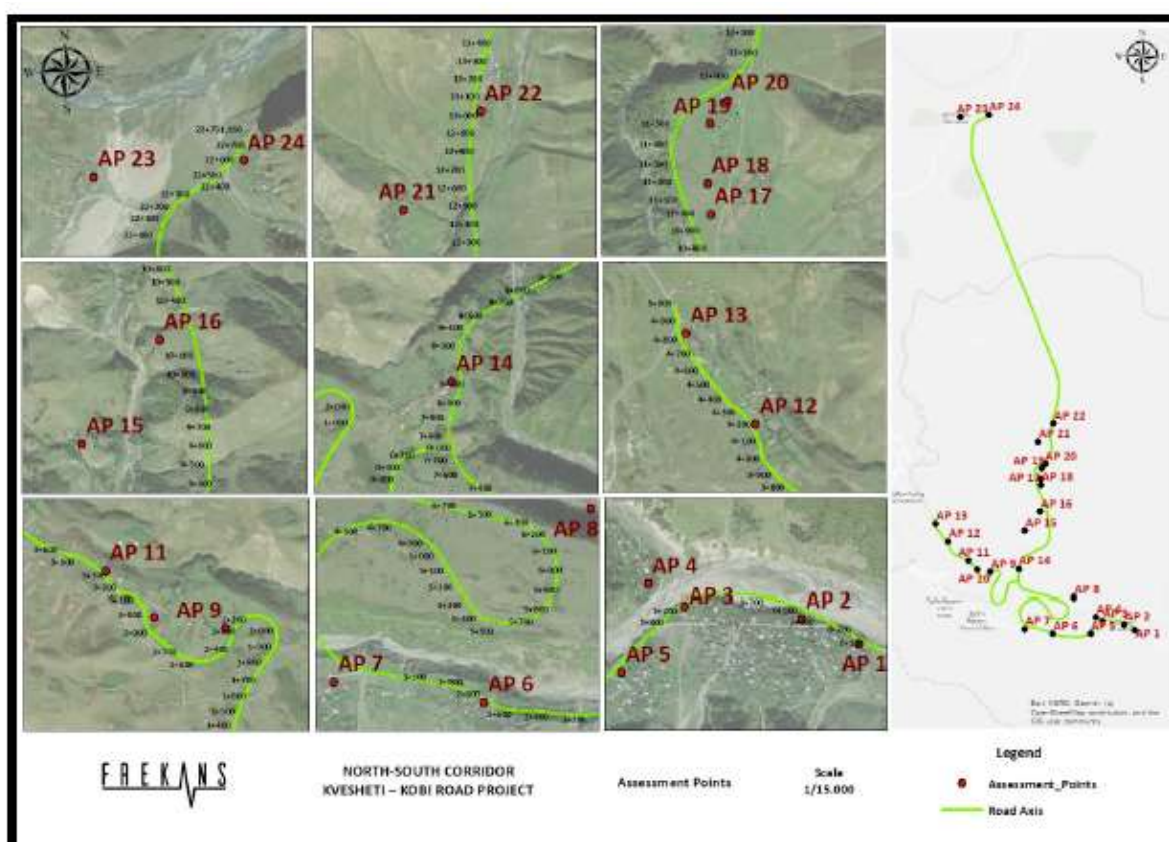
440. During field measurements, measurement points were selected to represent the baseline noise levels for settlement of concern. However, measurement points are not necessarily the point that has the most probability to affect from adverse effects of the motorway noise. Thus, receivers were separately identified throughout the road axis. All receiver point's ambient noise conditions are represented by a measurement station. Total of 5 receivers were identified throughout the road. Those total 5 identified receivers were used as assessment points for impact assessment efforts. These points are shown in the figure and table below.

Table 64: Identified Receptors

Representative Baseline Measurement Point	Assessment Point	Location	KM	Distance to Source (m)	Comments	Extent	Sensitivity	Importance
2	AP9	Kaishaurni	2.3	39	Residential Building	Site	Medium	Medium
2	AP10	Kaishaurni	2.9	48	Residential Building	Site	Medium	Medium
2	AP11	Kaishaurni	3.3	21	Residential Building	Site	Medium	Medium
3	AP12	Seturni	4.1	23	Residential Building	Site	Medium	Medium
3	AP13	Seturni	4.8	35	Residential Building	Local	Medium	Medium

* On the Kobi-Kvesheti Road

Figure 59: Identified Receptors



Note: These are the receptors for the ARP and the Kobi-Kvesheti Project road.

441. The operation noise model was created and calculated for 4 different variants namely, year 2025, year 2030, year 2035 and year 2040. Planned commissioning date of the motorway is September of 2024, scenarios are decided according to this information. Vehicle projection data is based on the data provided by ADB presented in Table 16: Normal Traffic Forecasts.

442. Speed for vehicles is integrated into the model as 80 km/h for all vehicles. Surface of the road is modelled as smooth asphalt. The maximum speed level for Access Road was modelled as 60 and 80 km/h. Since no significant difference was observed to the impact levels at the receivers, 80

km/h was accepted by studying the worst-case scenario. The results of the model without mitigation are presented below for 2025, 2030, 2035 and 2040.³⁷

³⁷ Note that the impact significance rating for the noise model followed a different methodology than for this ARP Addendum. Please see the full model for further details regarding the significance methodology used.

Table 65: Operational Noise Results, 2025

Measure Point	Ass. Point	Distance to Source (M)	Model Result L _{eq} (dBA)		Baseline L _{eq} (dBA)		Cumulative (dBA)		Limit Value (dBA)		Limits Exceedance Max	Scale of Impact	Impact Magnitude	Impact Significance
			Ld	Ln	Ld	Ln	Ld	Ln	Ld	Ln				
2	AP9	39	45,8	41,8	39,2	31,3	46,7	42,2	55,0	45,0	0,0	No Impact	No Impact	No Impact
2	API0	48	53,3	48,8	39,2	31,3	53,5	48,9	55,0	45,0	3,9	M	M	Moderate
3	API1	21	56,2	51,4	39,2	31,3	56,3	51,4	55,0	45,0	6,4	L	M	Moderate
3	API2	23	58,1	53,3	35,7	33,2	58,1	53,3	55,0	45,0	8,3	VL	L	Major
3	API3	35	51,5	47,1	35,7	33,2	51,6	47,3	55,0	45,0	2,3	S	S	Minor
Total														
No Impact													1	
Negligible													0	
Minor													1	
Moderate													2	
Major													1	

Table 66: Operational Noise Results, 2030

Measure Point	Ass. Point	Distance to Source (M)	Model Result L _{eq} (dBA)		Baseline L _{eq} (dBA)		Cumulative (dBA)		Limit Value (dBA)		Limits Exceedance Max	Scale of Impact	Impact Magnitude	Impact Significance
			Ld	Ln	Ld	Ln	Ld	Ln	Ld	Ln				
2	AP9	39	46,9	42,8	39,2	31,3	47,6	43,1	55,0	45,0	0,0	No Impact	No Impact	No Impact
2	API0	48	54,3	49,8	39,2	31,3	54,4	49,9	55,0	45,0	4,9	M	M	Moderate
3	API1	21	57,2	52,4	39,2	31,3	57,3	52,4	55,0	45,0	7,4	L	M	Moderate
3	API2	23	59,1	54,3	35,7	33,2	59,1	54,3	55,0	45,0	9,3	VL	L	Major
3	API3	35	52,6	48,1	35,7	33,2	52,7	48,2	55,0	45,0	3,2	M	M	Moderate
Total														
No Impact													1	
Negligible													0	
Minor													0	
Moderate													2	
Major													1	

Table 67: Operational Noise Results, 2035

Measure Point	Ass. Point	Distance to Source (M)	Model Result L _{eq} (dBA)		Baseline L _{eq} (dBA)		Cumulative (dBA)		Limit Value (dBA)		Limits Exceedance Max	Scale of Impact	Impact Magnitude	Impact Significance
			Ld	Ln	Ld	Ln	Ld	Ln	Ld	Ln				
2	AP9	39	47,8	43,9	39,2	31,3	48,4	44,1	55,0	45,0	0,0	No Impact	No Impact	No Impact
2	AP10	48	55,2	50,9	39,2	31,3	55,3	50,9	55,0	45,0	5,9	L	M	Moderate
3	AP11	21	58,1	53,6	39,2	31,3	58,2	53,6	55,0	45,0	8,6	VL	L	Major
3	AP12	23	60,0	55,5	35,7	33,2	60,0	55,5	55,0	45,0	10,5	VL	L	Major
3	AP13	35	53,5	49,3	35,7	33,2	53,6	49,4	55,0	45,0	4,4	M	M	Moderate
Total														
No Impact													1	
Negligible													0	
Minor													0	
Moderate													2	
Major													2	

Table 68: Operational Noise Results, 2040

Measure Point	Ass. Point	Distance to Source (M)	Model Result L _{eq} (dBA)		Baseline L _{eq} (dBA)		Cumulative (dBA)		Limit Value (dBA)		Limits Exceedance Max	Scale of Impact	Impact Magnitude	Impact Significance
			Ld	Ln	Ld	Ln	Ld	Ln	Ld	Ln				
2	AP9	39	48,6	44,7	39,2	31,3	49,1	44,9	55,0	45,0	0,0	No Impact	No Impact	No Impact
2	AP10	48	56,0	51,7	39,2	31,3	56,1	51,7	55,0	45,0	6,7	L	M	Moderate
3	AP11	21	58,9	54,3	39,2	31,3	58,9	54,3	55,0	45,0	9,3	VL	L	Major
3	AP12	23	60,8	56,2	35,7	33,2	60,8	56,2	55,0	45,0	11,2	VL	L	Major
3	AP13	35	54,3	50,0	35,7	33,2	54,4	50,1	55,0	45,0	5,1	L	M	Moderate
Total														
No Impact													1	
Negligible													0	
Minor													0	
Moderate													2	
Major													2	

443. The conclusions of the model, without mitigation are:

- For Year 2025; 2 out of 5 Points found out to have “Moderate” final impact significance, 1 out of 5 points found out to have “Major” final impact significance
- For Year 2030; 3 out of 5 Points found out to have “Moderate” final impact significance, 1 out of 5 points found out to have “Major” final impact significance
- For Year 2035; 2 out of 5 Points found out to have “Moderate” final impact significance, 2 out of 5 points found out to have “Major” final impact significance
- For Year 2040; 2 out of 5 Points found out to have “Moderate” final impact significance, 2 out of 5 points found out to have “Major” final impact significance.

444. The full noise model can be found in Appendix B.

Operational Vibration

445. Regarding operational phase vibration, the KK Project EIA noted that highway traffic is not likely to have any measurable impact on the structures or on comfort.

Impact summary and assessment of significance

446. Table 69 provides an assessment of the significance of potential noise and vibration impacts before implementation of the proposed mitigation measures that are discussed in the rest of this section.

Table 69: Noise and Vibration Potential Impacts

Phase	Potential Impact	Receptors	No. of Receptors Affected	Sensitivity of Receptors	Level of Public Concern	Risk of Exceeding Legal Threshold	Magnitude	Timeframe	Spatial Scale	Consequence	Probability	Significance
C	General Construction Noise	Local community	H	M	H	H	H/F	ST	SMA	MED	DEF	M
C	Construction vibration	Local Community	L	M	M	L	MOD	L/F	SMA	MED	UN	L
O	Traffic noise	Local Community	H	H	H	H	LT	LT	SMA	MAJ	DEF	H

Key: C: Construction / O: Operation / H: High / M: Medium / L: Low / MAJ: Major / MOD: Moderate / MIN: Minimum / H/F: High Frequency / M/F: Medium Frequency / L/F: Low Frequency / LT: Long term / MT: Medium term / ST: Short term / SMA: Small / MED: Medium / DEF: Definitely / POSS: Possible / UNLIKE: Unlikely. Cells shaded in blue are positive impacts.

Mitigation and Management Measures

Pre-construction / Construction Phase

General Construction Noise

447. The KK Project Lot 2 Contractor will continue to follow the noise management plan and the mitigation and management measures outlined in the KK Project EIA for general construction noise which includes regular community engagement. Construction camps and ancillary facilities have already been sited as part of the KK Lot 2 construction works, and it is noted that, due to limits on land availability, in some instances these facilities are located closer than 500m from residential receptors. Noise monitoring at Zakatkari should identify any instances where noise from the Lot 2 camp in Zakatkari leads to elevated levels in the surrounding residential areas. Where this occurs, the Lot 2 Contractor will be responsible for the installation of temporary noise barriers as necessary.

Vibration

448. Despite the fact no impacts are anticipated from vibration, as a precautionary approach the KK Project Lot 2 Contractor will continue to follow the construction vibration management plan (CVMP) and the mitigation and management measures outlined in the KK Project EIA for general construction vibration, including the requirements for pre-work survey. Specific conditions relating to cultural monuments and objects are discussed further below and where necessary the CVMP will be updated based on the identified issues.

Operational Phase

449. To overcome foreseen operational noise problems at receptors which have the final impact significances of “Moderate” and “Major”; noise barrier structures were then designed into the model and final impact significances calculated again for after mitigation case. The following table represents the proposed noise barriers for the Project.

Table 70: Proposed Noise Barriers

Barrier Name	Measurement Point	Assessment Point	Settlement	KM	Side – north/south	Height (m)	Length (m)	Area (m ²)
B6	2	API0	48	2+800 – 3+020	N	2	217	434
B7	3	API 1	21	3+160 – 3+440	N	2	279	558
B8	3	API2	23	4+020 – 4+430	N	2	323	646
B9	3	API3	35	4+680 – 4+880	N	2	197	394

Note: In this project, since receivers are distant from the barrier structures, noise barrier is suggested and modeled as to achieve at least B2 class (EN 1793-1) in terms of sound insulation. If it is decided to be opaque regarding the noise barrier design during the application stage, at least A2 class (EN 1793-2) is recommended in terms of absorptive characters.

450. After application of the noise barriers, noise model was re-run and noise assessment procedures re-applied. The table below shows the result of the operation noise assessment after mitigation measures applied.

Table 71: Operational Noise Result with Mitigation, 2040

Measure Point	Ass. Point	Distance to Source (M)	Model Result L _{eq} (dBA)		Baseline L _{eq} (dBA)		Cumulative (dBA)		Limit Value (dBA)		Limits Exceedance Max	Scale of Impact	Impact Magnitude	Impact Significance
			Ld	Ln	Ld	Ln	Ld	Ln	Ld	Ln				
2	AP9	39	48,6	44,7	39,2	31,3	49,1	44,9	55,0	45,0	0,0	No Impact	No Impact	No Impact
2	AP10	48	50,1	45,6	39,2	31,3	50,4	45,8	55,0	45,0	0,8	No Impact	No Impact	No Impact
3	AP11	21	49,2	44,9	39,2	31,3	49,6	45,1	55,0	45,0	0,1	No Impact	No Impact	No Impact
3	AP12	23	51,2	47,1	35,7	33,2	51,3	47,3	55,0	45,0	2,3	S	S	Minor
3	AP13	35	49,8	45,0	35,7	33,2	50,0	45,3	55,0	45,0	0,3	No Impact	No Impact	No Impact
													Total	
													No Impact	4
													Negligible	0
													Minor	1
													Moderate	0
													Major	0

451. As can be seen from the table above, after application of the proposed mitigation measures, operation phase noise assessment for 2040 is concluded as: 0 out of 5 assessment points found out to have “Major” or “Moderate” impact significance. The remaining one assessment point has a conclusion of “Minor”. Accordingly, the barriers specified in the model shall be constructed as part of the Project.

Residual Impacts

Table 72: Residual Noise and Vibration Impacts

Phase	Potential Impact	Potential Impact Significance	Residual Impact	Residual Impact Significance
C	General Construction Noise	Moderate	Implementation of the mitigation measures outlined herewith and within the KK Project EIA should ensure that impact significance is reduced to low.	Low
C	Construction vibration	Low	The mitigation measures proposed should ensure that there are no significant vibration impacts during the construction phase.	Not significant
O	Traffic Noise	High	Construction of the proposed noise barriers will ensure that in nearly all cases there is no significant impact.	Low

Monitoring

452. The table below provides the monitoring requirements for noise.

Table 73: Noise - Monitoring Requirements

Monitoring	Parameters	Frequency	Location	Responsibility	Costs
Construction					
Construction	Laeq	Monthly and in response to complaints from residents.	Kaishaurni, Seturni and any areas where complaints are received from locals.	Lot 2 Contractor	None, part of existing contractual obligations

Note: Zakatkari monitoring is undertaken as part of KK Project Lot 2.

7.5.5. Physical Cultural Heritage and Cultural Landscape

453. This section discusses the impacts upon physical cultural heritage (PCR) and cultural landscape during construction and operation of the Project and associated mitigation measures to be adopted.

Aspects of the Project that have the potential to generate impacts to PCR

#	Aspect	Yes	No	Assessment Boundary
Construction Phase				
1	Earthworks	X		Project buffer
2	Construction vehicles	X		Project buffer
3	Mobile construction plant		X	N/A
4	Stationary construction plant	X		Within plant boundary
5	Construction camps		X	Within camp boundary
6	Pavement construction		X	N/A
Operational Phase				
1	Traffic movements		X	N/A

Sensitive Receptors

454. The NACHP has identified the following sensitive receptors within the ARP portion of the Didveli plateau (shown in Figure 60) :

- Sameba Complex (Field ID 19) GISID:11655
- Hillock (Field ID 20)
- Kaishaurni – Suntni Castle GISID:6603
- Kaishaurni ruins of a backed tower GISID:11557
- Kaishaurni – settlement site in Murghulbi district GISID:35073
- Kaishaurni niche of the virgin and site of former church GISID:35074

455. In addition, the NACHP also recognizes the wider area as a historically established cultural landscape

Potential Impacts

Construction Phase

456. General construction activities and specifically earthworks and excavations have the potential to significantly impact upon the identified sensitive receptors. Most of the identified receptors do not overlap with construction zones. Although as noted by the NACHP, they should be carefully monitored. It is also possible that during excavation additional archeological finds could occur that have not been recorded to date and Lot 2 contractor will act according to the Georgian legislation (Chance Find Procedure).

Operational Phase

457. Once opened, the ARP will alter the landscape which has been recognized as an established cultural landscape, although to a lesser degree perhaps than the neighboring Khada Valley. The first couple of kilometers of the road will have the some impact with some areas of excavation and fill altering the natural landscape and the views from towers on the upper plateau looking towards the lower plateau.

Figure 60: Cultural Heritage Sensitive Receptors



Source: NACHP

Impact summary and assessment of significance

458. Table 74 provides an assessment of the significance of potential impacts to PCR and cultural landscape before implementation of the proposed mitigation measures that are discussed in the rest of this section.

Table 74: PCR Potential Impacts

Phase	Potential Impact	Receptors	No. of Receptors Affected	Sensitivity of Receptors	Level of Public Concern	Risk of Exceeding Legal Threshold	Magnitude	Timeframe	Spatial Scale	Consequence	Probability	Significance
C	Construction works damaging cultural objects	Identified PCR and chance finds	L	H	H	L	MAJ	ST	SMALL	MOD	POSS	M
C	Construction works damaging cultural objects	Sameba Complex	L	H	H	L	MAJ	ST	SMALL	MOD	POSS	M
O	Loss of cultural landscape	Cultural landscape	L	H	H	L	MAJ	ST	SMALL	MOD	POSS	M

Key: C: Construction / O: Operation / H: High / M: Medium / L: Low / MAJ: Major / MOD: Moderate / MIN: Minimum / H/F: High Frequency / M/F: Medium Frequency / L/F: Low Frequency / LT: Long term / MT: Medium term / ST: Short term / MED: Medium / DEF: Definitely / POSS: Possible / UNLIKE: Unlikely. Cells shaded in blue are positive impacts.

Mitigation and Management Measures

459. For Sameba Complex, the preferred mitigation measure is to change the alignment to avoid direct impacts to this site. A proposed realignment has already been developed as shown in Figure 17.
460. For the remaining identified PCR, the ARP shall follow all relevant mitigation and management measures outlined in the KK Project EIA including the Chance Find Procedure (Appendix E of the KK Project EIA) and Archaeological Five Phase Strategy (Appendix N of the KK Project EIA). This work will have to be closely monitored by the Cultural Heritage Monitors employed through the engineer.
461. Regarding loss of cultural landscape, the RD and the KK Project Lot 2 Contractor shall consult with the NACHP, the local community and relevant stakeholders to determine which types of landscaping are most suitable to reduce impacts on cultural landscape. This could include planting of different tree species in particular parts of the road affected by cut and fill and the avoidance of hard materials, such as concrete drains and gabion walls which may look out of place in the current landscape.

Residual Impacts

Table 75: Residual PCR Impacts

Phase	Potential Impact	Potential Impact Significance	Residual Impact	Residual Impact Significance
C	Construction works damaging cultural objects	Medium	Demarcating the site and providing information to workers in the area of the PCR should reduce potential impact significance to low.	Low
C	Construction works impacting Sameba Complex	Medium	The alignment from the Sameba complex moved and pre-construction survey work was done which will ensure that any impacts to this site will be of low significance.	Low
O	Loss of cultural landscape	Medium	Careful landscaping of the ARP will help to reduce the impacts to cultural landscape in the areas around Zakatkari. However, a change to the historical nature of this landscape will occur, but impact significance should be low.	Low

Monitoring

462. None, other than those already included as part of the KK Project Lot 2 Contractors responsibilities.

7.6. Cumulative and Induced Impacts

463. As mentioned previously, the ARP is essentially an extension of the KK Project, undertaken by the same Contractor. The ARP will be managed out of the KK Lot 2 facilities and works will be undertaken using existing equipment and facilities, therefore no ‘cumulative impacts’ relating to the KK project are deemed relevant. The KK Project EIA did identify several cumulative impacts that could affect the KK Project, and these can also therefore be extended to the ARP. The KK Project EIA provides details of these cumulative impacts and relevant mitigation measures.

464. A small six megawatt run-of river hydropower plant is being considered below the Didveli plateau between Mleta and Arakveti and minor cumulative impacts could arise during the construction phase of this project. However, these are not considered to be significant enough to warrant specific mitigation and management measures within this IEE.
465. As mentioned earlier in the report, construction of the ARP could induce development within the Didveli plateau which could become an extension of the Gudauri ski resort. It is also possible that more residential properties could be built adjacent to the road, especially on currently vacant land south of Seturni and Kaishaurni. It is therefore vital that planning conditions relating to the Gudauri recreation area continue to be applied to ensure that development is managed appropriately within the plateau.
466. To address some of these potential concerns relating to unplanned development the Khada Valley Development Plan (KVDP) is under preparation which includes the ARP project area. The KVDP has two key objectives:
- A. Seek the preservation of the Khada Valley and include:
 - i. A Development Plan that will be prepared in accordance with Georgia’s Laws and Regulations (in accordance with the Code and Resolution N260 of the Government of Georgia of June 3 2019 on the Rule of Spatial Planning and Urban Development Plans and contain all details necessary for the issuance of building permits for the defined construction zones and functional sub-zones; and
 - ii. A Priority Investment Plan that will serve as a guiding framework to identify, select, and prioritize sustainable projects that are suitable for government and/or private financing. The KVDP will help to show the links between community development aspirations, regional development, and local conservation goals. Specific objectives of this Plan will be to preserve the valley and limit impacts on its cultural heritage, assist valley residents with adapting to the changes the project will bring, and provide for the needs and impacts of the increased populations and likely commercial pressures that will ensue.
 - B. The Plan will follow best international practices while ensuring alignment with national legislation and strategies, relevant international conventions Georgia is signatory to, and ADB policy. It will foster participatory and inclusive planning, pay specific attention to nature-based and cultural heritage values, and provide an implementation framework for the long-term development of the valley.
467. Given the above, the cumulative impact of this plan is a significant positive, in terms of both environmental and social considerations.

7.7. Transboundary Impacts

468. The Project will not result in any significant transboundary impacts.

8. Stakeholder Engagement, Information Disclosure and Grievance Mechanism

8.1. Public Consultation Requirements

469. According to the ADB SPS (2009): “The borrower/client will carry out meaningful consultation with affected people and other concerned stakeholders, including civil society, and facilitate their informed participation. Meaningful consultation is a process that:

- Begins early in the project preparation stage and is carried out on an ongoing basis throughout the project cycle;
- Provides timely disclosure of relevant and adequate information that is understandable and readily accessible to affected people;
- Is undertaken in an atmosphere free of intimidation or coercion;
- Is gender inclusive and responsive, and tailored to the needs of disadvantaged and vulnerable groups; and
- Enables the incorporation of all relevant views of affected people and other stakeholders into decision making, such as project design, mitigation measures, the sharing of development benefits and opportunities, and implementation issues.

Consultation will be carried out in a manner commensurate with the impacts on affected communities. The consultation process and its results are to be documented and reflected in the environmental assessment report.”

470. The national legal requirements of Georgia with regards to stakeholder engagement and information disclosure are outlined below.

8.2. Stakeholder Engagement Activities

8.2.1. General Principles

471. The following general principles will govern stakeholder engagement activities:

- The content of documents for public comment will provide accessible and adequate information on the Project, and not create undue fears (regarding potential negative impacts) or expectations (regarding potential positive impacts such as job creation, etc.);
- Written information will be accompanied by visual illustrations and explanations as needed to build understanding of the project;
- The information will be disclosed in the local language(s) where needed and in a manner that is accessible and culturally appropriate, taking into account any vulnerable people;
- If key issues of particular concern arise, workshops may be offered to explain technical processes, assessment techniques, and quality assurance measures to verify results and ensure mitigation procedures are followed; and
- Efforts will be made to explain not only the proposed project and EIA process, but also applicable national laws and legislations, international principles and standards, and how the RD will address compliance.

8.2.2. Key Stakeholder Engagement Findings to Date

472. To date two consultation sessions, facilitated by the RD, have been held with stakeholders (full consultation reports are included in Appendix F):

- Session 1: 23 March 2022 - Hotel Marco Polo, Gudauri, Dusheti Municipality.
- Session 2: 24 May 2022 - Hotel Marco Polo, Gudauri, Dusheti Municipality.

473. Session 1 objectives were to provide information to the project affected persons on the activities envisaged in the Resettlement Action Plan and EIA. Session 2 objectives were to:

- Present the general information about Gudauri Access Road project;
- Raise awareness of land acquisition and resettlement procedures;
- Inform participants about the results of the examination of the Samkharauli National Forensic Bureau on the cost of lands; and
- Receiving the feedback from APs.

474. Key comments (not relating to resettlement or issues related to on-going Lot 2 Construction works) received during the consultations are summarized below.

Table 76: Session 1 Comments and Responses

#	Issue Raised By	Comment	Initial Response	Project actions in response to engagement	IEE reference
1.	Citizen	The citizen asked the representative of the Department whether it was planned to arrange passes for large and small cattle.	The representative of the Department explained to the citizen that the permissible speed limit is 60 km/h and that residents will be free to call cattle on the other side, as there is no protective barrier envisaged on the road.	During operation., signs will be provided to warn road users of the presence of livestock and pedestrians, and the speed limit upon leaving the main highway, which will be limited to 60 km/h.	EMP Item #8
2.	Citizen (village Seturebi)	The citizen asked whether the cultural heritage monument "Sameba Church" would be damaged as a result of the construction works.	According to the representative of RD, distance between the road and the church is approximately 70 meters. Consequently, the impact on the cultural heritage monument is not expected, although it will be monitored during the construction work.	The preferred mitigation measure is to change the alignment to avoid direct impacts to this site. A proposed realignment has already been developed as shown in Figure 17.	EMP Item #12

Table 77: Session 2 Comments and Responses

#	Issue Raised By	Comment	Initial Response	Project actions in response to engagement	IEE reference
1.	Citizen	Asked about the width of the road and whether the project provides a buffer zone.	Explained that the width of the asphalted road is 9 m. An additional 1 m. zone is planned on both sides and also buffer zone, which is necessary for the construction of the road. The width of the buffer zone depends on the technical requirements for each section.	None. This issue relates to technical design standards.	N/A
2.	Citizen	Asked whether the entrance to the property will be provided in case of raising the level of the road.	Replied that, of course, all yards will be provided with access.	The road has been designed to ensure continued access, as far as practical, to all local properties along the ARP. The access points are shown on Figure 6 to Figure 8.	Para. 66

3.	Citizen	Question about the vibration impact on buildings during construction works.	The current condition of the buildings will be surveyed and documented prior to the construction phase to avoid future misunderstandings.	The KK Project Lot 2 Contractor will continue to follow the construction vibration management plan (CVMP) and the mitigation and management measures outlined in the KK Project EIA for general construction vibration, including the requirements for pre-work survey. Specific conditions relating to cultural monuments and objects are discussed in the IEE and where necessary the CVMP will be updated based on the identified issues.	Para. 398
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8.3. Information disclosure

475. In compliance with ADB's SPS (2009), the IEE will be provided for disclosure on the ADB and RD websites. With regards to information disclosure, ADB is committed to working with the borrower/client to ensure that relevant information (whether positive or negative) about social and environmental safeguard issues is made available in a timely manner, in an accessible place, and in a form and language(s) understandable to affected people and to other stakeholders, including the public, so they can provide meaningful inputs into project design and implementation.

8.4. Grievance Redress Mechanism

8.4.1. Introduction

476. Grievance Redress Mechanisms (GRMs) are locally based, formalized way to accept, assess, and resolve community feedback or complaints. They provide predictable, transparent, and credible processes to all parties, resulting in outcomes that are relatively low cost, fair, and effective. They build on trust as an integral component and facilitate corrective action and pre-emptive engagement. GRMs also set out a timeframe in the resolution of complaints.³⁸ The Project GRM will serve as a venue for receiving and addressing project-affected peoples' concerns and grievances about environment related impacts. It will address concerns promptly through an understandable and transparent process that is accessible to all members of the community, gender responsive and culturally appropriate. The overall approach of the GRM is to deal with grievances at a local level first in an efficient manner and escalate to the next level or higher level of authority if grievance cannot be resolved.

477. The ADB Accountability Mechanism (AM) provides an independent forum and process for people to voice and seek solutions to their problem as well as alleged non-compliance by ADB with its operational policies and procedures. As ADB adheres to early problem prevention and problem-solving, project complaints and concerns should first be addressed promptly and effectively at the Project, through the GRM, and operational levels. The AM is the "last resort" process for dealing with problems and compliance issues that were not prevented or solved at GRM and operational levels.

478. The GRM should be established and operated in compliance with the Georgian Regulations and ADB Policy requirements. The ADB's 2009 Safeguards Policy Statement³⁹ requires the borrower/client to establish a mechanism that will receive and facilitate the resolution of affected persons' concerns and grievances about physical and economic displacement and other Project impacts, paying particular attention to vulnerable groups. A mechanism has already been established for the KK Project, and as such, the ARP will follow the same procedures which are described below.

8.4.2. Georgian Regulations

479. The Administrative Code of Georgia is the legal document defining the rules and procedures for any grievance review and resolution within the national regulatory framework. According to the law, the Administrative body receiving officially lodged claims is obliged to review the claims and engage the claimant in the grievance review and resolution process, and issue final decision in that regard.

³⁸ World Bank. 2014. Global Review of Grievance Redress Mechanisms in World Bank Projects. Washington, DC. © World Bank.

³⁹ ADB. 2009. *Safeguards Policy Statement*. Manila.

480. Clause 181. defines the content and the grievance submission forms. In particular, the grievance package should include: a) Name of the administrative body to whom the complaints are addressed; b) Name, address and contact details of the claimant; c) Name of the administrative body, who's decisions or administrative acts are the subject of complain; d) Name of the administrative act or decision, which is subject of complain; e) Content of the claim; f) The context and facts, based on which the complaint is substantiated; g) list of attachments.
481. Clauses 194 and 198 define the rules and procedures ensuring participation of the claimants in the grievance review process. According to the clause 202, the decision issued by the Administrative Body in relation with the reviewed claim has a status of individual administrative legal act. The standard period given for the issuance of the decision in relation with the grievance is 1 month.

8.4.3. Grievance Redress Process

482. The IEE includes in its scope the establishment of a responsive, readily accessible and culturally appropriate GRM capable of receiving and facilitating the resolution of APs' concerns and grievances related to the project. An established GRM allows an AP to appeal any decision, practice or activity arising from land or other assets compensation that they disagree with. The scope of the GRM is to address issues related to involuntary resettlement, social and environmental performance, and information disclosure.
483. The APs will have the right to file complaints and/or queries on any aspect of the project, including environmental issues and other social aspects such as land acquisition and resettlement. Under the adopted grievance mechanism, the APs may appeal any decision, practice or activity related to the project. All possible avenues will be made available to the APs to voice their grievances. The IA will ensure that grievances and complaints on any aspect of the project are addressed in a timely and effective manner.
484. The fundamental objectives of the GRM are:
- To reach mutually agreed solutions satisfactory to both, the Project and the APs, and to resolve any grievances locally, in consultation with the aggrieved party;
 - To facilitate the smooth implementation of the IEE and LARP, particularly to cut down on lengthy litigation processes and prevent delays in Project implementation;
 - To facilitate the development process at the local level, while maintaining transparency as well as to establish accountability to the affected people.
485. APs will be informed of their rights and of the procedures for addressing complaints whether orally or in writing during the IEE and LARP consultations and surveys and will be informed again when the compensation is disbursed. Care will be taken to prevent grievances rather than relying solely on the redress process. This can be achieved by establishing extensive communication and coordination between the affected communities, the EA, and local governments in general.
486. The GRM consists of the project-specific systems established at the municipal level and a regular system established at RD. Grievance Redress Committees (GRCs) have been established at a municipal level as a project-specific instrument and will function for the duration of Project implementation. The Grievance Redress Commission (GRCN) was formed as an informal structure within the RD-MRDI to record and ensure grievance review and resolution as part of the KK Project.
487. The GRCN was formed by the order of the Head of the RD as a permanent and functional informal structure, engaging personnel of RD from all departments to work on LAR and environmental issues and complaint resolution. This includes the top management of the RD-

MRDI, safeguard or LAR units, legal other relevant departments (depending on the specific structure of the IA). The GRCN is involved in Stage 2 of the grievance resolution process. The order states that, if necessary, a representative of local authorities, NGOs, auditors, APs and any other persons or entities can be included in the Commission as its members.

488. A GRC is an informal, project-specific mechanism established to administer grievances at Stage I. This informal body has been established at the community level in each affected municipality (village/community authority). The GRC includes representatives of municipal LAR teams and local communities. The RD representative in the municipal LAR team coordinates the GRC formation. He/she is responsible for the coordination of GRC activities and organizing meetings (conveyor). In addition, GRC comprises the village *Rtsmunebuli* (governor) or his/her representative, representatives of APs, women APs, and appropriate local NGOs to allow the voices of the affected communities to be heard and ensure a participatory decision-making process.

489. GRCs were established at the municipality level for the Project with an office order from the RD. The GRC at the municipality level consists of seven members as listed in the following tables. The GRC for Dusheti Municipality is based in Kvesheti.

Table 78: GRC at Dusheti Municipality

Name	Position	Telephone/email	Status
Archil Jorbenadze	Representative of LAR Commission (GRCN) of RDMRDI	591403038	Member
Mamuka Basilashvili	Representative of Resettlement Division	599509765	Member
Nana Bregadze	Specialist of Resettlement and Environmental Division	593333373	Member
Ketevan Kakhurashvili	Elected Representative of Kvesheti village	591113462	Member
Ushangi Zakaidze	Representative of APs, vil. Tkere	595012903	Member
Irma Burduli	Representative of Arakhveti population (Female)	577951221	Member
Marta Mezvrishvili	Representative of Kvesheti population (Female)	555916273	Member
Zurab Zakaidze	Representative of Zaqtakari population (Male)	577352310	Member
Mamuka Rostiashvili	Representative of Rostiani population (Male)	577239838	Member
Gocha Mghebrishvili	Contractor's Social Specialist	579907199	Member
Tamar Javakhi	Social Specialist/Construction Supervision Consultant	599613196	Member
Nika Sofadze	Environmental Specialist/Construction Supervision Consultant	597728871	Member
Tariel Karelidze	Community Liaison Specialist/ADB	595177079	Member

Grievance Redress Commission at Road Department

490. The GRCN was established at the RD level as a permanent GRM structure by order No. 224. It consists of 17 permanent members, two secretaries and three non-permanent members without the right of vote. The list of the permanent members is presented in the following table:

Table 79: RD GRCN

No	Name of Member	Position
1	Giorgi Tsereteli	Head of commission
2	Salome Tsurtsunia	Member of commission
3	Levan Kupatashvili	Member of commission
4	David Getsadze	Member of commission
5	Pavle Gamkrelidze	Member of commission
6	Pikria Kvernadze	Member of commission
7	Vaja Adamia	Member of commission
8	Davit Sajaia	Member of commission
9	Giorgi Eragia	Member of commission
10	Nodar Agniashvili	Member of commission
11	Mikheil Ujmajuridze	Member of commission
12	Gia Sopadze	Member of commission
13	Tinatin Kolbaia	Member of commission
14	Davit Kaladze	Member of commission
15	Eldar Nepharidze	Member of commission
16	Avtandil Kirvalidze	Member of commission
17	Giorgi Tsagareli	Not permanent member of commission
18	Mariam Begiashvili	Not permanent member of commission
19	Archil Jorbenadze	Not permanent member of commission

Grievance Resolution Process

491. A representative of the resettlement service of the IA is responsible for coordination of the Committee’s work and, at the same time, he/she is nominated as a Contact Person who receives the grievances and handles the grievance logbook. The local authorities at the municipal level, the civil works Contractor, the Supervising Company (Engineer), as well as APs (through informal meetings) are informed about the Contact Person and his contact details are available in the offices of all mentioned stakeholders.
492. The Contact Person collects and records the grievances, informs all members of the Committee and the management of RD about the essence of the problem, engages the relevant stakeholders in discussions with the aggrieved party and handles the process of negotiation with APs at Stage I of the grievance resolution process. The Contact Person prepares the minutes of meetings and collects signatures. If the grievance is resolved at Stage I, the Contact Person records the resolution of the grievance in his logbook and informs the RD management in writing.
493. If the complainants are not satisfied with the GRC decisions, they can always use the Stage 2 procedures of the grievance resolution process. In such case, the Contact Person helps the AP lodge an official complaint (the complainant should be informed of his/her rights and obligations, rules and procedures of lodging a complaint, format of complaint, terms of complaint submission, etc.).
494. The APs were informed about the available GRM. This was achieved through implementing information campaigns, distributing a Project information brochure, keeping all focal points up-to-date and maintaining regular communication with them, allowing multiple entry points for complaints, and introducing forms for easier reporting of complaints.

Table 80: Grievance Resolution Process

Steps	Process
Step 1	The complaint is informally reviewed by the focal point at the village level, which takes all necessary measures to resolve the dispute amicably.
Step 2	<ul style="list-style-type: none"> • If the grievance is not solved at the previous level, the municipality level representative will assist the aggrieved APs to formally lodge the grievances with the respective GRC at the municipality level. The aggrieved APs will lodge the complaint if there is failure of negotiation at the village level and produce documents supporting his/her claim. • The GRC member secretary will review the complaint and prepare a Case File for a GRC hearing and resolution. A formal hearing will be held with the GRC at a date fixed by the GRC member secretary in consultation with the conveyor and the aggrieved APs. • On the date of the hearing, the aggrieved AP will appear before the GRC at the village office and produce evidence in support of his/her claim. The member secretary will note down the statements of the complainant and document all procedures. • The decisions will be issued by the conveyor and signed by other members of the GRC. The case record will be communicated to the complainant by the LAR Team at the village level. <p>The grievance redress at this stage shall be completed within 4 weeks.</p>
Step 3	If the aggrieved AP is unsatisfied with the GRC decision at the municipality level, the next option will be to lodge grievances with the GRCN at the Resettlement Division of the RD at the national level within two weeks after receiving the decision from GRC. The complainants must produce documents supporting his/her claim. The GRCN will review the GRC hearing records and convey its decisions to the aggrieved APs within four weeks after receiving the complaint.
Step 4	If the RD decision fails to satisfy the aggrieved APs, they can pursue further action by submitting their case to the appropriate court of law (local courts) without reprisal. The aggrieved AP can take legal action over the amount of compensation or any other issues, e.g. occupation of their land by the contractor without their consent, damage or loss of their property, restrictions on the use of land/assets, environmental concerns such as dust caused by the contractor’s machinery, etc.
Step 5	Should the GRM process be exhausted without satisfactory resolution, an AP may bring a grievance to ADB for consideration.

8.4.4. GRC Records and Documentation

495. RD will keep record of all complaints received for its use as well as for any review by ADB during regular supervisions.

8.4.5. Communication

496. Prior to start of site works, the Contractor shall:

- Communicate the GRM to communities in the project impact zone.
- Set-up and publicize a 24-hour hotline for complaints.
- Ensure that names and contact numbers of representatives of GRC, the RD and the Contractor are placed on the notice boards outside the construction site.

497. In addition, it is recommended that the RD consult with APs’ representatives prior to implementation of the GRM to make any necessary revisions, if appropriate, to make the process more effective and ensure APs ownership/active participation in the process. The complaints resolution process was presented formally during the public consultations. The GRM will also be presented during routine community meetings in the Project area during the construction phase of the Project.

9. Environmental Management Plan

9.1. Environmental Management Plans

498. A detailed EMP was provided for the KK Project Lot 2. Most of the requirements of the KK Project Lot 2 EMP remain valid for the ARP and these requirements are included within existing contracts with the KK Project Lot 2 Contractor. However, some site-specific mitigation and management measures have also been identified by this IEE and those measures are provided as a Lot 2 EMP addendum in Appendix A.

9.2. Environmental Monitoring

499. Section 7 provides the specific monitoring activities for ARP beyond those already required as part of the Lot 2 Contractors obligations with respect to the KK Project EIA.

9.3. Site-Specific EMP (SSEMP)

500. The KK Project Lot 2 Contractor has already prepared its SSEMP, including all topic and site-specific sub-plans required as part of the KK Project EIA (note that some of the required sub-plans have not yet been finalized due to them not being required at this stage of the Project). The Lot 2 Contractor will be responsible for updating the SSEMP and its topic and site-specific sub-plans per the table below.

Table 81: SSEMP Topic Specific Sub-Plans

Plan	Requires Updating?	Updating Requirements
Topsoil Management Plan	Yes	This plan requires update as it does not include information on the areas to be used for the ARP
Waste Management Plan	Yes	This plan needs to be updated and approved by MoEPA. In general, according to the national legal requirements (Waste Management Code of Georgia), the waste management plan shall be approved by MoEPA and the plan shall be updated and sent to MoEPA for further review and approval in every three year. The current Contractor's Waste Management Plan was approved on 19.12.2020 by MoEPA.
Wastewater Management Plan	No	None
Air Quality Management Plan	Yes	Updated to include project area and monitoring requirements
Noise Control Plan	Yes	Updated to include project area and monitoring requirements
Spill Management Plan	Yes	Updated to include project area
Traffic Management Plan	Yes	To reflect any specific traffic arrangements in the Project area.

Plan	Requires Updating?	Updating Requirements
Occupational and Community Health and Safety Plan	Yes	To include the ARP within its scope
Labor and Working Conditions Management Plan.	No	None
Code of Conduct	No	None
Emergency Response Plan	Yes	To include ARP within its scope specifically relating to work close to gas infrastructure
Ground Water Management Plan	Yes	Updated to include project area
Re-cultivation/Land Restoration Plan	Yes	The new plan should be developed for ARP area and approved by MoEPA according to the national legal requirements (Government Resolution N424).
Biodiversity Management Plan	No	None
Construction Vibration Management Plan	Yes	This plan requires update to include the vibration monitoring locations for the ARP.
Tunnel Blasting Plan	No	None
Cultural Heritage Management Plan	Yes	To reflect the identified areas of PCR in this IEE.
Local Content Management Plan	Yes	This plan requires update to include information regarding the additional communities, such as Seturni, Kaishaurni.

Table 82: SEMP Site Specific Plans

Plan	Requires Updating?	Requirements
Accommodation Option Risk Assessment	No	None
Construction camp layout plan	No	None
Construction Camp Management Plan	No	None
Spoil Disposal Plan	Not at this stage	Depending upon on-going construction works
Asphalt Plan Management Plan	No	None
Concrete Batching Plant Management Plan	No	None
Method Statements for Temporary Storage Areas, temporary river crossings, and temporary roads	No	None
Bridge Construction Plan	No	None
Occupational Health and Safety (OHS) Plan for Tunnels	No	None
Tunnel Transition Plan	No	None

501. No works shall commence on the ARP until the relevant sub-plans are updated and approved by the Engineer.

9.4. Contractor, Engineer and RD PIU Requirements

502. No additional requirements are necessary beyond those already specified in the KK Project EIA.

9.5. Reporting and Review of the SSEMP

503. ARP monitoring will be included as part of the KK Projects Lot 2 Semi-annual Environmental Monitoring Reports (SAEMR). No additional requirements are necessary beyond those already specified in the KK Project EIA.

10. Conclusions and Recommendations

10.1. Conclusions

504. The ARP is proposed to be categorized as B for environment given that potential impacts are site-specific, temporary in nature and can be mitigated to standard levels through proper engineering design and incorporation of recommended measures. Further, based on the findings of this IEE, the ARP is unlikely to cause any significant adverse impacts which are irreversible, diverse or unprecedented. The ARP is located close to the Kazbegi National Park but it does not cross into it and as such, direct impacts to this site are not anticipated. Physical cultural resources on the territory the Didveli plateau have been taken into consideration in the design and realignment of ARP has been proposed to minimize any potential impacts to cultural objects.
505. This IEE has established that, with the exception of the residual impacts mentioned below, there are no significant environmental issues that cannot be either totally prevented or adequately mitigated to levels acceptable to the national and international standards for Project activities.
- Dust. Despite a number of targeted mitigation measures, it is still possible that dust could be a nuisance around construction zones and haul routes, specifically during the summer months.
 - Special Status Species. To ensure that Corncrakes are not harmed, or a breeding cycle is not lost (adult survival is under 30%), habitat removal within the RoW will be undertaken outside the breeding season (mid-May to end-August). This will ensure that no nests are lost, and that species are only displaced from the project area to breed elsewhere. However, it is still possible that some minor impacts to Corncrake could occur.
 - Unmet employment expectations. Although efforts will be made to manage employment expectations, it is likely that members of the local community who are not selected for jobs are likely to be disappointed with the selection process. However, the numbers are likely to be relatively small and therefore the impacts are of low significance.
 - Loss of key workers to the ARP. No specific mitigation measures have been provided for this issue, which is an unavoidable consequence of the project. However, the initial impacts are considered to be of low significance and therefore residual impacts will also be low.
 - Sexual Exploitation, Abuse and Harassment. Training of the workforce and development of the Gender Action Plan should help mitigate Impacts. However, such incidents cannot be completely ruled out. Therefore, any such incidents should be followed up with instant dismissal and reporting to the relevant authorities to take legal action.
 - Land Acquisition. Residual impacts are anticipated to be low if the LARP is implemented correctly. A GRM has been prepared to manage complaints received during this process.
 - Disposal of spoil material. The Lot 2 Contractor shall revise his existing spoil disposal plan to include the additional material from the ARP, if needed.
 - Accidents involving humans and livestock. Implementation of the KK Project EIA mitigation measures and ensuring that hazardous worksites are demarcated should reduce the potential for accidents involving the local community. However, accidents cannot be entirely ruled out. Residual impacts are considered to be of low significance.
 - General construction noise. Implementation of the mitigation measures in this IEE and within the KK Project EIA should ensure that impact significance is reduced to low.
 - Traffic Noise. Construction of the proposed noise barriers will ensure that in nearly all cases there is no significant impact.
 - Construction works damaging cultural objects. Demarcating the site and providing information to workers in the area of the PCR should reduce potential impact significance to low.
 - Construction works near Sameba Complex. Moving the alignment from the Sameba Complex and undertaking pre-construction survey work will ensure that any impacts to this site will be of low significance.

- Loss of Cultural Landscape. Careful landscaping of the ARP will help to reduce the impacts to cultural landscape in the areas around Zakatkari. However, a change to the historical nature of this landscape will occur, but impact significance should be low.

10.2. Recommendations

506. The KK Lot 2 Contractor and RD will also be responsible for ensuring all the mitigation measures currently used for the KK road are extended to the ARP. However, several additional mitigation and management measures have been identified in this IEE, and these also need to be implemented by the Lot 2 Contractor. These are summarized below and include in the EMP Addendum in Appendix A.

507. During the project cycles the following activities should be done;

Pre-construction phase

- Biodiversity – Lot 2 Contractor will expand his current activities to cover ARP. In addition, wet Meadows will be fenced off for the duration of construction and signs erected to ensure that workers do not enter these areas. Habitat removal within the RoW will be undertaken outside the Corncrake breeding season (mid-May to end-August).
- To ensure an accurate identification of the existing vegetation within the project area, it is recommended that the ECoW conduct pre-construction surveys and compile a comprehensive tree inventory list. Additionally, obtaining drone video footage is advised to establish the current environmental conditions prior to the commencement of any construction activities."
- Waste Management and Spoil Disposal - Revise the existing Spoil Disposal Plan and update as needed to reflect any ARP specific issues
- Air Quality – The KK Lot 2 Contractor will update his Air Quality Management Plan to include the ARP and will include the mitigation & monitoring measures for Lot 2 within the scope of ARP activities, e.g. for the management of dust and combustion emissions. Additional measures for the management of odor and volatile organic compounds are also included in the EMP addendum found in Appendix A.
- Access – The Lot 2 Contractor will update the Traffic Management Plan to ensure that the ARP is included. During operation., signs will be provided to warn road users of the presence of livestock and pedestrians, and the speed limit upon leaving the main highway, which will be limited to 60 km/h.

Construction phase

- Climate Change – The Lot 2 Contractor will identify drainage systems that might have insufficient capacity and increase dimensions accordingly in his design.
- Geohazards - Ensure that all national design codes are followed.
- Social Infrastructure (including Utilities) - Designs should ensure that the pipelines can remain in-situ while at the same time all safety codes for gas transmission are respected. Close coordination between the RD, TSO, Engineer and Contractor will be required during the final design and construction phases of the Project. Lot 2 Contractor will also update his emergency response plan to include working in the vicinity of the gas pipelines. The ERP should include a specific section relating to awareness and training of the workforce operating in this area.
- Health and Safety - Extend the KK road safety awareness program to villages across the Didveli plateau.
- Noise – Temporary noise barriers will be installed during construction,(if needed) where noise levels are negatively impacting upon residents. Permanent noise barriers will be installed per the requirements of the noise model, as summarized in this IEE.

- Physical Cultural Heritage and Cultural Landscape – For Sameba Complex, the preferred mitigation measure is to change the alignment to avoid direct impacts to this site. Based on the NACHP recommendation re-alignment in the design has already been considered. Vibration monitoring will also be undertaken at this site and other sensitive sites determined by this IEE. The Lot 2 Contractor will also provide adequate protection (fencing, barriers, signage, etc.) during construction of sensitive PCRs determined by this IEE.
508. Lot 2 Contractor will update his SEMP according to Table 81 and accounting for the above mentioned mitigation measures that go beyond the current activities undertaken as part of the KK road project.

Appendix A – EMP Addendum

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
			Implementation	Monitoring		
1	Air Quality	Update Air Quality Management Plan	KK Project Lot 2 Contractor	Engineer	1. Plan updated	None
		Undertake ambient air quality monitoring (PM10, PM2.5, CO, NOx, SO2) monthly and in response to complaints from residents.	KK Project Lot 2 Contractor	Engineer	1. Ambient air quality monitoring undertaken in Seturni and Kaishaurni.	None, part of existing contractual obligations
2	Odor	<p>The following measures shall be applied:</p> <ul style="list-style-type: none"> Adequate and sufficient sanitary facilities for site workers must be provided. Effective cleaning and maintenance of toilets to be undertaken to avoid odor dispersion and cleaning records/inspection sheets displayed in the toilets. All septic tanks must be sealed and fully functioning. Septic tanks must be operated and maintained according to manufacturer recommendations. Sanitary waste will be removed from site by licensed contractors and disposed in waste treatment facilities approved by the local government. Ensure all fuel storage areas are at least 50 m downwind from any residential property. 	KK Project Lot 2 Contractor	Engineer	1. No reports of odor nuisance by the public	None, part of existing contractual obligations
3	VOCs	<ul style="list-style-type: none"> Hazardous materials stored and used on site with potential gas emissions (e.g., Volatile Organic Compounds) will be located in well-ventilated, but secure low-risk areas, away from major transport routes and away from the site boundary (where possible). Volatile fuels and chemicals (including hazardous wastes) will be stored in sealed containers. On site storage of large quantities of volatile fuels will be avoided, equally prolonged exposure to direct sun and heat will be avoided. 	KK Project Lot 2 Contractor	Engineer	1. All hazardous materials stored in appropriate areas	None, part of existing contractual obligations

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
			Implementation	Monitoring		
		<ul style="list-style-type: none"> Fires and material burning will not be allowed on the Project site. Chemical storage areas will be purpose built and well maintained. A data log of all chemicals with Material Safety Data Sheets (MSDSs) will be provided at the storage facility within easy access. 				
4	Climate Change	Identify drainage systems that might have insufficient capacity and increase dimensions accordingly.	KK Project Lot 2 Contractor	Engineer	1. No flooding from drainage network	None, part of existing contractual obligations
5	Geohazards	Ensure that all national design codes are followed.	KK Project Lot 2 Contractor	Engineer	1. National codes followed in the designs.	None
6	Biodiversity	Wet Meadows will be fenced off for the duration of construction and signs erected to ensure that workers do not enter these areas.	KK Project Lot 2 Contractor	Engineer	1. Wet meadow fenced	2,000 USD for fencing
		Habitat removal within the RoW will be undertaken outside the Corncrake breeding season (mid-May to end-August).	KK Project Lot 2 Contractor	Engineer	1. No recorded loss of Corncrake	None, part of existing contractual obligations
		Undertake survey of habitat to be cleared prior to construction including specific surveys for endemic plants.	KK Project Lot 2 Contractor	Engineer	1. Pre-construction survey of habitat undertaken	None, part of existing contractual obligations
		Undertake recultivation and habitat restoration post-construction.	KK Project Lot 2 Contractor	Engineer	1. No net loss of biodiversity	None, part of existing contractual obligations
7	Employment	Manage employment expectations by explaining the number and type of opportunities in advance to local communities (targets for recruitment from the local communities on the Didveli plateau will be agreed between the KK Project Lot 2 Contractor and RD). Recruitment procedures will be transparent, public, and non-discriminatory and open with respect to ethnicity, religion, sexuality, disability, or gender.	KK Project Lot 2 Contractor	Engineer	1. Consultations with locals completed. 2. Job vacancies advertised through appropriate	None, part of the existing contractual obligations.

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
			Implementation	Monitoring		
		Clear job descriptions will be provided in advance of recruitment and will explain the skills required for each post. Job vacancies will be advertised in the local communities through appropriate and accessible media.			and accessible source	
8	Gender	The Gender Action Plan shall be updated to include specific training on SEAH to all contracted employees and provide GRM to report SEAH and other concerns.	KK Project Lot 2 Contractor	Engineer	3. Plan updated	None, part of existing contractual obligations
9	Social Infrastructure	Designs should ensure that the pipelines can remain in-situ while at the same time all safety codes for gas transmission are respected. Close coordination between the RD, TSO, Engineer and Contractor will be required during the final design and construction phases of the Project.	KK Project Lot 2 Contractor	Engineer	1. No damage or interruption to gas supply networks during construction	None
		Update the emergency response plan to include working in the vicinity of the gas pipelines. The ERP should include a specific section relating to awareness and training of the workforce operating in this area.	KK Project Lot 2 Contractor	Engineer	1. Plan updated	None
10	Spoil Disposal	Revise the existing Spoil Disposal Plan and update as needed to reflect any ARP specific issues.	KK Project Lot 2 Contractor	Engineer	1. Plan updated	None
11	Access and Access Roads	Update the Traffic Management Plan to ensure that the ARP is included.	KK Project Lot 2 Contractor	Engineer	1. Plan updated	None
		During operation., provide signage to warn road users of the presence of livestock and pedestrians, and the speed limit upon leaving the main highway, which will be limited to 60 km/h.	KK Project Lot 2 Contractor	Engineer	1. Signage provided during operation.	None, part of the existing contractual obligations.
12	Community Health and Safety	Ensure that all potentially hazardous work zones are sign posted and demarcated with bunting.	KK Project Lot 2 Contractor	Engineer	1. Signposts and bunting installed.	None, part of existing contractual obligations
		Extend the road safety awareness program to villages across the Didveli plateau	KK Project Lot 2 Contractor	Engineer	1. Road safety awareness program conducted.	None, part of the existing contractual obligations.
13	COVID-19	Ensure all national guidelines relating to COVID-19 are followed. The recommendations relate to:	KK Project Lot 2 Contractor	Engineer	1. Regulations followed by	None, contractor already has in place

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
			Implementation	Monitoring		
		<ul style="list-style-type: none"> Self-isolation Social Distancing Good Hygiene Use of masks. 			workers	COVID measures for existing contract.
		Provide: <ul style="list-style-type: none"> COVID-19 appropriate PPE. Testing of all staff arriving in country. Provision of health clinic staffed full time at construction camps. Handwashing facilities and sanitizers. Quarantine accommodation. 	KK Project Lot 2 Contractor	Engineer	1. Facilities provided and approved by the Engineer	None, contractor already has in place COVID measures for existing contract.
14	Noise	Installation of temporary & permanent noise barriers where necessary.	KK Project Lot 2 Contractor	Engineer	1. Barriers installed where complaints are received 2. Barriers installed per noise model	10,000 USD (temporary) 1,375,00 USD (permanent)
15	PCR	For Sameba Complex, the preferred mitigation measure is to change the alignment to avoid direct impacts to this site. Re-alignment has already been done. Detailed pre-construction archaeological investigation was done. Vibration monitoring will also be undertaken at this site.	KK Project Lot 2 Contractor	Engineer	1. Detailed pre-construction archaeological investigation conducted. 2. Alignment approved by NACHP	NACHP costs covered by NACHP. Vibration costs covered as part of existing contractual obligations.
		Provide adequate protection (fencing, barriers, signage, etc.) during construction of sensitive PCRs determined by this IEE (section 6.4.7).	KK Project Lot 2 Contractor	Engineer	1. No damage to PCR sites.	5,000 USD
		Conduct continuous vibration monitoring of the sensitive locations determined by this IEE during construction.	KK Project Lot 2 Contractor	Engineer	1. No damage to PCR sites.	Vibration costs covered as part of existing contractual obligations.

#	Environmental Aspect/ Concern	Proposed Mitigation Measures	Responsibility		Target / Indicator	Estimated Cost
			Implementation	Monitoring		
16	Cultural Landscape	Consult with the NACHP, the local community and relevant stakeholders to determine which types of landscaping are most suitable to reduce impacts on cultural landscape.	KK Project Lot 2 Contractor	Engineer	1. Consultation completed.	None

Appendix B – Noise Monitoring & Model

https://drive.google.com/file/d/1WtJvewc8fynCRE3b2hOjqVvG3C10JgYV/view?usp=drive_link

Appendix C – Cut and Fill Volumes

0+056.40 - 5+000 Gudauri Access FILL

CH	DISTANCE (m)	SURFACE (m ²)	SECTION VOLUME (m ³)	CUMULATIVE VOLUME (m ³)
0+056.408		535.546		
	3.592		1895.107	1895.107
0+060.000		519.636		
	20.000		10073.850	11968.957
0+080.000		487.749		
	20.000		9357.660	21326.617
0+100.000		448.017		
	20.000		8288.840	29615.457
0+120.000		380.867		
	20.000		7602.840	37218.297
0+140.000		379.417		
	20.000		7065.530	44283.827
0+160.000		327.136		
	20.000		6056.890	50340.717
0+180.000		278.553		
	20.000		4574.450	54915.167
0+200.000		178.892		
	20.000		2832.380	57747.547
0+220.000		104.346		
	20.000		1528.720	59276.267
0+240.000		48.526		
	20.000		856.240	60132.507
0+260.000		37.098		
	20.000		465.550	60598.057
0+280.000		9.457		
	20.000		206.620	60804.677
0+300.000		11.205		
	20.000		228.390	61033.067
0+320.000		11.634		
	20.000		312.910	61345.977
0+340.000		19.657		
	20.000		560.870	61906.847
0+360.000		36.430		
	20.000		991.130	62897.977
0+380.000		62.683		
	20.000		1448.240	64346.217

CH	DISTANCE (m)	SURFACE (m ²)	SECTION VOLUME (m ³)	CUMULATIVE VOLUME (m ³)
0+400.000		82.141		
	20.000		1695.100	66041.317
0+420.000		87.369		
	20.000		1540.970	67582.287
0+440.000		66.728		
	20.000		1128.350	68710.637
0+460.000		46.107		
	20.000		1342.440	70053.077
0+480.000		88.137		
	20.000		1777.460	71830.537
0+500.000		89.609		
	20.000		2282.850	74113.387
0+520.000		138.676		
	20.000		3183.680	77297.067
0+540.000		179.692		
	20.000		3884.720	81181.787
0+560.000		208.780		
	20.000		4616.390	85798.177
0+580.000		252.859		
	20.000		5287.770	91085.947
0+600.000		275.918		
	20.000		5403.380	96489.327
0+620.000		264.420		
	20.000		5044.930	101534.257
0+640.000		240.073		
	20.000		4664.800	106199.057
0+660.000		226.407		
	20.000		5137.060	111336.117
0+680.000		287.299		
	20.000		6066.050	117402.167
0+700.000		319.306		
	20.000		6519.640	123921.807
0+720.000		332.658		
	20.000		7089.880	131011.687
0+740.000		376.330		
	20.000		8231.750	139243.437
0+760.000		446.845		
	20.000		9190.810	148434.247
0+780.000		472.236		
	20.000		8993.220	157427.467
0+800.000		427.086		
	20.000		7724.820	165152.287

CH	DISTANCE (m)	SURFACE (m ²)	SECTION VOLUME (m ³)	CUMULATIVE VOLUME (m ³)
0+820.000		345.396		
	20.000		6599.420	171751.707
0+840.000		314.546		
	20.000		5610.590	177362.297
0+860.000		246.513		
	20.000		4003.290	181365.587
0+880.000		153.816		
	20.000		2125.590	183491.177
0+900.000		58.743		
	20.000		769.300	184260.477
0+920.000		18.187		
	20.000		181.870	184442.347
0+940.000		0.000		
	20.000		0.000	184442.347
0+960.000		0.000		
	20.000		0.000	184442.347
0+980.000		0.000		
	20.000		381.640	184823.987
1+000.000		38.164		
	20.000		1535.970	186359.957
1+020.000		115.433		
	20.000		3271.860	189631.817
1+040.000		211.753		
	20.000		4643.960	194275.777
1+060.000		252.643		
	20.000		6400.960	200676.737
1+080.000		387.453		
	20.000		6701.510	207378.247
1+100.000		282.698		
	20.000		4043.600	211421.847
1+120.000		121.662		
	20.000		1216.620	212638.467
1+140.000		0.000		
	20.000		0.000	212638.467
1+160.000		0.000		
	20.000		0.000	212638.467
1+180.000		0.000		
	20.000		0.000	212638.467
1+200.000		0.000		
	20.000		0.000	212638.467
1+220.000		0.000		
	20.000		0.000	212638.467

CH	DISTANCE (m)	SURFACE (m ²)	SECTION VOLUME (m ³)	CUMULATIVE VOLUME (m ³)
I+240.000		0.000		
	20.000		163.910	212802.377
I+260.000		16.391		
	20.000		455.440	213257.817
I+280.000		29.153		
	20.000		537.890	213795.707
I+300.000		24.636		
	20.000		463.160	214258.867
I+320.000		21.680		
	20.000		228.120	214486.987
I+340.000		1.132		
	20.000		11.320	214498.307
I+360.000		0.000		
	20.000		0.000	214498.307
I+380.000		0.000		
	20.000		0.000	214498.307
I+400.000		0.000		
	20.000		0.000	214498.307
I+420.000		0.000		
	20.000		0.000	214498.307
I+440.000		0.000		
	20.000		0.000	214498.307
I+460.000		0.000		
	20.000		0.000	214498.307
I+480.000		0.000		
	20.000		0.000	214498.307
I+500.000		0.000		
	20.000		0.000	214498.307
I+520.000		0.000		
	20.000		66.930	214565.237
I+540.000		6.693		
	20.000		205.100	214770.337
I+560.000		13.817		
	20.000		138.170	214908.507
I+580.000		0.000		
	20.000		128.790	215037.297
I+600.000		12.879		
	20.000		572.250	215609.547
I+620.000		44.346		
	20.000		1166.640	216776.187
I+640.000		72.318		
	20.000		1729.860	218506.047

CH	DISTANCE (m)	SURFACE (m ²)	SECTION VOLUME (m ³)	CUMULATIVE VOLUME (m ³)
1+660.000		100.668		
	20.000		2435.780	220941.827
1+680.000		142.910		
	20.000		2097.140	223038.967
1+700.000		66.804		
	20.000		898.600	223937.567
1+720.000		23.056		
	20.000		336.500	224274.067
1+740.000		10.594		
	20.000		205.860	224479.927
1+760.000		9.992		
	20.000		233.660	224713.587
1+780.000		13.374		
	20.000		322.960	225036.547
1+800.000		18.922		
	20.000		446.690	225483.237
1+820.000		25.747		
	20.000		519.510	226002.747
1+840.000		26.204		
	20.000		678.250	226680.997
1+860.000		41.621		
	20.000		1078.330	227759.327
1+880.000		66.212		
	20.000		1667.850	229427.177
1+900.000		100.573		
	20.000		2478.280	231905.457
1+920.000		147.255		
	20.000		3170.020	235075.477
1+940.000		169.747		
	20.000		3473.520	238548.997
1+960.000		177.605		
	20.000		3478.990	242027.987
1+980.000		170.294		
	20.000		3180.190	245208.177
2+000.000		147.725		
	20.000		2710.410	247918.587
2+020.000		123.316		
	20.000		2425.460	250344.047
2+040.000		119.230		
	20.000		2151.620	252495.667
2+060.000		95.932		
	20.000		1616.230	254111.897

CH	DISTANCE (m)	SURFACE (m ²)	SECTION VOLUME (m ³)	CUMULATIVE VOLUME (m ³)
2+080.000		65.691		
	20.000		656.910	254768.807
2+100.000		0.000		
	20.000		0.000	254768.807
2+120.000		0.000		
	20.000		0.000	254768.807
2+140.000		0.000		
	20.000		0.000	254768.807
2+160.000		0.000		
	20.000		0.000	254768.807
2+180.000		0.000		
	20.000		0.000	254768.807
2+200.000		0.000		
	20.000		0.000	254768.807
2+220.000		0.000		
	20.000		0.000	254768.807
2+240.000		0.000		
	20.000		178.880	254947.687
2+260.000		17.888		
	20.000		509.770	255457.457
2+280.000		33.089		
	20.000		668.173	256125.630
2+300.000		33.728		
	20.000		612.333	256737.963
2+320.000		27.505		
	20.000		434.420	257172.383
2+340.000		15.937		
	20.000		194.060	257366.443
2+360.000		3.469		
	20.000		34.690	257401.133
2+380.000		0.000		
	20.000		0.000	257401.133
2+400.000		0.000		
	20.000		8.020	257409.153
2+420.000		0.802		
	20.000		13.100	257422.253
2+440.000		0.508		
	20.000		5.080	257427.333
2+460.000		0.000		
	20.000		0.000	257427.333
2+480.000		0.000		
	20.000		0.000	257427.333

CH	DISTANCE (m)	SURFACE (m ²)	SECTION VOLUME (m ³)	CUMULATIVE VOLUME (m ³)
2+500.000		0.000		
	20.000		0.000	257427.333
2+520.000		0.000		
	20.000		0.000	257427.333
2+540.000		0.000		
	11.178		0.000	257427.333
2551.178/2738.07		0.000		
	21.930		0.000	257427.333
2+760.000		0.000		
	20.000		0.000	257427.333
2+780.000		0.000		
	20.000		17.790	257445.123
2+800.000		1.779		
	20.000		86.400	257531.523
2+820.000		6.861		
	20.000		105.980	257637.503
2+840.000		3.737		
	20.000		37.370	257674.873
2+860.000		0.000		
	20.000		0.000	257674.873
2+880.000		0.000		
	20.000		40.420	257715.293
2+900.000		4.042		
	20.000		185.200	257900.493
2+920.000		14.478		
	20.000		180.390	258080.883
2+940.000		3.561		
	20.000		75.640	258156.523
2+960.000		4.003		
	20.000		138.720	258295.243
2+980.000		9.869		
	20.000		288.670	258583.913
3+000.000		18.998		
	20.000		637.670	259221.583
3+020.000		44.769		
	20.000		930.760	260152.343
3+040.000		48.307		
	20.000		548.720	260701.063
3+060.000		6.565		
	20.000		65.650	260766.713
3+080.000		0.000		
	20.000		113.980	260880.693

CH	DISTANCE (m)	SURFACE (m ²)	SECTION VOLUME (m ³)	CUMULATIVE VOLUME (m ³)
3+100.000		11.398		
	20.000		535.300	261415.993
3+120.000		42.132		
	20.000		832.230	262248.223
3+140.000		41.091		
	20.000		481.170	262729.393
3+160.000		7.026		
	20.000		104.660	262834.053
3+180.000		3.440		
	20.000		113.010	262947.063
3+200.000		7.861		
	20.000		328.360	263275.423
3+220.000		24.975		
	20.000		388.680	263664.103
3+240.000		13.893		
	20.000		234.420	263898.523
3+260.000		9.549		
	20.000		154.470	264052.993
3+280.000		5.898		
	20.000		141.340	264194.333
3+300.000		8.236		
	20.000		204.990	264399.323
3+320.000		12.263		
	20.000		292.270	264691.593
3+340.000		16.964		
	20.000		364.230	265055.823
3+360.000		19.459		
	20.000		345.330	265401.153
3+380.000		15.074		
	20.000		155.310	265556.463
3+400.000		0.457		
	20.000		4.570	265561.033
3+420.000		0.000		
	20.000		0.000	265561.033
3+440.000		0.000		
	20.000		0.000	265561.033
3+460.000		0.000		
	20.000		0.000	265561.033
3+480.000		0.000		
	20.000		0.000	265561.033
3+500.000		0.000		
	20.000		1.110	265562.143

CH	DISTANCE (m)	SURFACE (m ²)	SECTION VOLUME (m ³)	CUMULATIVE VOLUME (m ³)
3+520.000		0.111		
	20.000		93.770	265655.913
3+540.000		9.266		
	20.000		92.660	265748.573
3+560.000		0.000		
	20.000		0.000	265748.573
3+580.000		0.000		
	20.000		0.000	265748.573
3+600.000		0.000		
	20.000		0.000	265748.573
3+620.000		0.000		
	20.000		0.770	265749.343
3+640.000		0.077		
	20.000		28.900	265778.243
3+660.000		2.813		
	20.000		34.520	265812.763
3+680.000		0.639		
	20.000		6.390	265819.153
3+700.000		0.000		
	20.000		0.360	265819.513
3+720.000		0.036		
	20.000		7.940	265827.453
3+740.000		0.758		
	20.000		7.580	265835.033
3+760.000		0.000		
	20.000		0.000	265835.033
3+780.000		0.000		
	20.000		0.000	265835.033
3+800.000		0.000		
	20.000		21.370	265856.403
3+820.000		2.137		
	20.000		126.020	265982.423
3+840.000		10.465		
	20.000		153.770	266136.193
3+860.000		4.912		
	20.000		76.560	266212.753
3+880.000		2.744		
	20.000		34.140	266246.893
3+900.000		0.670		
	20.000		6.700	266253.593
3+920.000		0.000		
	20.000		0.000	266253.593

CH	DISTANCE (m)	SURFACE (m ²)	SECTION VOLUME (m ³)	CUMULATIVE VOLUME (m ³)
3+940.000		0.000		
	20.000		0.000	266253.593
3+960.000		0.000		
	20.000		0.000	266253.593
3+980.000		0.000		
	20.000		0.000	266253.593
4+000.000		0.000		
	20.000		1.310	266254.903
4+020.000		0.131		
	20.000		1.310	266256.213
4+040.000		0.000		
	20.000		2.030	266258.243
4+060.000		0.203		
	20.000		23.620	266281.863
4+080.000		2.159		
	20.000		40.090	266321.953
4+100.000		1.850		
	20.000		31.750	266353.703
4+120.000		1.325		
	20.000		13.250	266366.953
4+140.000		0.000		
	20.000		0.000	266366.953
4+160.000		0.000		
	20.000		29.630	266396.583
4+180.000		2.963		
	20.000		54.940	266451.523
4+200.000		2.531		
	20.000		72.900	266524.423
4+220.000		4.759		
	20.000		126.570	266650.993
4+240.000		7.898		
	20.000		173.050	266824.043
4+260.000		9.407		
	20.000		140.800	266964.843
4+280.000		4.673		
	20.000		46.730	267011.573
4+300.000		0.000		
	20.000		0.000	267011.573
4+320.000		0.000		
	20.000		0.000	267011.573
4+340.000		0.000		
	20.000		0.000	267011.573

CH	DISTANCE (m)	SURFACE (m ²)	SECTION VOLUME (m ³)	CUMULATIVE VOLUME (m ³)
4+360.000		0.000		
	20.000		0.000	267011.573
4+380.000		0.000		
	20.000		0.000	267011.573
4+400.000		0.000		
	20.000		0.000	267011.573
4+420.000		0.000		
	20.000		0.000	267011.573
4+440.000		0.000		
	20.000		0.000	267011.573
4+460.000		0.000		
	20.000		0.000	267011.573
4+480.000		0.000		
	20.000		0.000	267011.573
4+500.000		0.000		
	20.000		25.520	267037.093
4+520.000		2.552		
	20.000		78.780	267115.873
4+540.000		5.326		
	20.000		56.110	267171.983
4+560.000		0.285		
	20.000		2.850	267174.833
4+580.000		0.000		
	20.000		0.000	267174.833
4+600.000		0.000		
	20.000		0.000	267174.833
4+620.000		0.000		
	20.000		0.000	267174.833
4+640.000		0.000		
	20.000		0.000	267174.833
4+660.000		0.000		
	20.000		2.230	267177.063
4+680.000		0.223		
	20.000		12.570	267189.633
4+700.000		1.034		
	20.000		34.490	267224.123
4+720.000		2.415		
	20.000		40.990	267265.113
4+740.000		1.684		
	20.000		16.840	267281.953
4+760.000		0.000		
	20.000		0.000	267281.953

CH	DISTANCE (m)	SURFACE (m ²)	SECTION VOLUME (m ³)	CUMULATIVE VOLUME (m ³)
4+780.000		0.000		
	20.000		0.000	267281.953
4+800.000		0.000		
	20.000		0.000	267281.953
4+820.000		0.000		
	20.000		0.000	267281.953
4+840.000		0.000		
	20.000		0.000	267281.953
4+860.000		0.000		
	20.000		0.000	267281.953
4+880.000		0.000		
	20.000		0.000	267281.953
4+900.000		0.000		
	20.000		0.000	267281.953
4+920.000		0.000		
	20.000		0.000	267281.953
4+940.000		0.000		
	20.000		0.000	267281.953
4+960.000		0.000		
	20.000		0.000	267281.953
4+980.000		0.000		
	20.000		0.000	267281.953
5+000.000		0.000		

0+056.40 - 5+000 Gudauri Access CUT

CH	DISTANCE (m)	SURFACE (m ²)	SECTION VOLUME (m ³)	CUMULATIVE VOLUME (m ³)
0+056.408		0.000		
	3.592		0.000	0.000
0+060.000		0.000		
	20.000		0.000	0.000
0+080.000		0.000		
	20.000		0.000	0.000
0+100.000		0.000		
	20.000		0.000	0.000
0+120.000		0.000		
	20.000		0.000	0.000
0+140.000		0.000		
	20.000		0.000	0.000
0+160.000		0.000		

CH	DISTANCE (m)	SURFACE (m ²)	SECTION VOLUME (m ³)	CUMULATIVE VOLUME (m ³)
	20.000		0.000	0.000
0+180.000		0.000		
	20.000		215.470	215.470
0+200.000		21.547		
	20.000		409.480	624.950
0+220.000		19.401		
	20.000		343.550	968.500
0+240.000		14.954		
	20.000		149.540	1118.040
0+260.000		0.000		
	20.000		0.000	1118.040
0+280.000		0.000		
	20.000		0.000	1118.040
0+300.000		0.000		
	20.000		0.000	1118.040
0+320.000		0.000		
	20.000		0.000	1118.040
0+340.000		0.000		
	20.000		0.000	1118.040
0+360.000		0.000		
	20.000		0.000	1118.040
0+380.000		0.000		
	20.000		171.130	1289.170
0+400.000		17.113		
	20.000		342.420	1631.590
0+420.000		17.129		
	20.000		341.710	1973.300
0+440.000		17.042		
	20.000		436.360	2409.660
0+460.000		26.594		
	20.000		490.830	2900.490
0+480.000		22.489		
	20.000		428.270	3328.760
0+500.000		20.338		
	20.000		414.680	3743.440
0+520.000		21.130		
	20.000		444.530	4187.970
0+540.000		23.323		
	20.000		488.010	4675.980
0+560.000		25.478		
	20.000		534.120	5210.100
0+580.000		27.934		

CH	DISTANCE (m)	SURFACE (m ²)	SECTION VOLUME (m ³)	CUMULATIVE VOLUME (m ³)
	20.000		576.070	5786.170
0+600.000		29.673		
	20.000		592.100	6378.270
0+620.000		29.537		
	20.000		592.880	6971.150
0+640.000		29.751		
	20.000		616.880	7588.030
0+660.000		31.937		
	20.000		653.400	8241.430
0+680.000		33.403		
	20.000		705.110	8946.540
0+700.000		37.108		
	20.000		726.750	9673.290
0+720.000		35.567		
	20.000		729.670	10402.960
0+740.000		37.400		
	20.000		782.390	11185.350
0+760.000		40.839		
	20.000		818.370	12003.720
0+780.000		40.998		
	20.000		809.660	12813.380
0+800.000		39.968		
	20.000		778.950	13592.330
0+820.000		37.927		
	20.000		762.720	14355.050
0+840.000		38.345		
	20.000		724.800	15079.850
0+860.000		34.135		
	20.000		619.400	15699.250
0+880.000		27.805		
	20.000		532.240	16231.490
0+900.000		25.419		
	20.000		693.290	16924.780
0+920.000		43.910		
	20.000		1147.500	18072.280
0+940.000		70.840		
	20.000		1617.190	19689.470
0+960.000		90.879		
	20.000		1476.030	21165.500
0+980.000		56.724		
	20.000		790.170	21955.670
1+000.000		22.293		

CH	DISTANCE (m)	SURFACE (m ²)	SECTION VOLUME (m ³)	CUMULATIVE VOLUME (m ³)
	20.000		446.090	22401.760
I+020.000		22.316		
	20.000		476.120	22877.880
I+040.000		25.296		
	20.000		252.960	23130.840
I+060.000		0.000		
	20.000		355.360	23486.200
I+080.000		35.536		
	20.000		355.360	23841.560
I+100.000		0.000		
	20.000		240.780	24082.340
I+120.000		24.078		
	20.000		598.510	24680.850
I+140.000		35.773		
	20.000		1585.470	26266.320
I+160.000		122.774		
	20.000		3112.490	29378.810
I+180.000		188.475		
	20.000		3780.970	33159.780
I+200.000		189.622		
	20.000		3198.630	36358.410
I+220.000		130.241		
	20.000		1914.480	38272.890
I+240.000		61.207		
	20.000		809.290	39082.180
I+260.000		19.722		
	20.000		310.250	39392.430
I+280.000		11.303		
	20.000		222.990	39615.420
I+300.000		10.996		
	20.000		220.510	39835.930
I+320.000		11.055		
	20.000		119.860	39955.790
I+340.000		0.931		
	20.000		221.650	40177.440
I+360.000		21.234		
	20.000		840.160	41017.600
I+380.000		62.782		
	20.000		1730.030	42747.630
I+400.000		110.221		
	20.000		2800.330	45547.960
I+420.000		169.812		

CH	DISTANCE (m)	SURFACE (m ²)	SECTION VOLUME (m ³)	CUMULATIVE VOLUME (m ³)
	20.000		3303.170	48851.130
I+440.000		160.505		
	20.000		3061.260	51912.390
I+460.000		145.621		
	20.000		2814.340	54726.730
I+480.000		135.813		
	20.000		2078.570	56805.300
I+500.000		72.044		
	20.000		890.360	57695.660
I+520.000		16.992		
	20.000		169.920	57865.580
I+540.000		0.000		
	20.000		0.000	57865.580
I+560.000		0.000		
	20.000		30.960	57896.540
I+580.000		3.096		
	20.000		30.960	57927.500
I+600.000		0.000		
	20.000		118.900	58046.400
I+620.000		11.890		
	20.000		118.900	58165.300
I+640.000		0.000		
	20.000		0.000	58165.300
I+660.000		0.000		
	20.000		0.000	58165.300
I+680.000		0.000		
	20.000		0.000	58165.300
I+700.000		0.000		
	20.000		0.000	58165.300
I+720.000		0.000		
	20.000		74.750	58240.050
I+740.000		7.475		
	20.000		169.370	58409.420
I+760.000		9.462		
	20.000		173.680	58583.100
I+780.000		7.906		
	20.000		135.570	58718.670
I+800.000		5.651		
	20.000		95.880	58814.550
I+820.000		3.937		
	20.000		52.690	58867.240
I+840.000		1.332		

CH	DISTANCE (m)	SURFACE (m ²)	SECTION VOLUME (m ³)	CUMULATIVE VOLUME (m ³)
	20.000		13.320	58880.560
1+860.000		0.000		
	20.000		0.000	58880.560
1+880.000		0.000		
	20.000		0.000	58880.560
1+900.000		0.000		
	20.000		0.000	58880.560
1+920.000		0.000		
	20.000		0.000	58880.560
1+940.000		0.000		
	20.000		0.000	58880.560
1+960.000		0.000		
	20.000		0.000	58880.560
1+980.000		0.000		
	20.000		0.000	58880.560
2+000.000		0.000		
	20.000		0.000	58880.560
2+020.000		0.000		
	20.000		0.000	58880.560
2+040.000		0.000		
	20.000		0.000	58880.560
2+060.000		0.000		
	20.000		0.000	58880.560
2+080.000		0.000		
	20.000		66.470	58947.030
2+100.000		6.647		
	20.000		677.370	59624.400
2+120.000		61.090		
	20.000		1616.690	61241.090
2+140.000		100.579		
	20.000		2186.240	63427.330
2+160.000		118.045		
	20.000		2295.210	65722.540
2+180.000		111.476		
	20.000		1937.980	67660.520
2+200.000		82.322		
	20.000		1300.400	68960.920
2+220.000		47.718		
	20.000		659.170	69620.090
2+240.000		18.199		
	20.000		181.990	69802.080
2+260.000		0.000		

CH	DISTANCE (m)	SURFACE (m ²)	SECTION VOLUME (m ³)	CUMULATIVE VOLUME (m ³)
	20.000		0.000	69802.080
2+280.000		0.000		
	20.000		0.000	69802.080
2+300.000		0.000		
	20.000		0.000	69802.080
2+320.000		0.000		
	20.000		0.000	69802.080
2+340.000		0.000		
	20.000		17.850	69819.930
2+360.000		1.785		
	20.000		89.260	69909.190
2+380.000		7.141		
	20.000		157.900	70067.090
2+400.000		8.649		
	20.000		142.030	70209.120
2+420.000		5.554		
	20.000		114.370	70323.490
2+440.000		5.883		
	20.000		158.340	70481.830
2+460.000		9.951		
	20.000		281.400	70763.230
2+480.000		18.189		
	20.000		493.240	71256.470
2+500.000		31.135		
	20.000		731.270	71987.740
2+520.000		41.992		
	20.000		988.250	72975.990
2+540.000		56.833		
	11.178		656.668	73632.658
2551.178/2738.07		60.660		
	21.930		678.788	74311.447
2+760.000		1.245		
	20.000		62.130	74373.577
2+780.000		4.968		
	20.000		51.890	74425.467
2+800.000		0.221		
	20.000		2.210	74427.677
2+820.000		0.000		
	20.000		0.000	74427.677
2+840.000		0.000		
	20.000		138.350	74566.027
2+860.000		13.835		

CH	DISTANCE (m)	SURFACE (m ²)	SECTION VOLUME (m ³)	CUMULATIVE VOLUME (m ³)
	20.000		241.580	74807.607
2+880.000		10.323		
	20.000		103.230	74910.837
2+900.000		0.000		
	20.000		0.000	74910.837
2+920.000		0.000		
	20.000		32.440	74943.277
2+940.000		3.244		
	20.000		36.320	74979.597
2+960.000		0.388		
	20.000		3.880	74983.477
2+980.000		0.000		
	20.000		0.000	74983.477
3+000.000		0.000		
	20.000		0.000	74983.477
3+020.000		0.000		
	20.000		0.000	74983.477
3+040.000		0.000		
	20.000		118.560	75102.037
3+060.000		11.856		
	20.000		599.860	75701.897
3+080.000		48.130		
	20.000		604.370	76306.267
3+100.000		12.307		
	20.000		123.070	76429.337
3+120.000		0.000		
	20.000		0.000	76429.337
3+140.000		0.000		
	20.000		29.330	76458.667
3+160.000		2.933		
	20.000		60.690	76519.357
3+180.000		3.136		
	20.000		31.690	76551.047
3+200.000		0.033		
	20.000		0.330	76551.377
3+220.000		0.000		
	20.000		0.000	76551.377
3+240.000		0.000		
	20.000		0.000	76551.377
3+260.000		0.000		
	20.000		0.000	76551.377
3+280.000		0.000		

CH	DISTANCE (m)	SURFACE (m ²)	SECTION VOLUME (m ³)	CUMULATIVE VOLUME (m ³)
	20.000		0.000	76551.377
3+300.000		0.000		
	20.000		0.000	76551.377
3+320.000		0.000		
	20.000		0.000	76551.377
3+340.000		0.000		
	20.000		0.000	76551.377
3+360.000		0.000		
	20.000		0.000	76551.377
3+380.000		0.000		
	20.000		10.560	76561.937
3+400.000		1.056		
	20.000		203.990	76765.927
3+420.000		19.343		
	20.000		636.400	77402.327
3+440.000		44.297		
	20.000		856.690	78259.017
3+460.000		41.372		
	20.000		708.890	78967.907
3+480.000		29.517		
	20.000		426.070	79393.977
3+500.000		13.090		
	20.000		149.740	79543.717
3+520.000		1.884		
	20.000		18.840	79562.557
3+540.000		0.000		
	20.000		82.820	79645.377
3+560.000		8.282		
	20.000		227.120	79872.497
3+580.000		14.430		
	20.000		304.020	80176.517
3+600.000		15.972		
	20.000		261.500	80438.017
3+620.000		10.178		
	20.000		130.420	80568.437
3+640.000		2.864		
	20.000		29.300	80597.737
3+660.000		0.066		
	20.000		26.920	80624.657
3+680.000		2.626		
	20.000		84.410	80709.067
3+700.000		5.815		

CH	DISTANCE (m)	SURFACE (m ²)	SECTION VOLUME (m ³)	CUMULATIVE VOLUME (m ³)
	20.000		99.040	80808.107
3+720.000		4.089		
	20.000		54.010	80862.117
3+740.000		1.312		
	20.000		54.950	80917.067
3+760.000		4.183		
	20.000		170.040	81087.107
3+780.000		12.821		
	20.000		184.460	81271.567
3+800.000		5.625		
	20.000		63.070	81334.637
3+820.000		0.682		
	20.000		6.820	81341.457
3+840.000		0.000		
	20.000		1.200	81342.657
3+860.000		0.120		
	20.000		4.410	81347.067
3+880.000		0.321		
	20.000		9.910	81356.977
3+900.000		0.670		
	20.000		64.940	81421.917
3+920.000		5.824		
	20.000		184.760	81606.677
3+940.000		12.652		
	20.000		244.370	81851.047
3+960.000		11.785		
	20.000		229.600	82080.647
3+980.000		11.175		
	20.000		159.100	82239.747
4+000.000		4.735		
	20.000		60.550	82300.297
4+020.000		1.320		
	20.000		21.120	82321.417
4+040.000		0.792		
	20.000		22.500	82343.917
4+060.000		1.458		
	20.000		17.000	82360.917
4+080.000		0.242		
	20.000		3.170	82364.087
4+100.000		0.075		
	20.000		25.900	82389.987
4+120.000		2.515		


CH	DISTANCE (m)	SURFACE (m ²)	SECTION VOLUME (m ³)	CUMULATIVE VOLUME (m ³)
	20.000		70.680	82460.667
4+140.000		4.553		
	20.000		74.970	82535.637
4+160.000		2.944		
	20.000		30.720	82566.357
4+180.000		0.128		
	20.000		2.670	82569.027
4+200.000		0.139		
	20.000		1.390	82570.417
4+220.000		0.000		
	20.000		0.000	82570.417
4+240.000		0.000		
	20.000		0.000	82570.417
4+260.000		0.000		
	20.000		0.000	82570.417
4+280.000		0.000		
	20.000		213.920	82784.337
4+300.000		21.392		
	20.000		662.310	83446.647
4+320.000		44.839		
	20.000		837.040	84283.687
4+340.000		38.865		
	20.000		784.900	85068.587
4+360.000		39.625		
	20.000		777.710	85846.297
4+380.000		38.146		
	20.000		634.570	86480.867
4+400.000		25.311		
	20.000		529.350	87010.217
4+420.000		27.624		
	20.000		679.660	87689.877
4+440.000		40.342		
	20.000		679.930	88369.807
4+460.000		27.651		
	20.000		392.910	88762.717
4+480.000		11.640		
	20.000		131.710	88894.427
4+500.000		1.531		
	20.000		15.310	88909.737
4+520.000		0.000		
	20.000		0.000	88909.737
4+540.000		0.000		

CH	DISTANCE (m)	SURFACE (m ²)	SECTION VOLUME (m ³)	CUMULATIVE VOLUME (m ³)
	20.000		4.630	88914.367
4+560.000		0.463		
	20.000		59.820	88974.187
4+580.000		5.519		
	20.000		180.720	89154.907
4+600.000		12.553		
	20.000		265.550	89420.457
4+620.000		14.002		
	20.000		247.440	89667.897
4+640.000		10.742		
	20.000		167.810	89835.707
4+660.000		6.039		
	20.000		68.600	89904.307
4+680.000		0.821		
	20.000		13.950	89918.257
4+700.000		0.574		
	20.000		9.830	89928.087
4+720.000		0.409		
	20.000		10.970	89939.057
4+740.000		0.688		
	20.000		44.810	89983.867
4+760.000		3.793		
	20.000		82.890	90066.757
4+780.000		4.496		
	20.000		107.700	90174.457
4+800.000		6.274		
	20.000		197.690	90372.147
4+820.000		13.495		
	20.000		292.320	90664.467
4+840.000		15.737		
	20.000		313.360	90977.827
4+860.000		15.599		
	20.000		358.300	91336.127
4+880.000		20.231		
	20.000		422.870	91758.997
4+900.000		22.056		
	20.000		366.970	92125.967
4+920.000		14.641		
	20.000		208.760	92334.727
4+940.000		6.235		
	20.000		87.770	92422.497
4+960.000		2.542		


CH	DISTANCE (m)	SURFACE (m²)	SECTION VOLUME (m³)	CUMULATIVE VOLUME (m³)
	20.000		49.540	92472.037
4+980.000		2.412		
	20.000		99.050	92571.087
5+000.000		7.493		

Appendix D – Temporary Facilities Assessment (per February 2023)

*North-South Corridor (Kvesheti-Kobi) Road Project, Georgia
Initial Environmental Examination – Gudauri Access Road*

Lot 2 – Construction Camp #2	
Location	Overview and Rationale
	<p>The camp is located on the eastern portion of the Didveli Plateau. The land plot is private and total area is 12 000m². Totally, the camp #2 is defined for 120 number of staffs. The site includes offices, technical inspection rooms, medical room, bathrooms, accommodation and canteens. A Covid-19 isolation area is also provided at the camp as shown below. A wastewater treatment plant is provided for grey water and a septic tank provided for sanitary wastewater.</p> <div style="text-align: center;">  </div> <p>Topsoil layer was stripped and transported to temporary topsoil storage area.</p> <p>Waste management is on the camp area: some plastic waste-bins are used for municipal waste, for hazardous waste storage areas to collect hazardous waste with roof, concrete floor and marked. For domestic waste local municipal company services contractor. For hazardous waste contractor made contract with specified licensed company, which takes hazardous waste from hazardous waste temporary storage area.</p> <p>The site was selected by the Contractor because of its location close to Bridge #3 and Tunnel #1. Camp #2 provides a base for workers involved with Bridge #3, Tunnel #1 and the works close to Zakatkari.</p>
	Land Use Requirements
	The site is leased from private landowners.
	Characteristic
Sensitive Human Receptors	Summary of Conditions
	<p>The plant is located on the Didveli Plateau. The nearest sensitive receptors are:</p> <ul style="list-style-type: none"> • Residential Property: 500m south • Urban Area: Arakhveti 700m south-east

North-South Corridor (Kvesheti-Kobi) Road Project, Georgia
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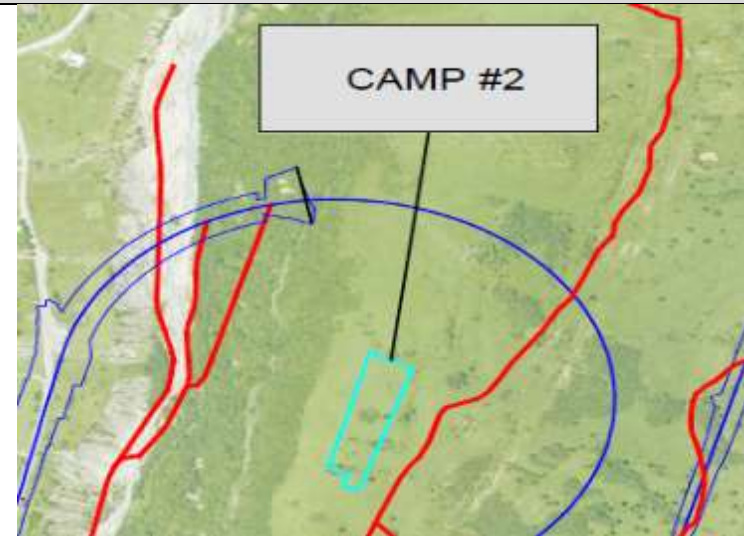
Ecology	<p>The Didveli plateau is classified as a modified habitat with some small portions of sensitive ‘wet meadow’ habitats located at several locations, the nearest of which is 225m east of the camp. Egyptian vultures have not been observed in the cliffs south of the camp for a number of years. Corncrake can be found on the plateau, but not in the vicinity of the camp.</p> 
Surface and Groundwater	<p>The Aragvi river is located 300m to the south of the camp. The camp and the river are bisected by extensive woodland and steep cliffs, the camp will extract and discharge water from the river. Groundwater has not been detected in the vicinity of the camp.</p>
Services / Infrastructure	<p>A number of gas pipelines and electricity transmission and distribution lines can be found on the Didveli plateau. The camp site has been selected to avoid these areas.</p>
Cultural Heritage	<p>Several archaeological sites and cultural objects and monuments are located within close proximity to the camp as shown in the figures below. None of them are located within the boundary of the camp (see the detailed map given at Batching Plant #2 section as both sites located together)</p>

North-South Corridor (Kvesheti-Kobi) Road Project, Georgia
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Site Map

Site Plan



Permits / Licenses / Plans	Item	Requirement	Engineer Approval (date)	National (date)	Approval	Comment
	Technical condition of water intake from surface water sources	Resolution N17 3 January 2014	N/A	Approved on 25.10.2022 by MoEPA.		Water use will be from Aragvi River by using water-pump. It is collecting in water tank.
	Maximum Permissible discharges of Pollutants discharged to Surface Water	Resolution N17 3 January 2014	N/A	Approved on 16.09.2022 by MoEPA.		Water coming from the kitchen and bathroom collected and treated in

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					water treatment equipment before discharge into the river Aragvi. Sewage water is pumped up by sewage truck.
	Camp Layout Plan	Environmental Decision N 2-354 (25.04.2019)	Approved on 10.02.22	Approved on 10.03.22 by MoEPA.	N/A
	Construction Camp Management Plan	Project EIA	Approved on 10.02.2022.	N/A	N/A
Site Aspects, Impacts and Mitigation Measures	Aspect	Impact		Mitigation	
	Generation of waste materials	Pollution of the surrounding environment		No additional mitigation required other than that already specified in the Project EIA.	
	Spills and leaks of oil from vehicles	Pollution of groundwater		No additional mitigation required other than that already specified in the Project EIA.	
	Noise and combustion emissions from the movement of vehicles.	Elevated levels of noise and emissions affecting local residents		No additional mitigation required other than that already specified in the Project EIA.	
	Presence of foreign workers	Incidents relating to cultural sensitivities, sexually transmitted disease, etc.		No additional mitigation required other than that already specified in the Project EIA.	
	Vehicle movement and presence of workers	Impacts to wet meadows		No additional mitigation required other than that already specified in the Project EIA.	
	Waste water	Discharge to private land		Ensure all wastewater is diverted to drainage channels that prevent discharge to private land.	
	Excavation works	Damage to PCR		No additional mitigation required other than that already specified in the Project EIA.	
Corrective Actions Recommended	N/A				

Lot 2 – Concrete Batching Plant #2		
Location	Overview and Rationale	<p>The batching plant is located within the boundary of Construction Camp #2 on the Didveli Plateau. The land plot is private and total area is 4 000m². The plant was designed and constructed according to the best practice with concrete hardstanding across the site and drainage into a water recycling tank. Topsoil layer was stripped and transported to temporary topsoil storage area.</p> <p>Wastewater from the plant is collected in the sedimentation ponds. The wastewater will be treated to meet the discharge water limits before discharge into the river Aragvi to be in compliance with the “Technical regulations of water flows in surface water by commercial and non-commercial objects” (Resolution N17, 3 January 2014).</p> <p>The site was selected by the Contractor because of its location close to Bridge #3 and Tunnel #1 which will require a large volume of concrete. The plant is also located within the boundary of Construction Camp #2 which reduces the requirements for additional land take and vehicle movements between the camp and batching plant.</p>
	Land Use Requirements	The site is a private land leased from a private landowner.
	Characteristic	Summary of Conditions
	Sensitive Human Receptors	<p>The plant is located on the Didveli Plateau. The nearest sensitive receptors are:</p> <ul style="list-style-type: none"> • Residential Property: 500m south • Urban Area: Arakhveti 700m south-east (on the other side of the valley)
	Ecology	<p>The Didveli plateau is classified as a modified habitat with some small portions of sensitive ‘wet meadow’ (ephemeral swamp) habitats located at several locations, the nearest of which is 225m east of the camp. Egyptian vultures have not been observed in the cliffs south of the camp for a number of years. Corncrake can be found on the plateau, but not in the vicinity of the batching plant.</p>
Surface and Groundwater	<p>The Aragvi river is located 300m to the south of the plant. The plant and the river are bisected by extensive woodland and steep cliffs, the plant will extract water from the river. Groundwater has not been detected in the vicinity of the Plant.</p>	



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Services /
Infrastructure

A number of gas pipelines and electricity transmission and distribution lines can be found on the Didveli plateau. The camp site has been selected to avoid these areas.

Cultural
Heritage

Several archaeological sites and cultural objects and monuments are located within close proximity to the plant as shown in the figures below. None of them are located within the boundary of the batching plant.




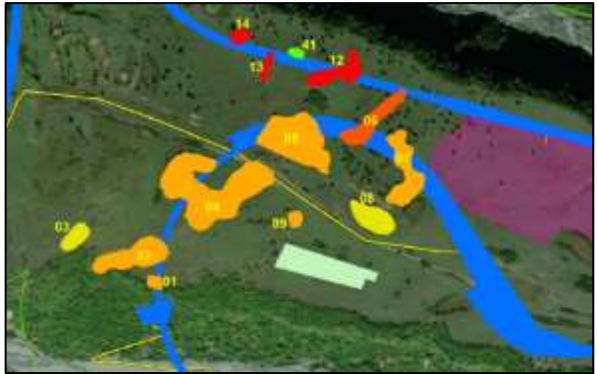

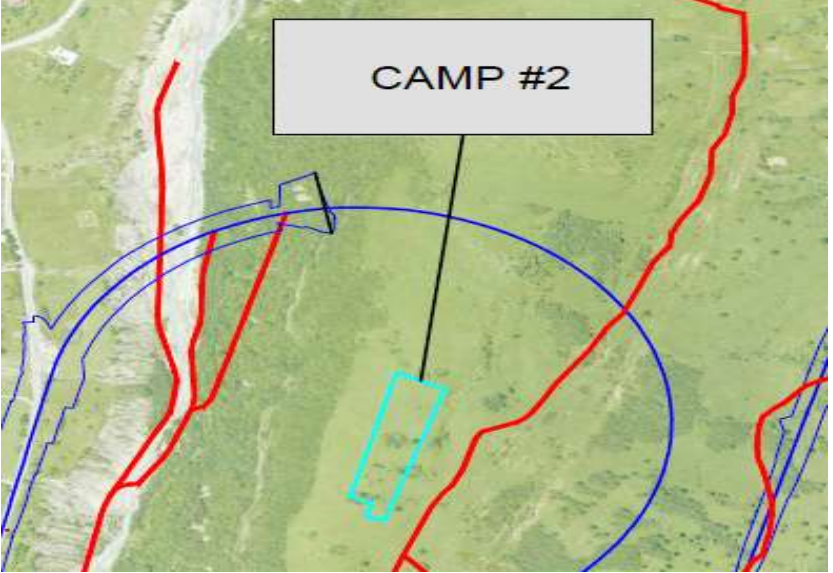
KEY	
A	Temporary facility
B	50m buffer
C	350m buffer
●	CH object
●	CH monument



Note: Description of the sites is given overleaf.

# According to the map	GIS database #	Monument/Object	Coordinates	Comment
14	35107	Didveli tower, hillfort, worship stone, Kaisahurni	460879.75; 4697843.14	
19	35093	Didveli structure ruins, Kaisahurni	460770.18; 4697639.32	
21	35118	Remains of structure, Kaisahurni	461317.58; 4698038.83	
22	35116	Remains of structure, Kaisahurni	461088.32; 4698006.46	
23	35117	Remains of structure, Kaisahurni	461173.09; 4698058.51	
24	35119	Remains of structure, Kaisahurni	461409.41; 4698013.67	
45	11556	Structures at Didveli, Kaisahurni	461027; 4697916	


North-South Corridor (Kvesheti-Kobi) Road Project, Georgia
Initial Environmental Examination – Gudauri Access Road

					
	Site Map		Site Plan		
					
Permits / Licenses / Plans	Item	Requirement	Engineer Approval (date)	National Approval (date)	Comment
	Technical condition of water intake from surface water sources	Resolution N17 3 January 2014	N/A	Approved on 25.10.2022 by MoEPA.	Water is extracted from Aragvi River by using water-pump.

*North–South Corridor (Kvesheti–Kobi) Road Project, Georgia
Initial Environmental Examination – Gudauri Access Road*

	Technical report of inventory of ambient air pollutant stationary sources and emission of hazardous substances	Resolution N17 3 January 2014	N/A	Approved on 26.09.2022 by MoEPA.	N/A
	Batching Plant Layout Plan	Environmental Decision N 2-354 (25.04.2019)	Approved on 10.02.22.	Approved on 10.03.22 by MoEPA.	N/A
	Batching Plant Management Plan	Project EIA	Approved on 21.02.2021.	N/A	N/A
Site Aspects, Impacts and Mitigation Measures	Aspect	Impact	Mitigation		
	Generation of waste materials	Pollution of the surrounding environment	No additional mitigation required other than that already specified in the Project EIA.		
	Spills and Leaks	Pollution of Aragvi river and groundwater	<ul style="list-style-type: none"> Monitor site run-off to ensure that drainage around the site collects contaminated water. 		
	Concrete wastewater management	Pollution of private land, woodland and Aragvi river	<ul style="list-style-type: none"> Ensure wastewater is treated properly to meet the discharge water limits before discharge into the river Aragvi. 		
	Air emissions from Plant	Air pollution	No additional mitigation required other than that already specified in the Project EIA.		
	Plant Noise	Nuisance to residential receptors	No additional mitigation required other than that already specified in the Project EIA.		
	PCR	Disturbance to sites	Ensure the recommendations of the NACHP regarding the sites close to the Batching Plant.		
	Construction Traffic	Traffic accidents and delays	No additional mitigation required other than that already specified in the Project EIA.		
Corrective Actions Recommended	<ul style="list-style-type: none"> Monitor site run-off and retroactively upgrade drainage system if required; Ensure the water from the plant passed through the sedimentation pond (equipped with oil catcher) is treated properly and meets discharge water limits before discharging in to the river. 				

*North–South Corridor (Kvesheti–Kobi) Road Project, Georgia
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Lot 2 – Truck Parking Area			
Location	Overview and Rationale	Truck parking area (a de-facto equipment lay down area) is located in Dusheti Municipality, village Kvesheti, near Aragvi riverside. Central coordinates of the area are 42.426837, 44.564994. The land plot is private and total area is 11 000m ² . This area will be used as temporary storage area and for vehicle maintenance. Working staff present are 5 persons. Drinking water is provided in bottles. Water for construction use is being collected in water reservoir, which is filled up by water-truck. Bio-toilet has been placed at the site. Topsoil layer doesn't exist. The site was selected by the Contractor due to its proximity to work zones and access to the existing main road.	
	Land Requirements and Use	The site is rented from a private enterprise.	
	Characteristic	Summary of Conditions	
	Sensitive Receptors	Human	The nearest residential receptor is approximately 100m south of the site.
	Ecology		The site is located within the flood plain of the Aragvi river. The site is heavily modified habitat. No sensitive species have been identified in this specific area. Species will however be using the Aragvi river in a wider context.
	Surface and Groundwater		The site is located adjacent to the Aragvi river.
	Services / Infrastructure		The existing road to Gudauri is located adjacent to the south of the site, providing suitable access for the vehicles.
	Cultural Heritage		Surveys undertaken by NACHP have not indicated the presence of any sensitive cultural objects or monuments in this area. Further, the siting of the facility in the river floodplain limits the potential for any archaeological sites to be present here.
Site Map			
			

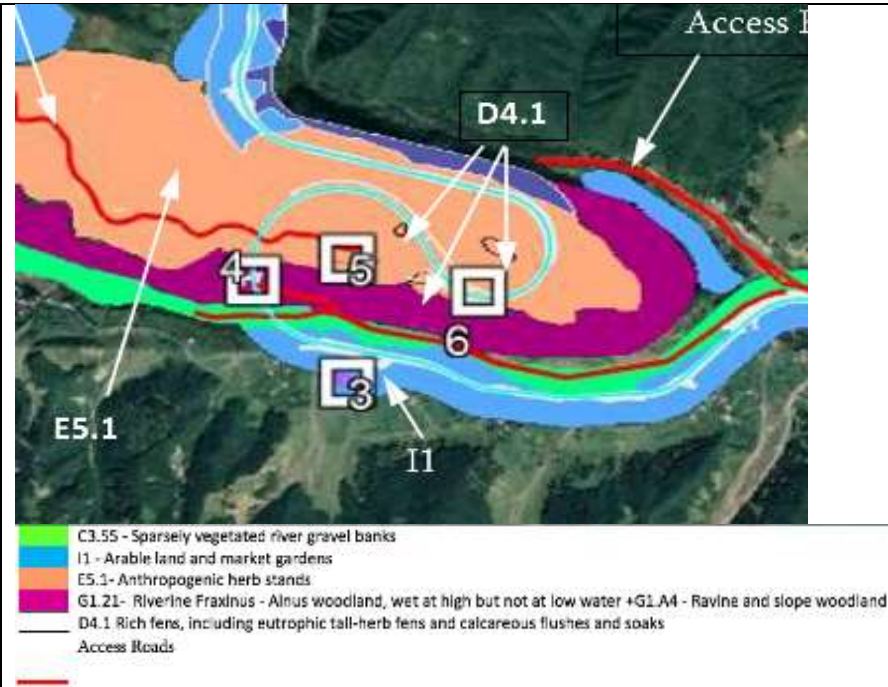
North–South Corridor (Kvesheti–Kobi) Road Project, Georgia
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Permits / Licenses / Plans	Item	Requirement	Engineer Approval (date)	National Approval (date)	Comment
	Technical condition of water intake from surface water sources	Resolution N17 3 January 2014	N/A	Approved on 25.10.2022 by MoEPA.	Water is extracted from Aragvi River by using water-pump.
	Method Statement	EIA	Pending	N/A	Need to be submitted to engineers Method statement of arranging parking area
Site Aspects, Impacts and Mitigation Measures	Aspect	Impact	Mitigation		
	Generation of waste materials	Pollution of the surrounding environment	No additional mitigation required other than that already specified in the Project EIA.		
	Spills and leaks of oil from vehicles	Pollution of groundwater and Aragvi river	In addition to the measures already proposed in the Project EIA: <ul style="list-style-type: none"> • Ensure vehicle maintenance is undertaken on the concrete hardstanding and bunded area only. 		
	Noise and combustion emissions from the movement of vehicles.	Elevated levels of noise and emissions affecting local residents	No additional mitigation required other than that already specified in the Project EIA.		
Speeding vehicles	Accidents involving pedestrians, livestock and vehicles	No additional mitigation required other than that already specified in the Project EIA.			
Corrective Actions Recommended	<ul style="list-style-type: none"> • Ensure vehicle maintenance is undertaken on the concrete hardstanding and bunded area only; • Develop and submit to engineers Method Statement of arranging parking area. 				

*North–South Corridor (Kvesheti–Kobi) Road Project, Georgia
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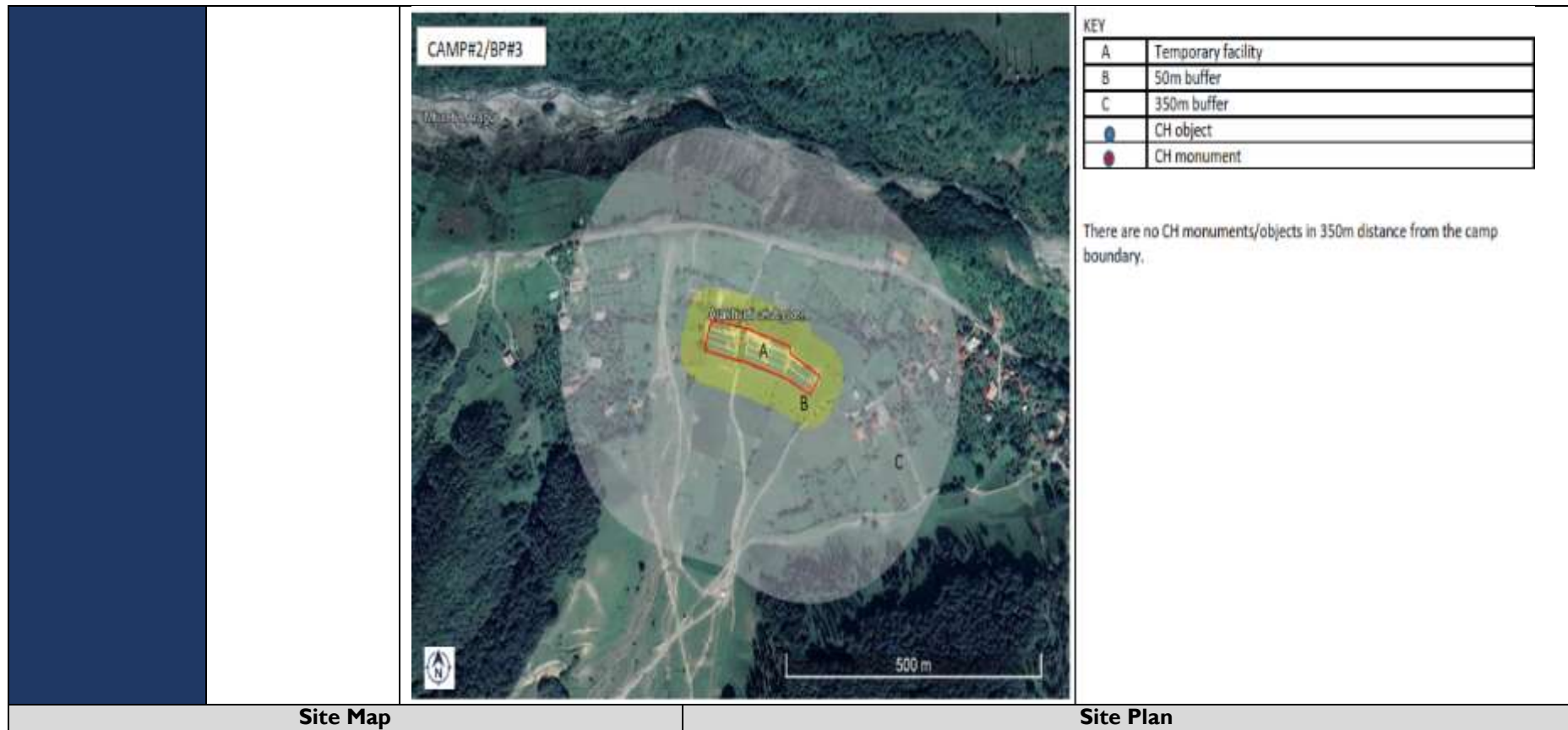
Lot 2 – Construction Camp #1		
Location	Overview and Rationale	<p>The camp is located in village Arakhveti, Dusheti municipally. The land plot is private and total area is 12 000m². Topsoil layer was stripped and transported to temporary topsoil storage area.</p> <p>The camp area is divided by small water channels emerging from the top of the hill and hydrological characteristics were prepared and submitted to engineers. Also, contractor prepared geological survey report required by Dusheti municipally regarding construction permission.</p> <p>Totally the camp is defined for 100 number of staffs. In the camp area, there are offices, conference hall, dormitories, canteens, bathrooms, toilets, wastewater treatment system. With plastic pipes water comes from reservoir constructed up from the camp area. Coordinates of the reservoir are shown on layout plan. The reservoir is being fill up by surface spring water coming from the mountains. The camp is equipped with wastewater collection and treatment systems.</p> <p>Waste management is on the camp area: some plastic waste-bins are used for municipal waste, for hazardous waste storage areas to collect hazardous waste with roof, concrete floor and marked. For domestic waste local municipal company services contractor. For hazardous waste contractor made contract with specified licensed company, which will take hazardous waste from hazardous waste temporary storage area.</p> <p>The camp site was selected due to its location relatively distant from urban areas (Kvesheti and Arakhveti) whilst also being close enough to key work sites in these areas.</p>
	Land Use Requirements	The site is a private land leased from a private landowner.
	Characteristic	Summary of Conditions
	Sensitive Human Receptors	Several small residential properties are located within 100m of the site. However, due to the difficult topography and the extent of residential receptors spread along the valley it was not possible to respect all of the siting distances of the Project EIA.
	Ecology	The site is located within residential / agricultural areas of Arakhveti. The site is heavily modified habitat. No sensitive species have been identified in this specific area.

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Initial Environmental Examination – Gudauri Access Road



Surface and Groundwater	The site is located more than 100m south of the Aragvi river.
Services / Infrastructure	The main existing road to Gudauri bisects the camp and the Aragvi river.
Cultural Heritage	Surveys undertaken by NACHP have not indicated the presence of any sensitive cultural objects or monuments in this area.

North-South Corridor (Kvesheti-Kobi) Road Project, Georgia
Initial Environmental Examination – Gudauri Access Road



*North–South Corridor (Kvesheti–Kobi) Road Project, Georgia
Initial Environmental Examination – Gudauri Access Road*

	Construction Camp Management Plan	Project EIA	Approved on 10.02.2022.	N/A	N/A
Site Aspects, Impacts and Mitigation Measures	Aspect	Impact		Mitigation	
	Generation of waste materials	Pollution of the surrounding environment		No additional mitigation required other than that already specified in the Project EIA.	
	Spills and leaks of oil from vehicles	Pollution of groundwater		No additional mitigation required other than that already specified in the Project EIA.	
	Noise and combustion emissions from the movement of vehicles.	Elevated levels of noise and emissions affecting local residents		No additional mitigation required other than that already specified in the Project EIA.	
	Presence of foreign workers	Incidents relating to cultural sensitivities, sexually transmitted disease, etc.		No additional mitigation required other than that already specified in the Project EIA.	
Corrective Actions Recommended	N/A				

Appendix E – Air Quality Monitoring & Model

https://drive.google.com/file/d/1qa_00nYlAgP_V0kWOdjV_CHL406LS6g/view?usp=drive_link

Appendix F – Consultation Reports

Gudauri Access Road (local road) Construction Project under the Kvesheti-Kobi Project

Minutes of Public Consultation

Date: March 23, 2022

The purpose of public consultation: To provide information to the project affected persons on the activities envisaged in the Resettlement Action Plan and Environmental Impact Assessment (hereinafter referred to as “EIA”)

Place of public consultation: Hotel Marco Polo, Gudauri, Kazbegi Municipality.

Chairman of the meeting: Mikheil Ujmajuridze, Nikoloz Karsimashvili

Secretary of the meeting: Nana Bregadze

The meeting was attended by:

- **Salome Tsurtsunia** - Deputy Chairperson of Department;
- **Mikheil Ujmajuridze** - Head of the Environmental and Social Issues Division;
- **Nikoloz Karsimashvili** - Head of Environmental Protection Unit;
- **Dimitri Lomidze** - First Category Senior Specialist of Resettlement Unit;
- **Besik Diasamidze** - Deputy Head of Projects Management Division of Donor Organizations Funded Construction, Modernization and Reconstruction Projects;
- **Luiza Bubashvili** - Environmental Safeguard Consultant under ADB & EIB financed projects
- **Mikheil Bagauri** – H&S Consultant under ADB financed projects
- **Tariel Karelidze** - Representative of Asian Development Bank (ADB);
- **Tamar Lazarashvili**- Representative of Asian Development Bank (ADB);
- **Tamar Javakhi** - Social Safeguards Specialist of Supervisory company;
- **Krishna Chakhun** - Team Leader of Supervisory company.

Public consultation commencement time: 12:00, 23 March 2022

Agenda:

To provide information on the procedures envisaged in the Resettlement Action Plan and IEE to the persons affected by Gudauri access road (local road) construction project under the Kvesheti-Kobi project.

The presentation was made by Mikheil Ujmajuridze, Head of the Environmental and Social Issues Division of the Roads Department of Georgia and Nikoloz Karsimashvili, Head of Environmental Protection Unit of the same division.

The public consultation was attended by Project Affected Persons. The construction works are financed by the Asian Development Bank, and the project implementing agency is the Roads Department of Georgia of the Ministry of Regional Development and Infrastructure of Georgia.

Map of Gudauri Access Road Construction Project under Kvesheti-Kobi Project



The speaker, Nikoloz Karsimashvili, introduced the project to the participants and informed them that this particular Resettlement Action Plan refers only to Gudauri access road (local road) construction project. The total length of the road is 5 km. According to topography, the width of the design road buffer is 9m (the width of each lane is 3.50m and the width of the shoulders is 1 m). The speaker spoke in detail about the arrangement of the road defined by the design, the pre-construction procedures, and the safety of construction. The focus was on the following environmental issues: climate change caused by the construction works, hydrological and geological environment, water quality, soil, biodiversity, protected areas, impact on socio-economic factors, study issues related to archaeological and cultural heritage, study of alternatives, and prepared modelling on air, noise and vibration. Attention was also paid to labor safety issues. In addition, various measures will be taken in order to avoid and/or mitigate the adverse impact on the environment.

The speaker, Mikheil Ujmajuridze, explained that the census-inventory of the affected land plots and assets will be carried out in April 2022. The census will be conducted in the presence of property owners. Currently, the valuation of land plots without considering the principle of zoning is being implemented by LEPL - Levan Samkharauli National Forensics Bureau.

Mikheil Ujmajuridze also explained to the audience the anticipated benefits of the land acquisition and resettlement plan. In particular, the population was informed about the compensatory measures determined for Project Affected Persons. Also, the population was explained about the temporary resettlement procedure, the grievance redress mechanism, and the monitoring procedures of the structure-buildings located in the vicinity of the project.

After the presentation, the participants expressed their interest in various issues to which the RD representatives gave comprehensive answers.

N	Comment Author (Name, Surname)	Question	Response

1.	M. Z.	In the village of Zakatkari, portion of the land owned by the citizen was affected by the project, which was acquired by the Department, and for the remaining part, the citizen submitted an application to the Department, whereupon a response has not been received.	The issue was reviewed by the Grievance Resolution Committee of the Department, which made a decision on the possibility of arranging the access road. As of today, the design work for the arrangement of the access road to the land plots is underway. In case the access road cannot be arranged, the Department will ensure the acquisition of similar types of land plots.
2.	B Z	The citizen noted that the road was not irrigated during the summer and requested to eliminate the problem.	The representative of the supervision company explained that similar incidents had occurred in the summer due to a water problem. This issue will be strictly controlled by the supervisor during the summer period.
3.	M S (Seturebi)	The local road project includes a part of the land plot and a fence and ornamental plants (shrubs) placed on it. The citizen is asking for compensation for the indicated plants. She also noted that the compensation amount should include a water channel that is independently connected to the real estate.	The representatives of the Department explained to the citizen that the appropriate compensation amount would be provided in exchange for the ornamental plants. As for the water channel, the citizen must provide conclusive evidence that the channel was constructed with her own funds in order for the appropriate compensation to be issued.
4.	T. S.	The citizen emphasized the fast movement of construction vehicles and inquired about what portion of his property is in the development zone of the road.	After the meeting, the representative of the Department provided the citizen with detailed information about the land plots affected by the project. As for the issue of the fast movement of construction vehicles, a representative of the supervision company promised to resolve the issue.
5.	D. N.	The citizen asked the representative of the Department whether it was planned to arrange passes for large and small cattle.	The representative of the Department explained to the citizen that the permissible speed limit is 60 km/h and that residents will be free to call cattle on the other side, as there is no protective barrier envisaged on the road.

6.	M.Z.	The citizen wanted to get information about what part of her property falls within right of the way.	After the meeting, the representative of the Department provided the citizen with detailed information about project-affected land plots.
7.	D. S. (village Seturebi)	The citizen asked whether the cultural heritage monument "Sameba Church" would be damaged as a result of the construction works.	According to the representative of RD, distance between the road and the church is approximately 70 meters. Consequently, the impact on the cultural heritage monument is not expected, although it will be monitored during the construction work.
8.	M. T.	The citizen is interested in the cost of 1 sq.m of land affected by the project.	According to the representative of the Department, LEPL Levan Samkharauli National Forensics Bureau is conducting an evaluation of project affected land plots without considering the zoning principles.

Photos: Public consultation for Gudauri access road construction project (local road) within the scope of Kvesheti-Kobi project



ASIAN DEVELOPMENT BANK
Summary Report of the Public Consultation Meeting with the residents of the villages of Zakatkari, Seturni, Jaghmiani and Kaishaurni on Gudauri Access Road issues.
Loan 3803-GEO: North-South Corridor (Kvesheti-Kobi) Road Project

24 May 2022. Marco Polo Hotel, Gudauri
12:00 PM -13:30 PM
Tariel Karelidze – Community Liaison Officer (CLO)

Objectives of the Public Consultation Meeting:

- (i) Presentation of the general information about Gudauri Access Road project;
- (ii) Raise awareness of land acquisition and resettlement procedures;
- (iii) Informing participants about the results of the examination of the Samkharauli National Forensic Bureau on the cost of lands;
- (iv) Receiving the feedback from APs;

Venue and participants:

The Public Consultation Meeting with the residents of the villages Zakatkari, Seturebi, Jaghmiani and Kaishaurni (APs) on Gudauri Access Road (12.00 PM – 13.30 PM) took place on 24 May 2022 at the selected hotel (Marco Polo) in Gudauri. 26 local residents (7 Females and 19 Males) in total attended the meeting.

Community residents (APs) from the villages of Zakatkari, Seturni, Jaghmiani, Kaishaurni were called by phone by RD representatives and suggested to participate in the Public Consultation Meeting. Local officials did not participate.

Summary of Proceedings

Mikheil Ujmajuridze and Nikoloz Karsimashvili presented the Gudauri Access Road project through power point presentation. The project in general, social and environmental approaches have been presented to the participants. The presentation is attached to the Summary Report. During the presentation, Nikoloz Karsimashvili emphasized that the provision of the consultation meetings on Gudauri Access Road issues was recommended by the ADB, since the RD is not obliged to hold this meeting in accordance with the legislation of Georgia, as the Gudauri Access Road is not a central highway and it does not need preparation of the EIA. The results of the examination of the Samkharauli National Forensic Bureau on the cost of lands by villages were also presented to the participants. At the end of the presentation, it was mentioned that RD would be happy to hear suggestions for improving communication between the Project and the APs.

After the presentation, the workshop participants were invited to discussion in a Q&A format.

Questions and Answers:

Q: Asked the question regarding the land plot which was acquired by the RD. The issue was raised on the previous consultation meeting, held on 23.03.2022. The owner of the land is awaiting the decision of the RD whether the remaining part will be additionally acquired or access to the plot will be provided.

A (Mikheil Ujmajuridze): The final decision on this matter will be made next week and the AP will be informed about the results.

Q: AP asked if the trees located on her land plot will be included in the calculation during the land acquisition process?

A (Mikheil Ujmajuridze): The RD replied that all objects, including trees, will be calculated in the valuation of land plots in accordance with the methodology of inventory.

Q: Asked about the width of the road and whether the project provides a buffer zone?

A (Micheil Ujmajuridze): Explained that the width of the asphalted road is 9 m. An additional 1 m. zone is planned on both sides and also buffer zone, which is necessary for the construction of the road. The width of the buffer zone depends on the technical requirements for each section.

Q: Asked whether it is possible to minimize the buffer zone width next to her property and, accordingly, the area of land acquisition on her plot.

A (Micheil Ujmajuridze): Explained that the width of the buffer zone depends on the terrain of the area and planned construction works. Some sections require road level rising, which needs a wider buffer zone. The request of Ms. Larisa Jagmaidze has been taken into account and the RD will discuss this issue.

Q: She asked whether the entrance to the yard will be provided in case of raising the level of the road.

A (Dimitri Lomidze): Replied that, of course, all yards will be provided with access.

Q: Question about the vibration impact on buildings during construction works.

A (Micheil Ujmajuridze): The current condition of the buildings will be surveyed and documented prior to the construction phase to avoid future misunderstandings.

Q: A question was raised about the dust and fast driving of project vehicles at the Seturni section.

A (Micheil Ujmajuridze): RD will take this matter into account and communicate with the Contractor about this.

Q: A participant from Zakatkari expressed concern about the lower cost of land in Zakatkari compared to Kaishaurni, Jaghmiani and Seturni. He demanded to make it the same as in other villages.

A (Dimitri Lomidze): Explained the basic principles for calculating the value of land. He mentioned that an important component of the calculation is the distance from Gudauri. The participant from Zakatkari disagreed with this logic and stated that this approach is unacceptable.

The participants of the meeting were provided with contact details of Tamar Javakhi (UBM) and Dimitri Lomidze (RD). Some attendees had questions regarding the impact on their own land plots, which were answered during the meeting and after that personally by Dimitri Lomidze.

Summary Agreements

The RD will start individual negotiations with APs on land acquisition issues.

Conclusions

The RD and UBM informed beforehand the APs in Jaghmiani, Seturebi, Kaishaurni and Zakatkari and invited them to participate in the information meeting which was effective in terms of attending the meeting by the local residents.

It would be better if RD facilitated the questions and answers part of the meeting more effectively. Sometimes some participants spoke in parallel, and it was difficult to catch all the topics of discussions. Such situation made the meeting a bit chaotic. Residents of Zakatkari need additional consultation on the methodology for calculating the cost of land to avoid misunderstandings.

Photos and attachments



Appendix G – Rapid Environmental Assessment

Instructions:

- (i) The project team completes this checklist to support the environmental classification of a project. It is to be attached to the environmental categorization form and submitted to the Safeguards Division (SDSS), for endorsement by Director, SDSS and for approval by the Chief Compliance Officer.
- (ii) This checklist focuses on environmental issues and concerns. To ensure that social dimensions are adequately considered, refer also to ADB's: (a) checklists on involuntary resettlement and Indigenous Peoples; (b) poverty reduction handbook; (c) staff guide to consultation and participation; and (d) gender checklists.
- (iii) Answer the questions assuming the “without mitigation” case. The purpose is to identify potential impacts. Use the “remarks” section to discuss any anticipated mitigation measures.

Country/Project Title: Georgia / North–South Corridor (Kvesheti–Kobi) Road Project - Gudauri Access Road

Sector Division: GRM

Screening Questions	Yes	No	Remarks
A. Project Siting Is the project area adjacent to or within any of the following environmentally sensitive areas?			
<ul style="list-style-type: none"> ▪ Cultural heritage site 	X		Anticipated but temporary, site-specific and can be mitigated. Physical cultural resources surveys were undertaken as part of the Cultural Heritage General Action Plan for the Kvesheti–Kobi (KK) Road Project in 2021, including in the Gudauri Access Road Project (ARP) area. There are some cultural objects on the territory of Didveli plateau which the ARP intends to pass close to. Most of these objects do not overlap with the construction zones, and re-alignment for the project road has also been proposed to avoid causing damage to the Sameba Complex (which was located directly across the ARP initial alignment). Pre-construction survey work will be undertaken to ensure that any impacts to this site will be of low significance. Although sites are unlikely to be affected during construction works, the Contractor will be required to implement mitigation measures as outlined in the KK Project EIA, including the Chance Find Procedure and Archaeological Five Phase Strategy. Closely monitoring by the Cultural Heritage Monitors employed through the engineer will also be in place.
<ul style="list-style-type: none"> ▪ Protected Area 		X	Not anticipated. The ARP is located close to the Kazbegi National Park but it does not cross into it and as such, direct impacts to this site are not anticipated. Furthermore, the portion of the Kazbegi National Park closest to the ARP is occupied by residential and agricultural properties.

Screening Questions	Yes	No	Remarks
<ul style="list-style-type: none"> ▪ Wetland 	X		Anticipated but temporary, site-specific and can be mitigated. There are two wet meadows close to Kaishaurni, but at a distance of more than 150m from the alignment and they are not anticipated to be directly affected by the ARP. The Contractor will be required to implement mitigation measures to ensure that these sites are protected and that there are no significant residual impacts.
<ul style="list-style-type: none"> ▪ Mangrove 		X	Not anticipated. There are no mangroves in the project area.
<ul style="list-style-type: none"> ▪ Estuarine 		X	Not anticipated. There are no mangroves in the project area.
<ul style="list-style-type: none"> ▪ Buffer zone of protected area 		X	Not anticipated. The ARP is located close to the Kazbegi National Park but it does not cross into it and as such, direct impacts to this site are not anticipated. Furthermore, the portion of the Kazbegi National Park closest to the ARP is occupied by residential and agricultural properties.
<ul style="list-style-type: none"> ▪ Special area for protecting biodiversity 	X		Anticipated but temporary, site-specific and can be mitigated. Ecological surveys in 2019 identified the presence of Corncrake across the Didveli plateau, including within the ARP alignment close to Kaishaurni. As the footprint of the road is limited, adverse impact on the species is unlikely. The Contractor will be required to implement mitigation measures outlined in the KK Project's Biodiversity Action Plan, which will also be applicable to the ARP. Furthermore, to ensure that Corncrakes are not harmed, or a breeding cycle is not lost, habitat removal within the RoW will be undertaken outside the breeding season (mid-May to end-August).
B. Potential Environmental Impacts			
Will the Project cause...			
<ul style="list-style-type: none"> ▪ encroachment on historical/cultural areas; disfiguration of landscape by road embankments, cuts, fills, and quarries? 	X		Anticipated but temporary, site-specific and can be mitigated. The road will require significant earthworks including cut and fill, embankments and spoil disposal. The Contractor will be required to consult with the National Agency for Cultural Heritage Preservation of Georgia (NACHP), local community and relevant stakeholders to determine which types of landscaping are most suitable to reduce impacts on cultural landscape in the areas around Zakatkari.
<ul style="list-style-type: none"> ▪ encroachment on precious ecology (e.g. sensitive or protected areas)? 		X	Not anticipated. The ARP is located close to the Kazbegi National Park but it does not cross into it and as such, direct impacts to this site are not anticipated. Furthermore, the portion of the Kazbegi National Park closest to the ARP is occupied by residential and agricultural properties.
<ul style="list-style-type: none"> ▪ alteration of surface water hydrology of waterways crossed by roads, resulting in increased sediment in streams affected by increased soil erosion at construction site? 		X	Not anticipated. No impacts to surface water have been identified. The only river within the vicinity of the ARP is the Khevi river, but is not considered to be located close enough to be affected by siltation from erosion run-off.
<ul style="list-style-type: none"> ▪ deterioration of surface water quality due to silt runoff and sanitary wastes from worker-based camps and chemicals used in construction? 	X		Anticipated during construction but temporary, site-specific and can be mitigated. The ARP intends to utilize some of the KK Project Lot 2 facilities, e.g., camp and batching plant. Lot 2 Contractors' Camp on the Didveli plateau extracts water from the Aragvi river. Permits are in place for this activity and the Contractor will be required to implement mitigation measures outlined in the KK Project's EIA.

Screening Questions	Yes	No	Remarks
<ul style="list-style-type: none"> increased local air pollution due to rock crushing, cutting and filling works, and chemicals from asphalt processing? 	X		Anticipated during construction but temporary, site-specific and can be mitigated. The project may result in local air pollution and dust emission due to earthworks and batching plant operations. The Contractor will be required to update the KK Project's Air Quality Management Plan to ensure that air pollution control measures are in place in the ARP area.
<ul style="list-style-type: none"> risks and vulnerabilities related to occupational health and safety due to physical, chemical, biological, and radiological hazards during project construction and operation? 	X		Anticipated during construction but temporary, site-specific and can be mitigated. Construction activities may have occupational health and safety impacts if not properly managed. The Contractor will be required to update the KK Project's Occupational Health and Safety Management Plan to ensure that mitigation measures are in place in the ARP area.
<ul style="list-style-type: none"> noise and vibration due to blasting and other civil works? 	X		Anticipated during construction but temporary, site-specific and can be mitigated. Nuisance or disturbance due to noise and vibration may be experienced during construction but can be minimized with mitigation measures specified in the EMP. Scheduling of works and prior information with the affected people will be conducted. In addition, noise barriers will be installed as necessary. Based on preliminary assessment, there will be no blasting works needed .
<ul style="list-style-type: none"> dislocation or involuntary resettlement of people? 	X		Not anticipated No physical resettlement or dislocation is envisaged.
<ul style="list-style-type: none"> dislocation and compulsory resettlement of people living in right-of-way? 	X		Not anticipated no physical resettlement or dislocation is envisaged.
<ul style="list-style-type: none"> disproportionate impacts on the poor, women and children, Indigenous Peoples, or other vulnerable groups? 		X	Not anticipated. Based on preliminary assessment, there will be no disproportionate impact on vulnerable groups by the project. Entitlements to vulnerable people will be included in the LARP as needed. There are no indigenous peoples found in the project area.
<ul style="list-style-type: none"> other social concerns relating to inconveniences in living conditions in the project areas that may trigger cases of upper respiratory problems and stress? 	X		Anticipated during construction but temporary, site-specific and can be mitigated. Vehicle movements during construction may result in dust generation. The Contractor will be required to update the KK Project's Air Quality Management Plan to ensure that dust control measures are in place in the ARP area.
<ul style="list-style-type: none"> hazardous driving conditions where construction interferes with pre-existing roads? 	X		Anticipated during construction but temporary, site-specific and can be mitigated. During the construction phase, the Project will be adding a mix of light, and heavy and slow-moving vehicles onto the road network (vehicles transporting workers, trucks carrying heavy equipment between work areas and haul trucks moving spoil). This may result in increased risk of collisions and road transport accidents and harm to animals, local shepherds, and communities. The Contractor will be required to update the KK Project's Traffic Management Plan to ensure that mitigation measures for the ARP area are included.
<ul style="list-style-type: none"> poor sanitation and solid waste disposal in construction camps and work sites, and possible transmission of communicable diseases (such as STI's and HIV/AIDS) from workers to local populations? 	X		Anticipated during construction but temporary, site-specific and can be mitigated. The Contractor will be required to implement the mitigation measures outlined in the KK Project's Waste Management Plan, which will also be applicable to the ARP, including provision of adequate sanitary facilities and waste bins in the construction camp and project sites. The Contractor will also be required to provide workers with awareness trainings on communicable diseases such as STIs and HIV/AIDS.
<ul style="list-style-type: none"> creation of temporary breeding habitats for diseases such as those transmitted by mosquitoes and rodents? 		X	Not anticipated.

Screening Questions	Yes	No	Remarks
<ul style="list-style-type: none"> accident risks associated with increased vehicular traffic, leading to accidental spills of toxic materials? 	X		Anticipated during construction but temporary, site-specific and can be mitigated. Construction vehicles will use the existing roads to transport materials. This may result in increased risk of collisions and accidental spills of oils, fuels, and other hazardous liquids used during project works. The Contractor will be required to properly cover these materials during transport and store them only in designated areas.
<ul style="list-style-type: none"> increased noise and air pollution resulting from traffic volume? 	X		Anticipated during construction but temporary, site-specific and can be mitigated. Vehicle movements during construction may result in dust generation and increased noise levels, but impacts can be minimized with mitigation measures specified in the EMP. Scheduling of works and prior information with the affected people will be conducted. In addition, noise barriers will be installed as necessary.
<ul style="list-style-type: none"> increased risk of water pollution from oil, grease and fuel spills, and other materials from vehicles using the road? 	X		Anticipated during construction but temporary, site-specific and can be mitigated. Construction vehicles will use the existing roads to transport materials. This may result in accidental spills of oils, fuels, and other hazardous liquids used during project works. The Contractor will be required to properly cover these materials during transport and store them only in designated areas to minimize impacts to groundwater.
<ul style="list-style-type: none"> social conflicts if workers from other regions or countries are hired? 		X	Not anticipated. The ARP will be constructed by the KK Project Lot 2 contractor and his existing staff, who are already on site. It is possible the Contractor may require additional staff, but numbers are likely to be relatively small and therefore the impacts are of low significance.
<ul style="list-style-type: none"> large population influx during project construction and operation that causes increased burden on social infrastructure and services (such as water supply and sanitation systems)? 		X	Not anticipated. The ARP will be constructed by the KK Project Lot 2 contractor and his existing staff, who are already on site. It is possible the Contractor may require additional staff, but numbers are likely to be relatively small and therefore the impacts are of low significance.
<ul style="list-style-type: none"> risks to community health and safety due to the transport, storage, and use and/or disposal of materials such as explosives, fuel and other chemicals during construction and operation? 	X		Anticipated during construction but temporary, site-specific and can be mitigated. The Contractor will be required to implement control measures for the transport, storage, use and disposal of hazardous wastes and materials.
<ul style="list-style-type: none"> community safety risks due to both accidental and natural causes, especially where the structural elements or components of the project are accessible to members of the affected community or where their failure could result in injury to the community throughout project construction, operation and decommissioning. 	X		Anticipated but temporary, site-specific and can be mitigated. Community health and safety risks are present during construction due to earthworks, excavations, equipment operations and vehicle movements. The Contractor will be required to implement the mitigation measures outlined in the KK Project's Community Health and Safety Plan, which will also be applicable to the ARP, including clear demarcation of worksites to reduce the potential for accidents involving the local community.

Appendix H – Vibration Model

https://drive.google.com/file/d/1AWleXni5m_LQgt6GZ7p2LXDnbAD-qYyq/view?usp=drive_link