Technical Assistance Consultant's Report

Project Number: 48414-001/TA 8950-UZB
February 2020

Uzbekistan: Third CAREC Corridor Road Investment Program
(Financed by the Technical Assistance Special Fund)

Biodiversity Action Plan (BAP)

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For Government of Uzbekistan
Committee for Roads

Asian Development Bank

Biodiversity Action Plan

UZB: Central Asia Regional Economic Cooperation (CAREC) Corridor 2 Road Investment Program – Karakalpakstan Road Project (A380 Kungrad to Daut-Ata Section – 240 km)

February 2020

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This Biodiversity Action Plan presents the Project's strategy for alignment with the ADB SPS in managing risks associated with the priority biodiversity features identified in the EIA.

The project is located within one of the largest arid zones in Central Asia, the 200,000km^2 Ustyurt Plateau. The Ustyurt plateau is a semi-arid raised plateau surrounded by chinks (extensive cliffs or escarpments), and bounded by the Caspian lowland in the north, the Aral Sea in the northeast, the Mangyshlak Peninsula in the west, and the Karakum and Kyzylkum deserts in the south.

Biodiversity screening for the project (Chapter D, Section 2, of the EIA) identified 343 species and ecosystems as potentially occurring in the project area of influence (AoI).

Table 1 : Threatened species in the project area

Status	Mammals	Birds	Reptiles	Plants	Total
Total potentially occurring in project AoI	65	242	27	9	343
IUCN Critically Endangered (CR)	1	1	0	0	2
IUCN Endangered (EN)	0	5	0	0	5
IUCN Vulnerable (VU)	3	8	1	0	11
Uzbekistan Red Data Book: Critically Endangered (CR) or Endangered (EN)	6	3	0	0	9

This included a number of threatened mammals, birds and reptiles, including two CR species, five EN, eleven VU, and nine listed by the Uzbekistan Red Data Book (UzRDB)[1]. Species included the IUCN listed, critically endangered, Saiga antelope and Sociable Lapwing, and the IUCN listed, endangered, Steppe Eagle, Saker Falcon, Pallas Fish-eagle and Egyptian Vulture.

As the only Critical Habitat feature, this BAP focuses on the Saiga antelope, however mitigation is proposed in the EIA to ensure No Net Loss (NNL) for all threatened species in the project area. The main Natural Habitat feature of higher biodiversity value in the vicinity of the project area is a 5km by 1km *Haloxylon* forest (*Black Saxual*), which is located to the north-east, between km95 and km99, of the project road, some 10km north of the town of Jaslik.

The most significant risks and impact to Saiga antelope from the road will be as a result of injury or mortality from vehicular collision, induced poaching from the improved accessibility the road will bring, increased habitat fragmentation of their traditional migration corridor, and induced human development in the area (Table 10 for full impact assessment). No clearance of *Haloxylon* forest is planned for construction, however risks will come from human disturbance, either by workers or road users, and mitigation is proposed in the Natural Habitat Action Plan in Table 11.

[1] It is understood that the Uzbekistan Red Data Book was not completed in conjunction with the International Union for the Conservation of Nature (IUCN)

A package of mitigation measures have been proposed (Table 13: Saiga Action Plan), in line with the mitigation hierarchy, to manage direct risks to the Saiga antelope, including a traffic management system that will include traffic calming measures and enforcement by the local police force. Additional measures have been proposed that will see the project support the Saigachy Reserve, home to the closest known population of Saiga to the road. Phase 1 will see the development of a Management Plan for the Reserve, whilst Phase 2 will include implementation of measures outlined in the Plan, including creation of a watering hole(s) and resourcing of anti-poaching measures.

Support to the Saigachy Reserve will have multiple benefits. By incentivising the Saiga to remain in the Reserve, and away from the road, the risks relating to vehicular collisions and disturbance will be reduced. Creation of a watering hole will need to be carefully managed so not to create a focal point for hunters, so anti-poaching measures will be designed to target the Reserve as a whole and the watering holes, which with careful planning and implementation can support reducing the risk of induced poaching. Poaching constitutes one of the biggest threats to Saiga conservation so project support to the reserve in anti-poaching capacity will also support wider anti-poaching efforts.

Finally resourcing the monitoring capabilities of the Reserve will support the long-term conservation of the Saiga antelope and other species present in the Reserve.

The mitigation measures included in this BAP, and the EIA, will ensure the project is compatible with the Asian Development Bank Safeguards Policy Statement (2009) requirements and so that it results in no net loss of priority biodiversity found in the project area, with support to the Saigachy Reserve contributing to net gain for the critically endangered Saiga antelope. Additional mitigation is provided in the EIA to mitigate all risks and impacts associated with the project on threatened species present in the project area.

This BAP includes measures for additional conservation actions. The impacts of the road can be mitigated, and conservation of the Saiga supported, by supporting the management and the resources of the Saigachy Reserve. This has the potential to incentivise the Saiga antelope to remain in the reserve, and away from the road. Supporting a Management Plan that will include the creation of a watering hole and resourcing anti-poaching capacity will mitigate the serious risks of induced poaching due to improved accessibility, vehicular collisions, and habitat fragmentation.

Support to the Saigachy Reserve will be provided through a Phase 1 of financial support (Q2 2020) for the development of a Management Plan (MP). MP development will need to initially completed in conjunction with the Goscomecology of Uzbekistan and the Goscomecology of Karakalpakstan in Tashkent. The MP is to include the mid and long-term activities (>5 years) to be undertaken as part of Phase 2 of financial support (Q4 2020) – these are detailed in Section 6.

As discussed, the Saiga antelope is critically endangered and one of the most significant barriers to conservation of the Ustyurt Saiga antelope population is linear infrastructure, specifically the Kazakh – Uzbek border fence and the Shalkar – Beyneu railway in Kazakhstan. Habitat fragmentation from linear infrastructure has isolated two groups of the Ustyurt Saiga and has

contributed significantly to numbers of the species south of the border fence to reduce dramatically.

ADB and the project are well-placed to generate significant conservation gains for the Ustyurt Saiga population by using their leverage to catalyse further cooperation between the Governments of Uzbekistan and Kazakhstan, building on existing initiatives, to improve the permeability of the linear infrastructure discussed. Considering the terrible condition of the Saiga antelope in Uzbekistan, efforts will be under-taken by ADB immediately to work with the CAREC programme in inserting mitigation to the Shalkar – Beyneu railway.

With the implementation of the activities in the Management Plan (Phase 2) will come an extended monitoring programme in the Saigachy Reserve. Resourcing of monitoring will significantly improve understanding of the population numbers and needs of species found in the Reserve and will be amalgamated into ongoing regional conservation efforts by the Institute for Natural Resources, University of Nukus.

Monitoring of the efficacy of the Reserve's Management Plan will be conducted annually and an adaptive management approach will be applied to assess if resourcing efforts for Management Plan activities, and approaches to monitoring themselves, need to be re-directed.

1 Introduction

1.1 Purpose of this Document

This document is a draft Biodiversity Action Plan (BAP) for the rehabilitation and upgrade of a 240km section of the A380 road running from Kungrad to Daut Ata (Kazakhstan border crossing point), in the Republic of Karakalpakstan (hereafter "the Project"). An Environmental Impact Assessment (EIA) for the Project was completed in 2019 (hereafter referred to as "the EIA").

The Project is being financed by the Asian Development Bank (ADB) and will be delivered through the ADB's Central Asia Regional Economic Cooperation (CAREC) programme. The proposed project is classified as a category A for environment based on the ADB Safeguards Policy Statement (2009) (SPS). The ADB SPS requires projects in Natural Habitat to design mitigation measures to achieve at least no net loss of biodiversity. It requires projects in Critical Habitat to demonstrate '*no measurable adverse impacts, or likelihood of such, on the critical habitat which could impair its high biodiversity value or the ability to function*', no '*reduction in the population of any recognized endangered or critically endangered species or a loss in area of the habitat concerned such that the persistence of a viable and representative host ecosystem be compromised*', and mitigation of any lesser impacts.

This BAP therefore presents the Project's strategy for alignment with the ADB SPS in managing risks associated with the priority biodiversity features identified in the EIA and Critical Habitat Assessment.

The Critical Habitat Assessment (Appendix E) and EIA concluded that the project area is potentially Critical Habitat for the Saiga antelope (*Saiga tatarica*). Priority Natural Habitat identified is an area of *Haloxylon* forest (5km by 1km, in size) in close proximity to the road. See Section 3.2 for a full characterisation of priority biodiversity features found in the project area.

This BAP therefore predominantly focuses on measures for the project to manage the risks and impacts to Saiga antelope and the Haloxylon forest, and details appropriate mitigation in accordance with the mitigation hierarchy. It also includes an action plan for implementation of the measures outlined, and a long-term monitoring plan. This BAP is written to avoid duplication of information from accompanying sources wherever possible.

1.2 Project Overview

The Government of Uzbekistan intends to rehabilitate and upgrade a 240km section of the existing 1,204km A380 road in the north-western region of Uzbekistan. The upgrades will be between Kungrad (km 964) and Daut-Ata (km 1,204) and will terminate at the border crossing point between Uzbekistan and Kazakhstan (Daut Ata). The project will be overseen by the Ministry of Investments and Foreign Trade, and the Ministry of Finance. The executing agency will be the Committee for Roads under the Ministry of Transport.

Of the total 240 km project upgrade, 61.5km or 25% will follow the existing A380 alignment while the remaining 178.5 km (75%), will be realigned new road that will replace a now abandoned adjacent road. There will be 3.5km of alignment that will connect the A380 to the abandoned road,

and where there is no road at all, this happens twice, from km9.5 to km12, and from km218 to km219.

The proposed rehabilitation and upgrading involves civil works for the upgrading of the Project road from 2-lane without paved shoulders to a wider, 2-lane road (2 x 3.75m) with 3.75m shoulder (0.75m paved and 3.00m unpaved). Either the existing right of way (RoW) or land allocated to the road project by resolution of the Khokim of Kungrad district will be used. Works will also involve upgrading of the project road to cement concrete pavement; and replacement/new construction of culverts. The road will include the design of the embankment slope ratio of 1:4.

Street lighting will be provided at the railway level crossing (km86), the police control point (km 220) and in front of the Daut Ata border crossing point. 40 pipe culverts are proposed, all 1.25m in diameter. On both sides of the culverts, will be run off for 40m, with 20 x 20m collecting basis at either end. The general design speed for the road is 100km/h; and design also includes road safety features: road signs and indicators, traffic markings, traffic lights, fences, signal posts, and bus stops.

1.3 Key Information Gaps

Final locations for a number of key project components are currently unclear. While exact locations for twenty seven borrow pits are determined, for the additional fifty borrow pits that are estimated to be required for the embankment fill, locations are not clearly specified, and temporary facilities required for construction (e.g. construction camps, storage facilities) are to be located by the contractors, who are yet to be confirmed.

Assumptions have been made where this information is missing. For example, the EIA estimates a total of 8,691,434m^3 required in soil for the embankment fill for the road. To ensure a precautionary approach it has been assumed that all of this estimate will be used by the project and will come from areas of Natural Habitat. The Environmental Specialist for the project will be required to quantify all exact losses throughout construction.

Contractors will be contractually required to place temporary construction facilities such as camps and storage areas in Modified Habitat or near-by towns, Jaslik and Karakalpakiya.

1.4 Impact Methodology

Ecological impacts have been assessed based on an evaluation of consequence and likelihood[2]. For this purpose “consequence” was taken to mean “how impacts alter the viability of a biodiversity feature”, which itself is a function of its “irreplaceability” (i.e. number of sites or geographic extent where the value is present) and “vulnerability” (which relates to the impact and likelihood of existing and future threats). Highly irreplaceable biodiversity values occur only at a

[2] See Hardner, J., R.E. Gullison, S. Anstee, M. Meyer. 2015. Good Practices for Biodiversity Inclusive Impact Assessment and Management Planning. Prepared for the Multilateral Financing Institutions Biodiversity Working Group https://publications.iadb.org/en/good-practices-biodiversity-inclusive-impact-assessment-and-management-planning

few sites. Vulnerable biodiversity values include those that have experienced rapid loss over recent history and/or are faced by current threats that could lead to rapid loss."

Vulnerability – and to some extent irreplaceability – are also reflected in the IUCN's conservation status which uses the categories of Least Concern (LC), Near Threatened (NT), Vulnerable (VU), Endangered (EN), Critically Endangered (CR), Extinct in the Wild (EW), and Extinct).

Table 2: Definitions of impact consequence based on IUCN conservation status assessment methodology

Consequence	Description
Minor	No net loss in biodiversity value, regardless of conservation status
Moderate	Net loss in value with status of LC, NT or VU
Serious	Net loss in value with status of EN, or status of a value changes to EN to project impacts
Extreme	Net loss in value with a status of CR, or status of a value changes to CR due to project impacts
Catastrophic	Status of value changes to EW (species) or CO (ecosystem) due to project impacts

Likelihood was determined based on probability of occurrence and expressed as follows:

Table 3: Definition of Likelihood

Almost certain:	expected to occur in the project
Likely:	probably will occur in the project
Possible:	might occur in some circumstances
Unlikely:	may occur at some time
Rare:	Will only occur in exceptional circumstances

These two sets of parameters can be incorporated into a multicriteria matrix as shown in the following Table.

Table 4: Risk matrix for biodiversity impact assessment

Likelihood	Consequence				
	Minor impact	Moderate impact	Serious Impact	Extreme Impact	Catastrophic impact
Almost certain: expected to occur in project	M	H	C	C	C
Likely: probably will occur in project	M	H	H	C	C
Possible: might occur in some circumstances	L	M	H	C	C
Unlikely: may occur at some time	L	L	M	H	C

Likelihood	Consequence				
	Minor impact	Moderate impact	Serious Impact	Extreme Impact	Catastrophic impact
Rarely: only in exceptional circumstances	L	L	M	H	H

Risk Ratings: L: Low; M: Moderate; H: High; C: Catastrophic

1.5 Application of the Mitigation Hierarchy

In accordance with the ADB SPS, projects should not convert or degrade **Natural Habitat** unless: (i) there are no technically and financially feasible alternatives; (ii) a comprehensive analysis demonstrates that the overall benefits from the project will substantially outweigh the project cots, including environmental costs; and (iii) any conversion or degradation is appropriately reduced or mitigated. Mitigation measures should be designed to achieve no net loss of biodiversity.

Additionally, no project activity is permitted in areas of **Critical Habitat** unless: (i) there are no measurable adverse impacts, or likelihood of such, on the critical habitat that could impair its high biodiversity value or ability to function; (ii) the project is not anticipated to lead to a reduction in the population of any recognized endangered or critically endangered species, or a loss in the area of the habitat concerned such that the persistence of a viable and representative host ecosystem will be compromised; and (iii) any lesser impacts are mitigated to achieve at least no net loss of biodiversity.

The project should minimise any further conversion or degradation of **Modified Habitat** that contains significant biodiversity values where this is technically and financially feasible and cost-effective, and depending on the nature and scale of the project, will identify opportunities to enhance habitat and protect and conserve biodiversity as part of the project activities.

Therefore, mitigation measures for the project have been designed to achieve no net loss of biodiversity, and where possible to achieve net gain, and in accordance with the ADB *Environmental Safeguards: Good Practice Sourcebook (2012)* and the mitigation hierarchy, summarised as follows:

Table 5: Applied Mitigation Hierarchy

Avoid	Minimise	Restore	Offset

As a matter of priority, the client should seek to avoid impacts on biodiversity and ecosystem services.	When avoidance of impacts is not possible, measures to minimise impacts to biodiversity and ecosystem services should be implemented	When avoidance and minimisation of impacts is not possible, measures to restore biodiversity and ecosystem services should be implemented	Biodiversity offsets may be considered only after appropriate avoidance, minimisation and restoration measures have been applied. Biodiversity offsets should be designed to achieve no net loss or a net gain where the affected habitat is natural or modified

2 Biodiversity

2.1 Context

The project is located within one of the largest arid / semi-arid zones in Central Asia, the 200,000km^2 Ustyurt Plateau. The Ustyurt plateau is a raised plateau surrounded by chinks (extensive cliffs or escarpments), and bounded by the Caspian lowland in the north, the Aral Sea in the northeast, the Mangyshlak Peninsula in the west, and the Karakum and Kyzylkum deserts in the south.

The main landscape of the plateau is clay desert with a wavy relief although it also has numerous endorheic basins[3], dry lakes, salt lakes, and takirs[4] or sand islands. Prominent components include the Assake-Audan depression (~30m above sea level (asl)); the Churuk Depression-and giant Barsakelmes salt-lake, the Agiyik salt marsh, and the Sam, Karticom, and Matai-Kum sands. The central part of Ustyurt is also crossed from the northwest to the southeast by Karabaur Ridge (~300m asl). The average height of the plateau is some 230m above mean sea level, although its distinctive cliffs rise to more than 150m above this.

The project road will be located at a considerable distance from these more striking features, and runs across a large area of flat, generally undifferentiated semi-arid desert.

Starting at its southern end the road passes through the typical clayey gravelly desert landscape of the Ustyurt plateau with occasional areas of salt pan and sandy desert. There are no permanent streams here, although temporary freshwater lakes may form on the clay soils after rain. Much of the route passes through similar desert habitat to the southern end (mostly sandy plain), although the semi-arid desert habitat has been adversely affected by human development. Habitat quality generally improves along the road towards the Kazakh border.

2.2 Priority Biodiversity

In general, ecological conditions on the Ustyurt plateau have deteriorated in recent decades with the drying of the Aral Sea, the development of the oil and gas industry (including numerous access roads for the wells), and informal roads. As a result, an increasing amount of the traditional Natural Habitat is now considered at least modified to some extent and, generally, the project road affects such areas (Section 3.3).

Biodiversity screening for the project (Chapter D, Section 2, of the EIA) identified 343 species and ecosystems as potentially occurring in the project area of influence (AoI).

Table 6: Threatened species in the project area

Status	Mammals	Birds	Reptiles	Plants	Total
Total potentially occurring in project AoI	65	242	27	9	343
IUCN Critically Endangered (CR)	1	1	0	0	2

[3] Inland drainage basins where water flows to inland terminal locations where it eventually evaporates or seeps into the ground, having no access to discharge into the sea.

[4] In Kazakh means smooth, even, or bare

Status	Mammals	Birds	Reptiles	Plants	Total
IUCN Endangered (EN)	0	5	0	0	5
IUCN Vulnerable (VU)	3	8	1	0	11
Uzbekistan Red Data Book: Critically Endangered (CR) or Endangered (EN)	6	3	0	0	9

This included a number of threatened mammals, birds and reptiles, including two CR species, five EN, eleven VU, and nine listed by the Uzbekistan Red Data Book (UzRDB)[5]. Species included the IUCN listed, critically endangered Saiga antelope and Sociable Lapwing, and the IUCN listed, endangered Steppe Eagle, Saker Falcon, Pallas Fish-eagle and Egyptian Vulture.

As the only Critical Habitat feature, this BAP focuses on the Saiga antelope, however mitigation is proposed in the EIA to ensure No Net Loss (NNL) for all threatened species in the project area.

The main Natural Habitat feature of higher biodiversity value in the vicinity of the project area is a 5km by 1km *Haloxylon* forest (*Black Saxual*), which is located on the northeast side, between km95 and km99, of the project road, some 10km north of the town of Jaslik. This is considered by national experts an important habitat locally for conservation and ecosystem services (e.g. grazing, firewood), and is also used for autumn and winter grazing being a valuable fodder plant. Herbaceous species can flourish under closed *Haloxylon* canopies, and *Haloxylon* forests can produce substantial amounts of edible biomass. It is reported to occasionally support nesting birds, including raptors. The road at no point passes directly through the *Haloxylon* forest.

A full Critical Habitat Assessment (EIA Appendix E) identified the project area likely to be Critical Habitat for the Saiga antelope (*Saiga tatarica*). This assessment is precautionary in nature and considers the Saiga currently in Kazakhstan unable to move south beyond the Shalkar – Beyneu railway, as having likely potential to be impacted by the project should existing barriers to migration be mitigated. This is discussed in greater detail across the remainder of this BAP.

Saiga antelope
The Ustyurt Saiga antelope's traditional migration corridor is currently being impeded by human development in the form linear infrastructure, namely the 215km Uzbek – Kazakh border fence, running NE-SW (which has had gaps integrated into it to mitigate impacts to Saiga and other terrestrial species ability to cross it), and the Shalkar – Beyneu railway, north of the border fence, which experiences high volumes of rail traffic and is proving to be a near total barrier to Saiga passing across it. This has resulted in two isolated sub-populations on either side. Recent estimations suggest the Ustyurt Saiga population is currently ~5,900 in number, with the Uzbek sub-population constituting a tiny fraction of that.

Efforts are currently underway to make the linear barriers impeding the Saiga antelope's migration corridor more permeable, this is covered further in Section 6: Additional Conservation Actions. Additionally, the Saiga is considered a resilient species capable of impressive population growth

[5] It is understood that the Uzbekistan Red Data Book was not completed in conjunction with the International Union for the Conservation of Nature (IUCN)

under natural conditions (although is susceptible to catastrophic mass die-offs)[6], and recent satellite tracking of all Saiga populations in Kazakhstan, including the Ustyurt Saiga, show Saiga numbers are recovering from the extreme lows seen earlier in the 21st Century.

Figure 1 below depicts the ecologically appropriate area of analysis (EcAoA) applied in the Critical Habitat assessment of the Saiga antelope. The grey area reflects the latest information available on current, and traditional, movements of the Ustyurt Saiga population. Recent satellite data shows the Kazakh herd stretching north, nearly parallel with the town Shalkar and as far south as the most recent attempted crossing of the road at Abadan. Satellite tracking data from 2006 to 2012 also shows Saiga recorded southwest of the project road (in red), which correlates with historic understanding of the species migration patterns. National experts from the Saiga Conservation Alliance and staff from the Saigachy Reserve[7] believe at present there to be no Saiga southwest of the road.

The 628,000 ha Saigachy Reserve is situated 22km from the project road at its closest point. The Reserve was gazetted in 1991 by the State Committee of Karakalpakstan primarily to help safeguard and restore the population of the Saiga antelope and their traditional calving places (although calving hasn't been recorded in the reserve in recent years). Originally designated as a temporary reserve for 10 years (renewed in 2001 and 2011), the reserve has since been re-designated and expanded and is now divided into six strictly protected zones and a buffer area. As a state reserve all activities other than monitoring and research are forbidden in the reserve. There are presently 13 people responsible for the management of Saigachy Reserve, constituting 10 rangers and three administrative staff. Resources of the reserve include four cars and a field base, and the rangers carry out daily monitoring for poachers and species identification.

Saiga antelope are difficult to observe in the wild in Uzbekistan. Consultation with the rangers from the Saigachy Reserve revealed that recent monitoring in the Reserve has recorded a single herd only of approximately 15 individuals. The assumption amongst the staff of the Reserve and experts from the Saiga Conservation Alliance is that at the time of writing this herd is the closest to the project road. However, due to the difficulty in observing this species in the wild in Uzbekistan it must be noted that it is possible the local population is higher than reported.

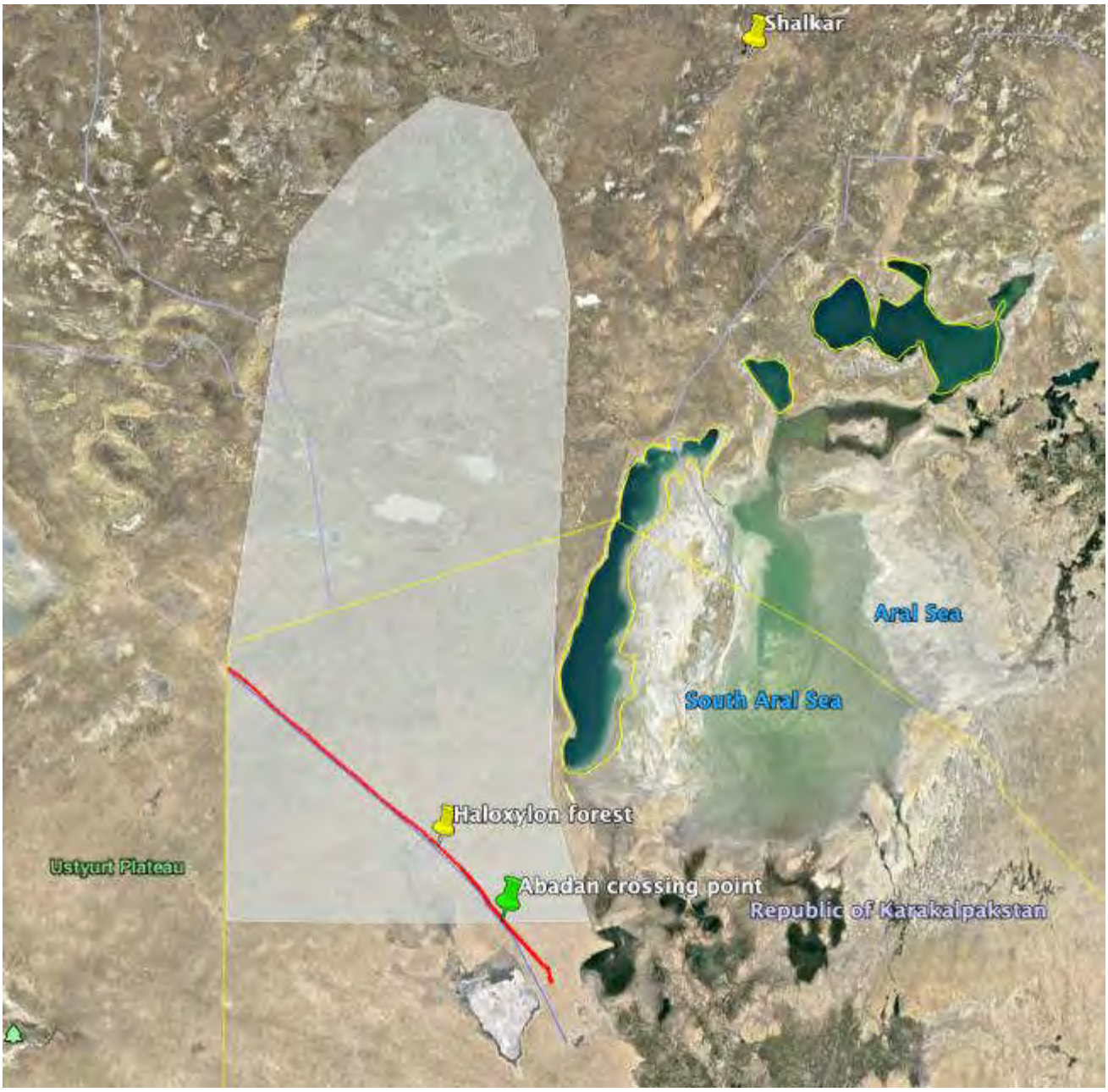
This in mind, it is assumed the closest population of Saiga antelope to the project road are the small herd in the Saigachy Reserve. The Critical Habitat Assessment concluded the project area as potential Critical Habitat for the Saiga antelope based on the known traditional migration corridor of the Ustyurt Saiga population and population projections for the future. In the short-term it is considered extremely unlikely the Saiga antelope will interact with the road (although still

[6] **IUCN, Saiga status justification**: Although the Saiga currently does not meet the Red List Criteria thresholds for Critically Endangered, the previous assessment of CR A2acd is retained in this assessment because this reassessment falls under the IUCN's five-year rule. This rule applies to taxa that appear to be genuinely improving in status, and states that "a taxon may be moved from a category of higher threat to a category of lower threat if and when none of the criteria of the higher category has been met for five years or more". The Saiga is considered to have crossed the thresholds between CR and EN around 2015, therefore its status will be re-evaluated again in 2020. Saiga currently meets the thresholds for Endangered under criterion A4 based on observed, estimated and projected declines of >50% over 11 years (three generations), commencing from May 2015, due to the risk of mass mortality events (MME) resulting from outbreaks of disease, exacerbated by climatic and environmental factors, and taking place alongside ongoing poaching pressure for the illegal trade in horns.

[7] Elena Bykova and Aleksandr Esipov, pers comms December 2019

possible). However, with on-going efforts to improve the permeability of the linear infrastructure currently impeding the species, and with population numbers of the Saiga antelope increasing across Kazakhstan, including the Ustyurt population, interaction with the road over the life-time of the project is considered likely, with potentially serious impacts.

Figure 1 : Critical Habitat for the Ustyurt Saiga antelope (project road in red)



3 Potential Impacts on Critical and Natural Habitat

3.1 Saiga Antelope Impact Overview

This section provides an overview of the direct, indirect and cumulative impacts identified in the ecological impact assessment to the Saiga antelope.

Construction Impacts

A range of ecological impacts will occur during construction works and will require mitigation as described in the sections below (habitat loss, potential for poaching etc.). Given Saiga antelope are very rare and not known to use the project area at the current time, and their sensitivity to disturbance, these animals are not expected to approach any construction works. Impacts on Saiga as a result of project construction are thus expected to be minimal and will be managed through GIIP so long as poaching by construction workers can be effectively prevented. Construction activities such as the RoW at alignment connecting points (km 9.5 – 12 and km 218 – 219), borrow pits and culverts, will all require vegetation clearance of Critical Habitat for the Saiga antelope – see Table 10, and Figure's 5 and 6, below for more on this.

Operational Impacts

Impacts associated with operations have the potential to be more significant and there are global concerns regarding the barrier effect of linear infrastructure on open plains ungulates (indeed this is considered a key priority in the Convention on the Conservation of Migratory Species - CMS). In Central Asia (including Mongolia) the number, intensity and use of large infrastructure projects (including railways, mining sites, pipelines, border fences, roads, etc.) has increased rapidly in recent years and has been found to impede the movement of large herbivores by preventing access to resources or by forcing animals to make large detours to gain access. They can also reduce the capacity of wildlife to escape droughts or harsh winters by moving to better areas, resulting in increased intra and inter-specific competition, poor body condition, poor recruitment, and high mortality (B. Lkhagvasuren et al., 2011)

Whilst the 1:4 embankment ratio means that the height of the proposed road is not considered a physical impediment to saiga crossing it (pers. comm., Saiga Conservation Alliance[8]), disturbance effects are considered a more material potential impact. The extremely small number of Ustyurt Saiga currently present in the wider area, and the fact that the road is replacing an existing road, means that in the short-term direct impacts to this species from the upgrade and rehabilitation are expected to be low.

However, in the longer term, and given the 30-year minimum design life of the project, there is the potential for associated risks of the road to become a severe issue should the current population recover, or traditional migration patterns be restored for example by impeding linear infrastructure (e.g. border fence, Shalkar – Beyneu railway) becoming more permeable. Indeed,

[8] Elena Bykova and Aleksandr Esipov, pers comms December 2019

using an average Saiga population growth rate of 27% (see accompanying Saiga Technical Note), even the small local population of 15 animals could grow to some 5,900 individuals over the project lifetime. A precautionary approach to impact assessment is therefore required.

The current average daily traffic count on the road is estimated at between 1,800 and 2,600 vehicles, with the vast majority through traffic heading to the Kazakh border. Cars account for more than half of existing traffic and cars and multi-axle trucks together comprise 87% of the total. There is approximately a 70:30 split in day / night driving, with risk of collision to ungulates such as Saiga antelope believed to be heightened at night.

The following traffic growth has been predicted in line with current levels of import/export growth and overall levels of local/national economic growth:

Table 7: Traffic Projection Growth Rates (%)[9]

Period	Traffic growth rate (%)		
	Car	Bus	Goods Vehicles
2018-2023	6.0	4.0	4.0
2023-2028	5.0	3.0	3.0
Beyond 2028	4.0	2.0	3.0

Table 8: Projected Traffic Count Day/Night

Vehicle Class	Speed, kph	2018			2023			2028		
		AADT	Peak Hour Traffic Daytime	Peak Hourly Traffic Nighttime	AADT	Peak Hour Traffic Daytime	Peak Hourly Traffic Nighttime	AADT	Peak Hour Traffic Daytime	Peak Hourly Traffic Nighttime
Auto	120	1339	75	32	1792	100	43	2287	128	55
Medium Truck	120	157	9	4	191	11	4	221	13	5
Heavy Truck	100	561	32	13	683	39	16	791	44	19
Buses	120	74	4	2	90	5	2	104	6	2
Motorcycle	80	54	3	1	72	4	2	92	5	2

Traffic growth rates are given as compound increases annually and have the potential to result in increasing risk of habitat fragmentation and Saiga mortality/disturbance over the 30 years of the project. Given the potential for the population of Saiga to increase dramatically over the same time period and should the linear infrastructure impediments be successfully made more permeable, a precautionary and adaptive management approach is proposed to support long-

[9] *Source: Draft Final Report for Karakalpakstan Road Project; ADB TA No. 8950-UZB PPTA for Third CAREC Corridor Road Investment Program, Phase 1*

term conservation of this critically endangered species. This will include long term monitoring and periodic re-assessment of impacts of the road, especially in the context of Saiga population numbers and with regards to the efficacy of mitigation measures outlined further below.

Induced impacts from operation of the road are also possible; increased accessibility as a result of the upgrade works to the road could potentially result in increased poaching of the Saiga and increased economic and human development. Economic hardship has been one of the drivers behind high levels of poaching of Saiga for their horns and meat, with male Saiga being targeted specifically for their horns. As well resulting in direct population decline, poaching specifically for males results in disproportions in the gender balance of Saiga herd dynamics that themselves result in additional population decline. Human development at different scales is also expected due to the improvements in road quality. Smaller scale infrastructure such as petrol stations and recreation areas are considered likely, whilst larger scale initiatives, such as further oil and gas development, is possible. These would likely have some fragmentation impact to the Saiga antelope.

Risks and impact from construction and operation are summarised in Table 9 below.

3.2 Saiga Antelope Impact Assessment

Table 9 below describes the impacts identified by the EIA to the critically endangered Saiga antelope.

Table 9: Saiga antelope impact assessment

Imp. Ref.	Factor	Project phase (o-Operation; C-Construction)	Impact	Sensitivity of receptor	Timeframe	Consequence	Probability	Significance
A.1	General Vegetation Clearance	C	The vast majority of vegetation clearance will be on already modified habitat. Approximately 3.5km (1.46%) of total road route alignment will be placed on habitat that hasn't already been disturbed in some way. Natural Habitat losses are also anticipated from the borrow pits required for soil and from the 40 culverts planned, with water run-off channels and balancing ponds on both sides of each culvert. **Approximately 310.98 ha of vegetation will be cleared for construction of the project (see Section 3.3 for breakdown).** As the road and associated facilities crosses the Saiga antelope's traditional migration corridor, this vegetation clearance will be in Critical Habitat for the Saiga antelope. The amount of vegetation lost is not anticipated to impair the habitat's ability to function, and, in the context of the contiguous habitat, the direct impact of vegetation lost through the project is considered minimal. All vegetation losses will be quantified by the Environmental Specialist and offset through restoration of semi-arid desert on the Ustyurt plateau to pre-project standards. Described further in Restoration Methodology, below.	Medium	M-T	Minor	Almost Certain	**M**

Imp. Ref.	Factor	Project phase (o-Operation; C-Construction)	Impact	Sensitivity of receptor	Timeframe	Consequence	Probability	Significance
A.2	Impacts from vehicle movements (including transport of people and equipment) to and from the construction site and use of machinery and equipment.	C, O	Disturbance to species including visual and noise disturbance. Dust production. Potential for off-road travel resulting in habitat degradation and species disturbance. Potential for **direct mortality** due to collision and machine/equipment use. Saiga antelope are known to be wary of any kind of human development and are anticipated to typically avoid project construction activities. Numbers in Uzbekistan are also extremely low at present, further reducing the likelihood of risks from vehicle movements during construction – although they are still possible. Thus, risks during construction are thought to be minor. Based on known Saiga population growth, and ongoing efforts to make existing habitat barriers more porous, it is not impossible for the small local population of 15 animals to be restored to 6000 or more individuals within the 30-year project timescale. Considering increased traffic volumes, traveling at greater speeds, the risk of vehicular collision during road crossing is considered potentially extreme, as the loss of any number of this critically endangered species would have a significant impact.	High	L-T	Extreme	Likely	**C**
A.3	Impacts from working compounds and camps	C	Construction camps are planned for all project lots during construction although final locations are to be selected by the Contractor. These can result in disturbance of fauna, degradation and pollution of habitats, and direct mortality through illegal hunting or trapping. Influx of a number of construction workers can have a significant effect. A number of species will also be at risk from attack from guard dogs used for security in and around ancillary facilities. The generation of food waste from construction camps is likely.	Medium	S-T	Minor	Unlikely	**L**

Imp. Ref.	Factor	Project phase (o-Operation; C-Construction)	Impact	Sensitivity of receptor	Timeframe	Consequence	Probability	Significance
			As discussed, Saiga antelope are known to be very wary of human activity and are most likely to avoid project construction sites and compounds. Saiga antelope, especially young Saiga, have suffered previously from attack by dogs. Degradation and pollution impact from construction working camps to Saiga Critical Habitat are possible but thought to be a Minor impact. Mitigation for these issues will mainly be managed through the application of GIIP.					
A.4	Habitat pollution; including deposition and runoff	C, O	Construction Dust can impact on vegetation and affect productivity. Pollution impacts can occur as a result of spills, e.g. during refuelling. During road operation, nitrogen deposition from vehicles, road-run off (including any de-icing salt) and dust may affect habitats and can create surface water films. Construction will take place on Critical Habitat for the Saiga antelope and dust and pollution could cause at least temporary degradation here. Although this has the potential to occur, associated residual impacts are not anticipated to be significant or widespread and will mainly be managed through the application of GIIP by contractors.	Low	S-T	Minor	Unlikely	**L**
A.5	Water bodies	C, O	Water bodies are planned for construction (water retention ponds) and operation (culverts with water collecting basins on either end). Waterbodies can attract birds and mammals which can increase the risk of **direct mortality** via vehicle collision and poaching from construction workers and road users. Road embankments and	Low	L-T	Serious	Rarely	**M**

Imp. Ref.	Factor	Project phase (o-Operation; C-Construction)	Impact	Sensitivity of receptor	Timeframe	Consequence	Probability	Significance
			drainage channels alongside can form road-side depressions which are likely over time to develop vegetation, which can attract grazers. Waterbodies can attract animals in the dry environment of the semi-arid desert which may be subject to threats from collisions, hunting or disturbance. Road run-off also may pollute waterbodies which could affect local species. Possible chance of Saiga being attracted to waterbodies to drink, and related vegetation to graze. Their sensitivity to human disturbance means they are unlikely to be drawn to these if humans are present or traffic volumes are significant. Although unlikely, this does present a risk from poaching or collision. Mitigation will be applied to avoid any unnecessary build-up of waterbodies from both construction and operation. Water collecting basins at the end of culverts will be 40 m from the road, removing the risk of vehicular collision. An Environmental Specialist will be present on site and an adaptive management approach will be put in place to monitor the severity of these impacts, supported by monitoring.					
A.6	Contractor Behaviour	C	Disturbance to local biodiversity and natural habitat from contractors and construction workers is a risk. Risks include hunting, disturbance of sensitive sites (e.g. nesting sites), and degradation of natural habitat (e.g. *Haloxylon* forest for firewood). Poaching is a significant issue for Saiga antelope in Uzbekistan and is a significant contributor to population decline. The closest known population in Uzbekistan of Saiga antelope is presently in the Saigachy	Low	S-T	Serious	Rarely	**M**

Imp. Ref.	Factor	Project phase (o-Operation; C-Construction)	Impact	Sensitivity of receptor	Timeframe	Consequence	Probability	Significance
			Reserve, some 22km from the road at its closest point. The likelihood of contractors coming into contact with Saiga antelope is extremely low. Hunting of threatened species by contractors is a more general risk for the project, and the impacts to Saiga will be managed through the general mitigation, including appropriate awareness raising, contractor codes of conduct and penalties for violation. General contractor disturbance is likely to keep Saiga away from construction sites anyway.					
A.7	Habitat fragmenta-tion	C, O	Currently on average 1,800 to 2,600 vehicles use the road per day. Traffic growth estimates as per Table 9 above. Improved road condition is predicted to increase traffic speeds to as much as 100 km/h. Increased road traffic, travelling at greater speed is likely to mean the road poses a more significant barrier to animals looking to cross, therefore causing increased isolation and fragmentation to Saiga antelope and other terrestrial species. Construction traffic is unlikely to have a major effect compared to the current situation. However, in the medium to long term, operational traffic increases will likely increase the difficulty for the Saiga crossing the road. Mitigation to road design at specified crossing points and the use of intelligent traffic management (e.g. warning signs, road markings, local law enforcement) will be used to manage these risks. An adaptive management approach will be applied to assess the effectiveness of the mitigation.	High	L-T	Extreme	Likely	**C**

Imp. Ref.	Factor	Project phase (O-Operation; C-Construction)	Impact	Sensitivity of receptor	Timeframe	Consequence	Probability	Significance
A.8	Increased disturbance/ mortality due to increased accessibility	O	The upgraded road should make access to the area easier, potentially resulting in increased disturbance, such as hunting, in the project AoI. Poaching has been a significant driver in population decline of the Saiga antelope. Increased poaching as a result of the upgraded road and improved access is a serious risk to the Saiga.	High	L-T	Extreme	Possible	C
A.9	Cumulative effects, such as increased infrastructure in the area due to better access.		Existing effects, such as risk of hunting, waste production and pollution may be exacerbated. Difficult to predict the long-term impact of cumulative impacts such as increased infrastructure. No current additional plans for infrastructure directly related to the project road. However, development, including that of the oil and gas industry, continues in the wider project area, and the development, for example, of road-side amenities (e.g. petrol stations, recreation areas) as a result of the improved road quality and increased road usage, is probable. Related impacts to the Saiga antelope could be considerable considering their sensitivity to human disturbance and their already vastly interrupted traditional migratory routes around the Ustyurt plateau. As discussed, any induced growth in poaching could also be extremely destructive for the species.	High	L-T	Extreme	Possible	C

3.3 Impacts to Natural Habitat Overview

The potential Critical Habitat of the Saiga antelope (Figure 1) covers the majority of the project AoI, meaning there is significant overlap in delineation of Critical Habitat and Natural Habitat for the project, and thus risks to Critical Habitat from the project will typically apply to Natural Habitat also.

Anthropogenic activity has resulted in general deterioration of ecological conditions on the Ustyurt plateau. In the vicinity of the project, and in-keeping with the wider landscape, the project AoI has been impacted, to one degree or another, by off-road driving, as shown in Figure 2, and is a complex mosaic of both Natural and Modified Habitat.

Figure 2: Project road and surrounding human disturbance (project road in blue)

Despite the modification from off-road driving and other anthropogenic activity, habitat found in the wider project area (characterised as semi-arid desert consisting of contiguous shrub) can in places still contain many of the principal characteristics and functions of the native habitat.

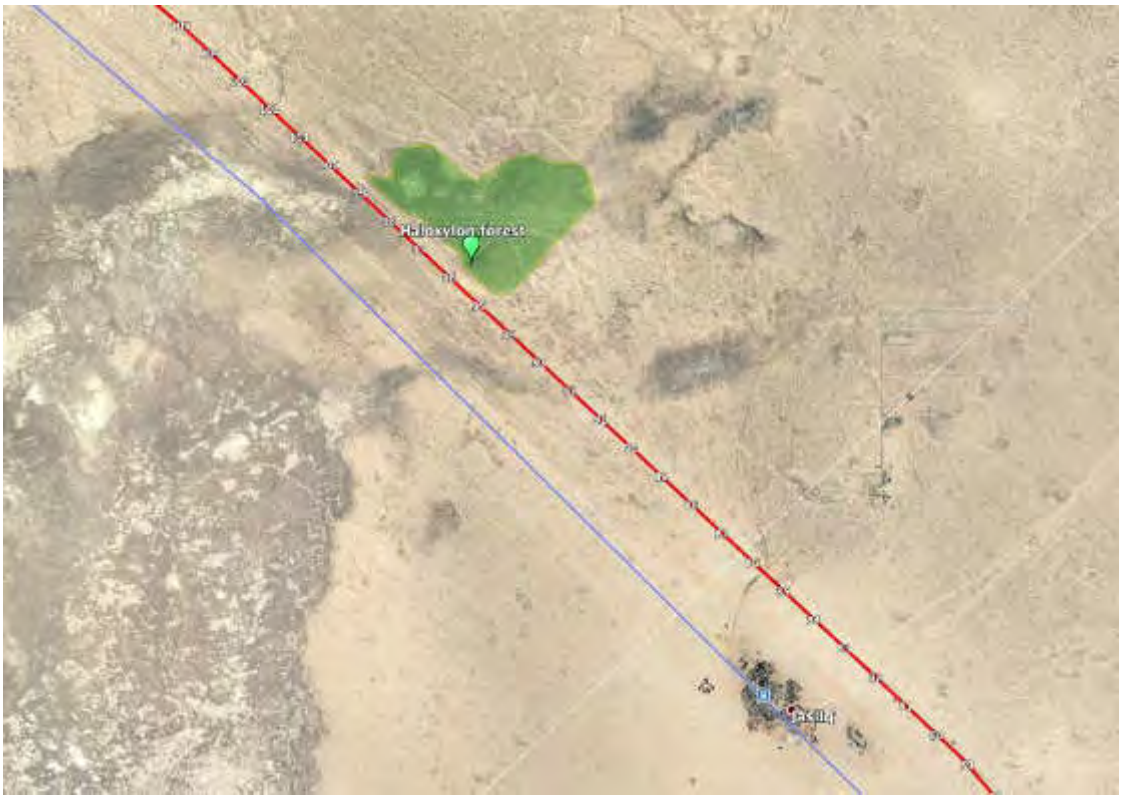
Therefore, we consider Modified Habitat present in the project AoI to consist only of the existing paved A380 and previously tarmacked abandoned road. The demarcated Modified Habitat of these roads includes a precautious RoW of 50m (25m either side) from construction which has caused severe degradation.

Natural Habitat is mapped in detail where known impacts from the project are expected. Where impacts to Natural Habitat are expected, but final locations are currently unknown, the Environmental Specialist will be required to map these areas in detail and these will be included in contractor management plans.

Figure 3: Typical contiguous shrub found in the project area and off-road

The area of *Haloxylon* forest, and its associated shrub lands, are considered the priority Natural Habitat feature of higher biodiversity value in the project AoI, capable of supporting a range of threatened species including nesting raptors and Caracal. Whilst the project route alignment passes close (some 250 – 300m) to the *Haloxylon* forest, it will not directly impact upon it, however indirect and induced impacts (e.g. human disturbance from workers and road users, clearance for firewood) will need to be managed. The *Haloxylon* forest is located from km 95 to km 99 on the right-hand side of the project road.

Figure 4: Mapping of Haloxylon forest



Appropriate mitigation will be designed in line with mitigation hierarchy for all impacts to Natural Habitat associated with the project, with special attention paid to all impacts to the *Haloxylon* forest. In line with the ADB requirements the project will be required to offset the vegetation losses required for project construction to ensure NNL of biodiversity, these vegetation losses will impact upon Natural and Critical Habitat.

Table 10: Estimated disturbance to Critical and Natural Habitat from project construction

New alignment connection points incl. RoW at widest point	**104,800m^2**
Borrow pits	**2,897,144m^2**
Culverts	**35,200m^2**
Temporary facilities (construction camps / storage facilities etc.	**Unknown**
Total	**3,109,844m^2 (310.98 ha)**

Losses of Natural Habitat are expected to result from the, approximately 1.5% (3.5km) of the project route alignment where the existing A380 and abandoned road are connected (connection points between: km9.5 – km12; and km218 – km219). Clearance and other impacts to Natural Habitat are anticipated to occur from the gathering of embankment fill from borrow pits, and from the construction of culverts and their associated water collection basins. Locations for temporary facilities for construction are to be finalized by the contractor, but final locations will be required

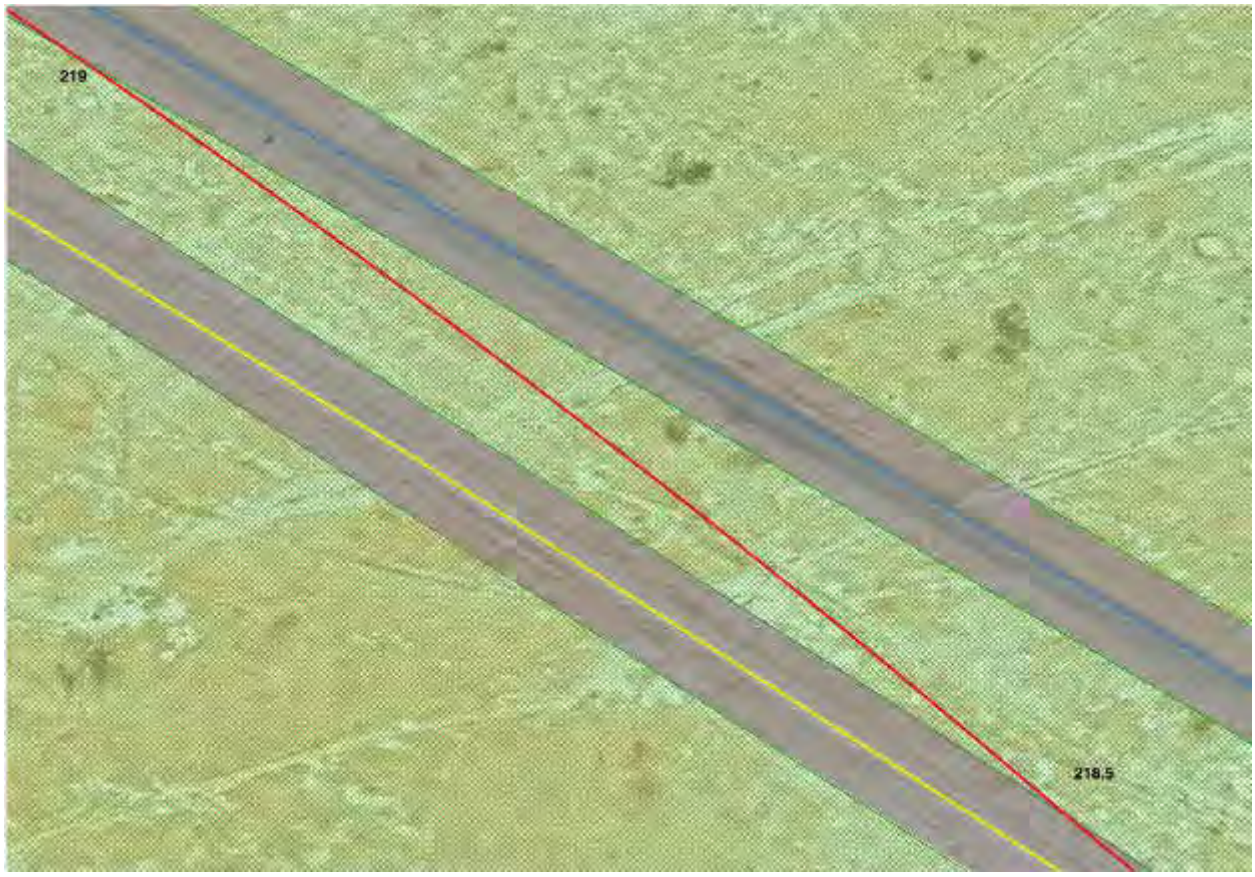
to be on already Modified Habitat. Further information on the estimates provided in Table 10 is provided in Chapter D, Section 2 of the EIA).

The Environmental Specialist for the project will be required to monitor and quantify total actual losses from all construction activities. These losses will be offset through habitat restoration as per the habitat restoration guidelines provided in Section 4.4.

Figure 5: Route alignment connecting point 1 - km 9.5 - 12

A380	
New project route alignment	
Abandoned road	
Modified Habitat	
Natural / Critical Habitat	

Figure 6: Route alignment connection point 2 - km 218 - 219



4 Action Plans

4.1 Saiga Mitigation Overview

Direct Mitigation of Impacts at Crossing Points

The current road embankments planned (1:4) are reported to be at a manageable slope for Saiga antelope crossing, although not having a full visual of the other side of the road may make Saiga nervous of attempting to cross - long term monitoring is proposed to confirm this. Research by Kirk A. Olsen, 2012[10], highlighted that embankments along most regional rail corridors are also not expected to be tall enough to physically alter Saiga movements, and recommended that some 66 at-grade Saiga crossings were to be designed for the Zhezkagan-Saksaulskiy railway and 20 between Shalkar-Beyneu (at the time of writing, it is unclear if these were included in the final design). These crossings were proposed to resemble a modified at-grade vehicle crossing at 50 meters wide with a 1:10 slope ratio.

To help avoid direct Saiga mortality from traffic accidents these same specifications (1:10 slope ratio for 50 m in length) are to be included in the project road design, and locations of these will be largely based on known historic Saiga crossing points (alongside appropriate traffic management systems). These historic Saiga crossing points have been identified along the A380, and are the most recent known attempted crossings by herds of significant numbers of Saiga antelope, at the following coordinate points:

Figure 7: Historical attempted Saiga crossing points

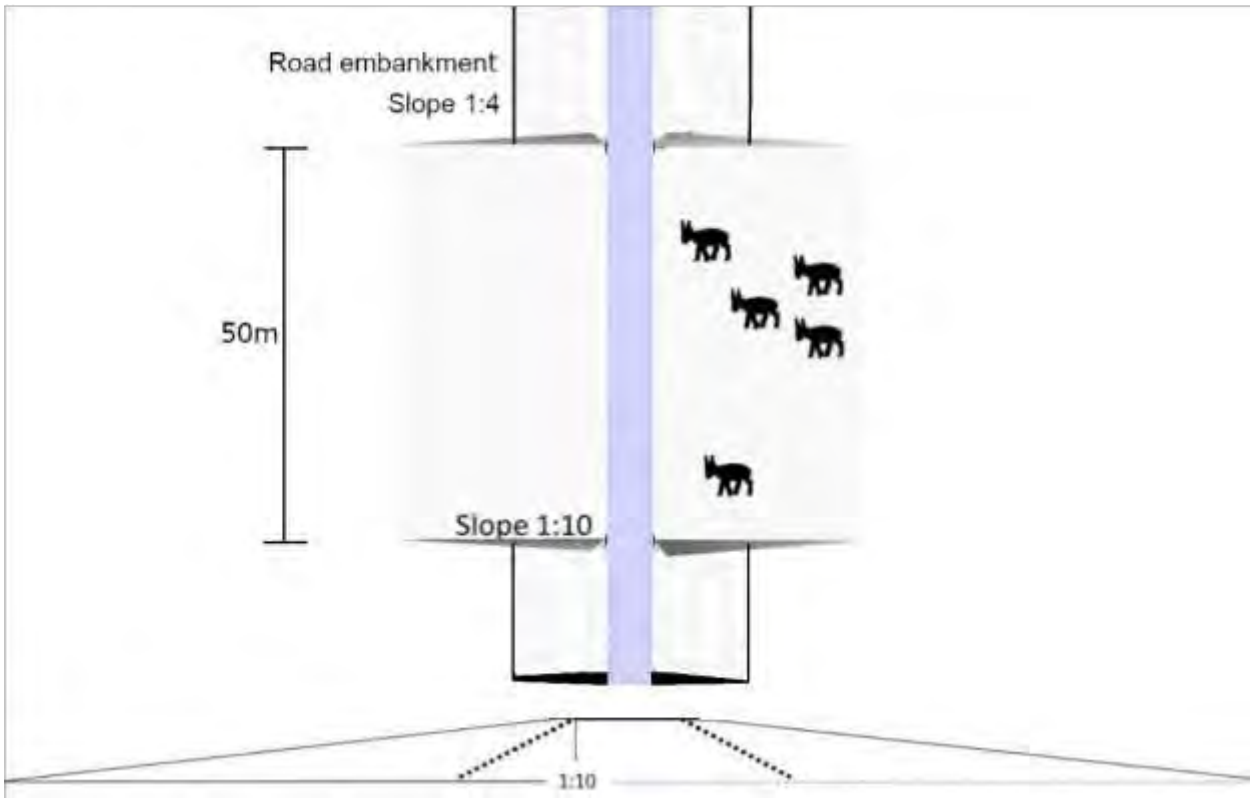
1. Abadan N 43 42': E 57 48'
2. Jaslyk N 43 58' E 57 30';
3. Bergakh N 44 18'; E 57 03'

Design for the project road will include **four Saiga crossing points**. An additional crossing point has been added further northwest along the road as consultations with national experts and satellite data show populations present in that area. Each of the four crossings will be 50m in

[10] 'Saiga Crossing Options', Kirk A. Olsen, 2012

length with an embankment slope ratio of 1:10[11]. Road height at these four points must be <1m tall to increase visibility to the other side of the road for the Saiga.

Figure 8: Saiga crossing cross-section



Although these four points have been selected based on the known historical crossing points, slight amendments to exact final locations have been made to two of the crossings based on recommendations during consultation with Saiga antelope experts, pers comms[12]. They are detailed as follows:

Table 11: Project road Saiga crossing points

Crossing Point	Co-ordinates	Notes
1. Abadan	N 43 42' : 57 48'	Most recent known attempted crossing point (2004). Project crossing point matches the attempted historical crossing co-ordinates.
2. Jasliq	N 44 05' : E 57 21'	The known attempted crossing point - N 43 58' E 57 30' - is in close proximity to the town Jasliq (Figure 7). To ensure the crossing point does not result in induced risks of human disturbance and poaching

[11] As the only CH-triggered species, mitigation in this BAP focuses on Saiga, however it is expected that the designated crossing points will also serve to improve other larger mammal species' in the area, such as Goitered gazelle and Caracal for example, ability to cross the road.

[12] Elena Bykova and Aleksandr Esipov (Saiga Conservation Alliance) and Dr. Joseph Bull (University of Kent), January 2020

		by channelling Saiga towards human settlement, the project road crossing point has been shifted some 15km northwest of the town to N 44 05' : E 57 21'
3. Bergakh	N 44 18' : E 56 59'	Project crossing point matches the attempted historical crossing co-ordinates.
4. Reserve	N 44 31' : E 56 38'	A fourth crossing point is to be included in the road design. This is because the closest known population of Saiga antelope are currently in the Saigachy Reserve and satellite tracking data (see Saiga Technical Note) also shows the species traditionally to be present in furthest northwest corners of Uzbekistan.

Figure 9: Project road Saiga crossing points

As well as the road design adjustments, a **traffic management system** will be installed that will include:

- Speed limits of 50km/h[13] in effect 100m either side, and inclusive of, the four 50m Saiga crossing points. To avoid sharp braking, the speed limit will reduce initially to 70km/h in a transition zone (50m in length) from the general speed limit of the project road of 100km/h.

- Road markings to inform drivers to slow down at the four crossing points

- Sporadic road signage along the motorway warning of random speed checks (considered to be more effective than wildlife-specific signage)

(Traffic lights are considered to be ineffective as it's thought likely due to the remote-ness of the project area drivers will not heed to them)

The traffic management system will be legally enforced by the **local police** through strict financial penalties (fines) given to drivers found not adhering to the traffic calming measures above. Capacity building and awareness raising will be provided to local regulators, such as traffic police, to improve their understanding of the issues at hand. Support from the local police authority is considered to be essential to the success of this mitigation measure.

Crossing of the road for other species will be facilitated by culverts along the road.

Mitigation of impacts to achieve NNL, and potentially net gain also, of the Saiga antelope will be done through support of the management of the Saigachy Reserve. Details on how this will be carried out can be found in Section 6: Additional Conservation Actions below.

An **adaptive management approach** will be undertaken to assess how effective mitigation is proving to be. Should there be even a single incident of collision with a Saiga antelope, adaptive management will be triggered - including immediate review by the executing agency of efficacy of the crossing points (completed alongside international E&S experts, the Saiga Conservation Alliance, and Saigachy Reserve) and traffic management system (to be completed alongside local police) described above.

Should the currently proposed mitigation be assessed to be ineffective, an intelligent traffic management system will be installed. The intelligent traffic management system will include any adaptations to the crossing points recommended as part of the aforementioned review. It will incorporate additional traffic calming measures that are triggered based on satellite tracking of Saiga movements. This will require the collaring of a number of individuals in order to GPS track the herd, and when a significant number (>10) of Saiga move in the direction of the road the additional traffic calming measures will be activated. Additional traffic calming measures to be considered as part of adaptive management include:

- Raiseable barriers at Saiga crossing points (similar to those seen as road – rail intersections) which will be operated by the local authorities. Direct control of individual

[13] We propose a speed limit of 50kph at all saiga crossing points. This known to reduce collisions risk for similar species, for example one study on Red Deer showed that a speed limit of 50kph reduced deer-vehicle collisions to almost zero. Drivers at this speed should have sufficient ability to stop if Saiga are trying to cross, and animals are much more likely to be able to avoid collisions with vehicles travelling at this speed. (Meisingset et al. 2014).

barriers will be available and can be closed off accordingly depending on exact Saiga movements

The intelligent traffic management system will be the responsibility of the Executing Agency and local police authorities.

Collaring can be challenging in small herds of ungulates, such as Saiga antelope, due to high die-off rates during collaring. In Kazakhstan, the ACBK have adapted a collaring methodology specifically for the Saiga antelope. Therefore, any collaring attempts for the project must be carried out in cooperation with the ACBK, Saiga Conservation Alliance and Saigachy Reserve.

Monitoring efforts for the project will be integrated with regional biodiversity monitoring and evaluation efforts at the Saigachy Reserve and Nukus University.

4.2 Saiga Action Plan

Table 12: Saiga Action Plan

Mit. Ref.	Imp. Ref.	Issue	Detailed action plan	Project phase	Mitigation hierarchy				Responsibility
					Avoid	Reduce	Restore	Offset	
B.1	A.1	Vegetation Clearance	• Areas for vegetation clearance will be clearly marked out. • Laydown areas and compounds will be sited to avoid unnecessary clearance of vegetation. • Existing tracks or natural gaps in vegetation will be used as preferred access routes where practical. • The workforce will adhere to working corridors. A vehicle management system will be introduced and geofences will be enforced at all construction sites. Construction vehicles will alert the driver when they are crossing a geofence boundary and a report will be generated for the PMU.	C					Contractor
B.2	A.1	Vegetation Clearance	• All vegetation losses to Natural / Critical Habitat will be quantified and offset, compensating (or where possible overcompensating) for habitat lost as a result of the project. Restoration will be overseen by the Environmental Specialist and will follow the methodology described in Section 4.3. This is to ensure no net loss to biodiversity.	C					Executing Agency
B.3	A.2	Impacts from vehicle movements	During construction, • Single vehicle track policies and use of low-impact vehicles will be applied where practical. • Off-road travel will be prohibited where practical. • Natural breaks in vegetation will be used as preferred access routes where possible.	C					Contractor

Mit. Ref.	Imp. Ref.	Issue	Detailed action plan	Project phase	Mitigation hierarchy				Responsibility
					Avoid	Reduce	Restore	Offset	
			• The workforce will adhere to working corridors. • All staff will be provided with environmental awareness training. • The workforce will not deviate from approved clearance areas. • Appropriate speed limits will be applied, and traffic will be restricted to existing and/or dedicated haul routes to reduce direct mortality and disturbance from vehicles during construction. Penalties for violation will apply.						
B.4	A.2	Impacts from vehicle movements	The following Actions will be completed in line with the specifications detailed in Section 4.1: • Four vehicle crossing points, 50 metres in width and with a 1:10 slope ratio, to maximise visibility to the other side of the road to incentivise the Saiga to cross. • Road markings to inform drivers to slow down at the four crossing points • Road signage along the motorway warning of random speed checks (considered to be more effective than wildlife-specific signage) • Speed limit of 50km/h stretching 100m either side, and inclusive of, the four 50m crossing points • The traffic management system will be legally enforced by the local police through financial penalties (fines) given to drivers found not adhering to the traffic calming measures above. Capacity building and awareness raising will be provided to local regulators, such as traffic police, to improve their understanding of the issues at hand.	O					Contractor; Executing Agency
B.5	A.3	Impacts from working compounds and camps	• Construction camps will be located away from demarcated sensitive areas, including Natural Habitat and Critical Habitat, and a hunting ban will be enforced for all construction workers to avoid impacts to Saiga.	C					Contractor

Mit. Ref.	Imp. Ref.	Issue	Detailed action plan	Project phase	Mitigation hierarchy				Responsibility
					Avoid	Reduce	Restore	Offset	
			• Priority set for construction camps to be established in near-by towns to reduce impacts						
B.6	A.4	Habitat pollution; including deposition and runoff	• Use of GIIP to minimize impacts associated with dust and pollution (e.g. use of drip trays under standing equipment, designated refuelling areas with hardstanding).	C					Contractor
B.7	A.5	Water bodies	• Contractors will be required to avoid water leakage and formation of permanent surface water at construction sites that might attract Saiga (and other species). As part of this, the roadbed must not have depressions where rainwater is accumulated. Drainage channels at roadside that could overtime lead to vegetation growth must be avoided.	C					Contractor
B.8	A.5	Water bodies	• Monitoring required over the mid to long term to assess induced impacts, such as hunting, to Saiga and other species, as a result of operational waterbodies. E.g. to monitor whether distance of water collection basins at the end of culvert channels are sufficient distance from the road.	O					Executing Agency
B.9	A.6 Contractor Behaviour	Impacts from poor contractor behaviour	Contract requirements to ensure that: • Saiga antelope awareness raising will be included (as part of wider biodiversity awareness raising) within the contractor's site induction training. • This will include: roles and responsibilities, using photographs, behaviour training including bans on hunting, foraging, and trapping, national regulatory requirements, activities that should be observed in specific sections or periods/months (e.g. calving) to avoid or minimize the risk of disturbance, injury, or death of the	C					Contractor

Mit. Ref.	Imp. Ref.	Issue	Detailed action plan	Project phase	Mitigation hierarchy				Responsibility
					Avoid	Reduce	Restore	Offset	
			Saiga, and reporting and protection activities during chance encounters with Saiga antelope. • Contractors will enforce a total ban on guard dogs and firearms						
B.10	A.7	Habitat fragmenta-tion	The following Actions will be completed in line with the specifications detailed in Section 4.1: • Four vehicle crossing points, 50 metres in width and with a 1:10 slope ratio, to maximise visibility to the other side of the road to incentivise the Saiga to cross. • Road markings to inform drivers to slow down at the four crossing points • Road signage along the motorway warning of random speed checks (considered to be more effective than wildlife-specific signage) • Speed limit of 50km/h stretching 100m either side, and inclusive of, the four 50m crossing points • The traffic management system will be legally enforced by the local police through financial penalties (fines) given to drivers found not adhering to the traffic calming measures above. Capacity building and awareness raising will be provided to local regulators, such as traffic police, to improve their understanding of the issues at hand. • Adaptive management approach implemented to assess long-term effectiveness of mitigation. Alternatives to be considered include an intelligent traffic management system, backed by GPS data						Executing Agency
B.11	A.8	Increased disturbance / mortality due to increased	• Encourage the growth of the Saigachy population of Saiga antelope to achieve no net loss for the project and support net gain in the population (detailed in Section 6.1). • Financial support the Saigachy Reserve to develop a Management Plan						ADB

Mit. Ref.	Imp. Ref.	Issue	Detailed action plan	Project phase	Mitigation hierarchy				Responsibility
					Avoid	Reduce	Restore	Offset	
		accessibili-ty	• Financially support Management Plan development and implementation of activities outlined in the MP. MP activities to include the creation and management of a watering hole(s) for Saiga (and other species) in the Reserve to support their population growth and to incentivise them to stay in the reserve and away from the project area. • Management Plan to include resource support measures for Saigachy Reserves anti-poaching capacity (required resources to be confirmed in consultation with the Saigachy Reserve, Saiga Conservation Alliance, Goscomecology of Karakalpakstan and the Institute of Natural Sciences, University of Nukus) • Management Plan to include resource support for the monitoring and evaluation capacity of the Saigachy Reserve team. Support will benefit the conservation of the Saiga antelope and other species present in the reserve (e.g. Goitered gazelle)						
B.12	A.9	Cumulative effects, such as increased infrastructur e in the area due to better access.	• Support the customs border post as an important intervention point to enforce laws against trafficking. • Project Biodiversity Specialist will conduct regular training and develop checklists and toolkits for the border police on the following subjects: Basic awareness on botany and zoology, and wildlife and forest legislations that covers domestic laws on wildlife and forest, species protection (Red Book), wildlife and forest offenses and international agreements including the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), United Nations Convention Against Transnational Organized Crime, United Nations Convention Against Corruption, and other Bilateral and Multilateral Agreements on Biodiversity as described in the EIA						Executing Agency

Mit. Ref.	Imp. Ref.	Issue	Detailed action plan	Project phase	Mitigation hierarchy				Responsibility
					Avoid	Reduce	Restore	Offset	
			Report Enforcement agencies, mandates, and powers, including international cooperation in criminal matters • Support interaction with the CITES Management Authorities and the INTERPOL Wildlife Crime Working Group • Law enforcement cooperation and information sharing						

4.3 Natural Habitat Action Plan

Mitigation measures are included in the EIA to ensure NNL to biodiversity, including Natural Habitat. To ensure NNL of the *Haloxylon* forest no clearing or conversion of mature (>1m tall) *Haloxylon* trees will take place as part of the scheme, with road improvements for the project being limited to the designated right-of-way. These areas will be clearly demarcated as a strict protection zone and no activity, camps, equipment, or workers, will be allowed in the vicinity of the forest. Any contractor(s) working near to the *Haloxylon* forest will be contractually required to coordinate with the appropriate agencies (e.g. the Glavgosecoexpertiza) and jurisdictional local government to enforce this restriction. A system of strict financial penalties will be in place for any worker found to violate these rules. Any individual trees that do need to be removed will be replaced on a 1:3 ratio. As a result, impacts on *Haloxyon* forest are considered to be of minor significance only.

An estimated 3,109,844m^2 (310.98 ha) of Natural Habitat is set to be lost from construction activities. The Environmental Specialist will be required to quantify all disturbed and lost Natural Habitat from construction activities and this amount will need to be offset through restoration by the Executing Agency, in line with ADB's SPS, to ensure NNL to biodiversity from the project. Offsets will be designed in line with the IFC GN6 to achieve 'like-for-like or better' which states that biodiversity offsets must be designed to conserve the same biodiversity values that are being impacted by the project (an "in-kind" offset)[14].

The Environmental Specialist for the project will work with the Goscomecology of Karakalpakstan and the Institute of Natural Sciences, University of Nukus, to build on lessons learnt from existing efforts for offsetting applied for the 'Mainstreaming biodiversity into Uzbekistan's oil-and-gas sector policies and operations' project to guide habitat restoration in the methodology outlined below. Restoration will be based on international experience, including the aforementioned oil and gas project, adapted to the national context and conditions, and to offset the habitat fragmentation impacts of the road will generally prioritise restoration efforts that target improved habitat connectivity.

Lessons learnt from the 'Mainstreaming biodiversity into Uzbekistan's oil-and-gas sector policies and operations' project[15]
Uzkorgaz Chemical, a chemical company operating in the Surgil area of the Ustyurt plateau, worked with the '*Mainstreaming biodiversity into Uzbekistan's oil-and-gas sector policies and operations'* project in 2015 in an effort to offset the impacts of their chemical facility. The project piloted the restoration of 50ha in the vicinity of the Uzkorgaz Chemical facility. This prompted Uzkorgaz Chemical to work on an additional 625.5ha at a total cost of US$ 233,400.

[14] The IFC GN6 states a biodiversity offset should be designed and implemented to achieve measurable conservation outcomes that can reasonably be expected to result in no net loss and preferably a net gain of biodiversity. The design of a biodiversity offset must adhere to the "like-for-like or better" principle and must be carried out in alignment with best available information and current practices.

[15] Full report found: https://www.uz.undp.org/content/uzbekistan/en/home/operations/projects1/environment_and_energy/mainstreaming-biodiversity-into-uzbekistans-oil-and-gas-policies-and-operations.html

Of the 625.5ha restored, 620ha was under the natural vegetation of (*Haloxylon aphyllum*) saxaul. Restoration efforts were somewhat limited by the gypsum layers in the substratum. The seeds for the restoration were collected from the wild (i.e., wild sourced seeds) and were restricted to indigenous species only. It was evaluated that the restoration efforts resulted in "reasonable" vegetation cover, however plant growth insufficient to attract certain mammalian species.

The 625.5ha of land restored was to offset land damaged, however the Uzkorgaz Chemical efforts had confused offsetting with restoration and in doing so were not achieving no net loss, or net gain. The project found that these concepts were relatively new in Uzbekistan and it will take time for them to clarify completely.

Habitat restoration offsets will initially be prioritised in the Saigachy Reserve. This will technically be an out-of-kind offset which will involve trading-up by targeting the Reserve which is considered to be of higher conservation priority than the habitat in the vicinity of the project AoI and supports a range of threatened species including the Saiga antelope and Goitered gazelle. Targeting offsets at the Reserve has the additional benefits of incentivising species like the Saiga to remain in the Reserve and avoid the road, and mitigates fragmentation caused by the project road by improving habitat connectivity.

Any surplus offset requirements once the restoration requirements of the Reserve have been met will be carried out to generate improved habitat connectivity on the Ustyurt plateau (e.g. *Haloxylon* forest). All restoration efforts will be conducted in collaboration with the Goscomecology of Karakalpakstan and the Institute of Natural Sciences, University of Nukus, and any restoration in the Saigachy Reserve will be carried out in collaboration with the management team of the Reserve also.

4.4 Restoration Methodology

A degradation weighting system will be applied to calculate the quantity of offsets required from the project based on a sliding scale of habitat quality weighted against the degree of modification to the native habitat. Degrees of modification have been calculated as far out as the furthest extent of habitat losses expected from construction activities - 500m from the project route alignment for borrow pits (final locations of borrow pits to be confirmed by the contractor).

Three weighted corridors will be applied (indicatively depicted in Figure 10 for the entire road - not to scale; depicted at-scale at random intersection of the project road in Figure 11). The Environmental Specialist will be required to quantify all losses per Corridor from construction activities using geo-technology. Losses from each Corridor will have the following implications for offset requirements:

Table 13: Weighted offset methodology

Degradation Corridor	Corridor Dimensions	Habitat Quality (Degree of Modification)	Offsetting Requirements
1.	50m wide (25m either side of the road)	100% modified	No offsetting requirement
2.	400m wide (200m either side of the road)	50% modified	50% of total land lost from Corridor 2 to be offset
3.	1000m wide (500m either side of the road)	25% modified	75% of total land lost from Corridor 3 to be offset

Figure 10: Indicative degradation weighting corridors (project road in red; not to scale)

Figure 11: At-scale degradation weighting corridors (indicative road intersection)

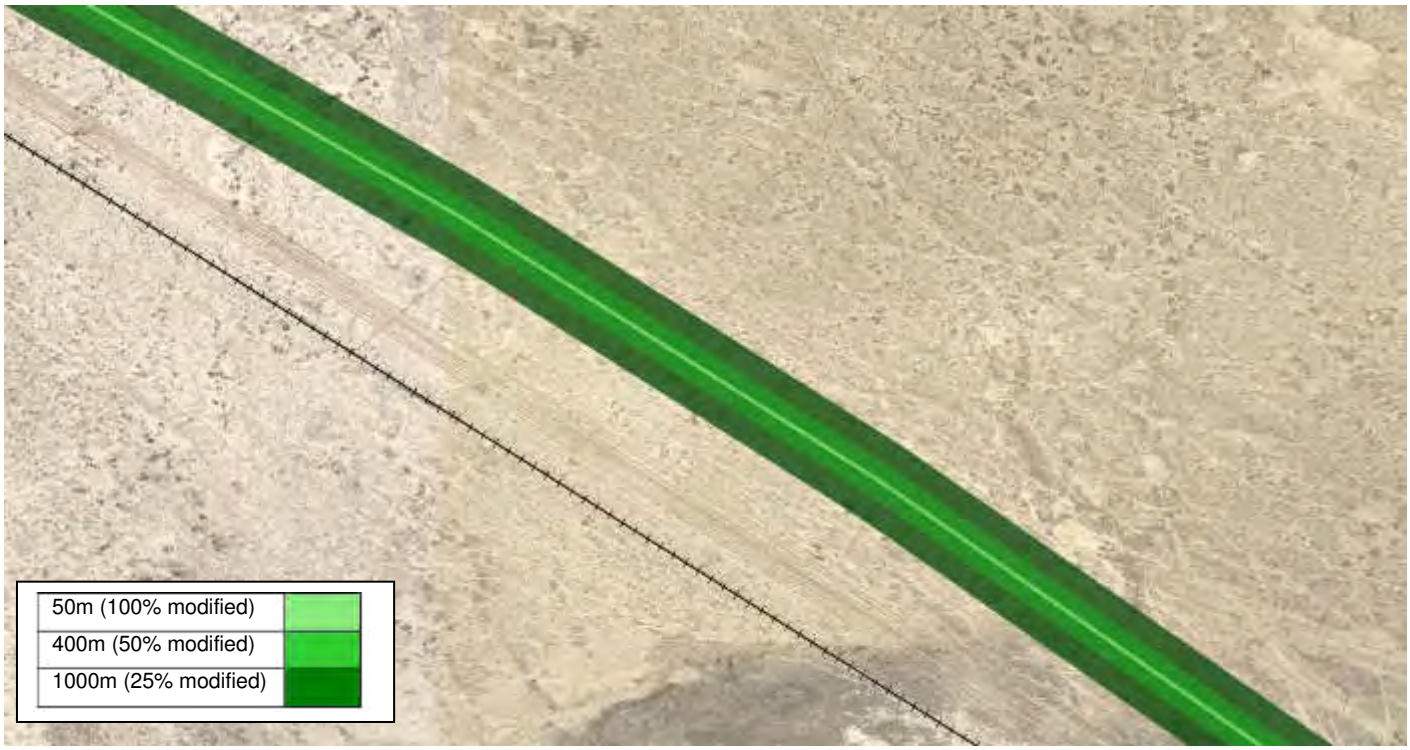


Figure 12 below shows the first point at which project route alignment (red line) connects from the A380 to the abandoned road between km9.5 and km12. Connection point 1 is estimated to result in habitat losses of approximately 89,000m^2 from Degradation Corridor 2 and 38,000m^2 from Degradation Corridor 3.

As such the project will be required to offset approximately 7.30ha of habitat from Connection point 1 (44,500m^2 ((4.45ha)) due to Corridor 2 losses, and 28,500m^2 ((2.85ha)) due to Corridor 3 losses)

Figure 12: Connection point 1 – habitat losses

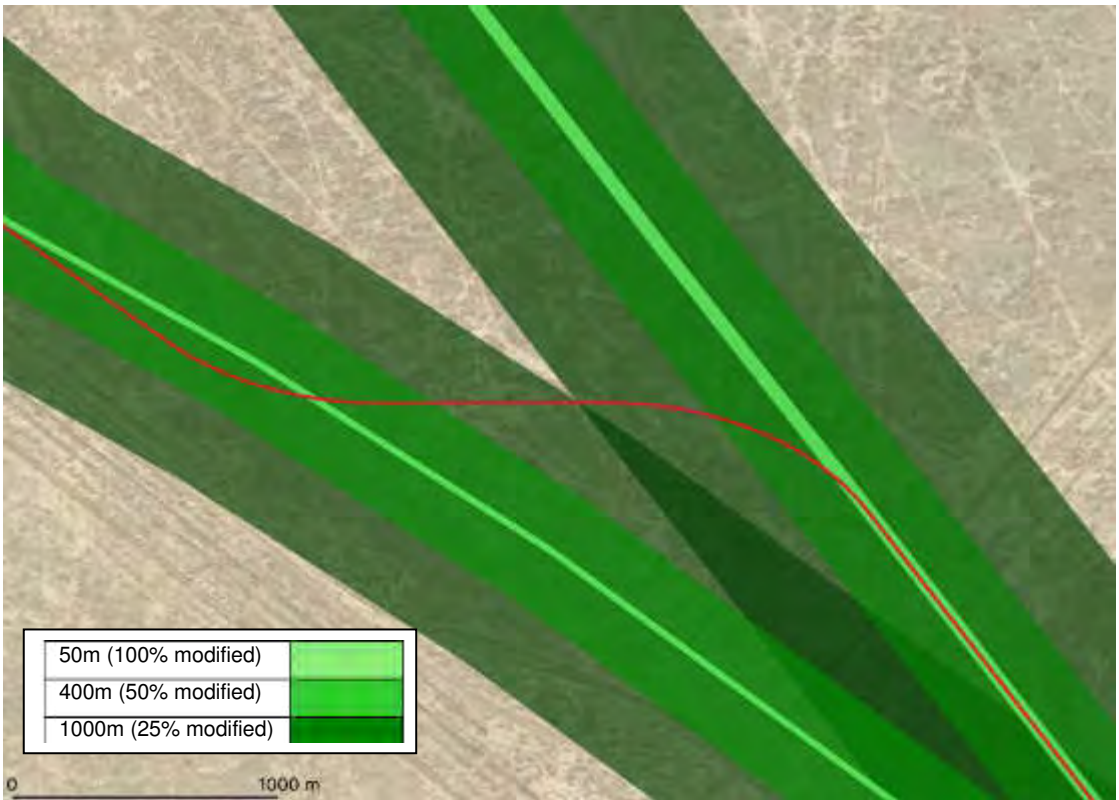


Figure 13 shows the second point at which the project route alignment requires connection from the abandoned road to the A380, between km218 and km219. Connection at this point will result in losses from Degradation Corridor 2 only with approximately 31,800m^2 of habitat being lost.

These losses will require approximately 15,900m^2 (1.59ha) to be offset through restoration.

Figure 13: Connection point 2 – habitat losses

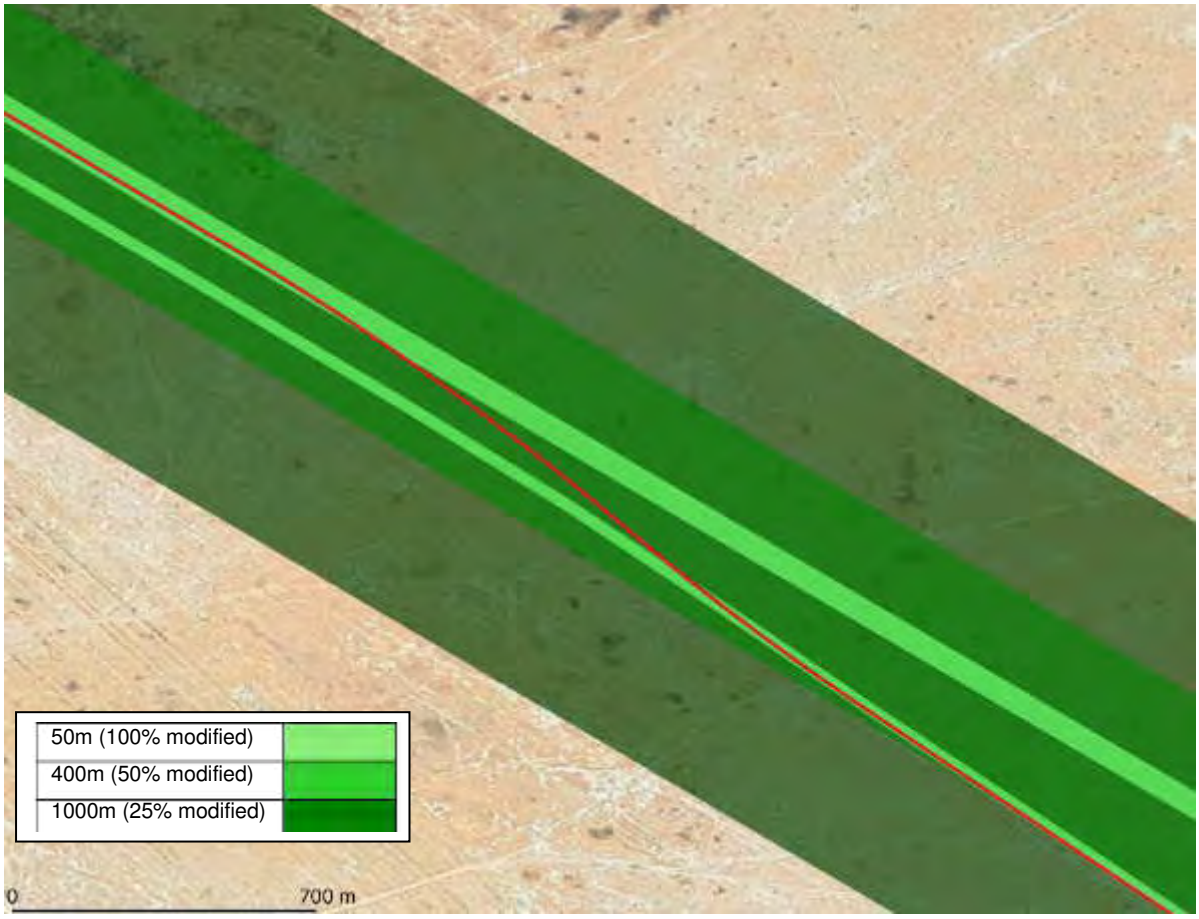


Figure 14 (yellow icon) shows an indicative proposed run-off channel and water collecting basin. These are planned either side of the 40 culverts being constructed. Construction of culvert run-off channels and water collecting basins will result in approximately 35,000m^2 of habitat losses, all from within Degradation Corridor 2.

These losses will require approximately 17,600m^2 (1.76ha) to be offset through restoration.

Figure 14: Culvert design

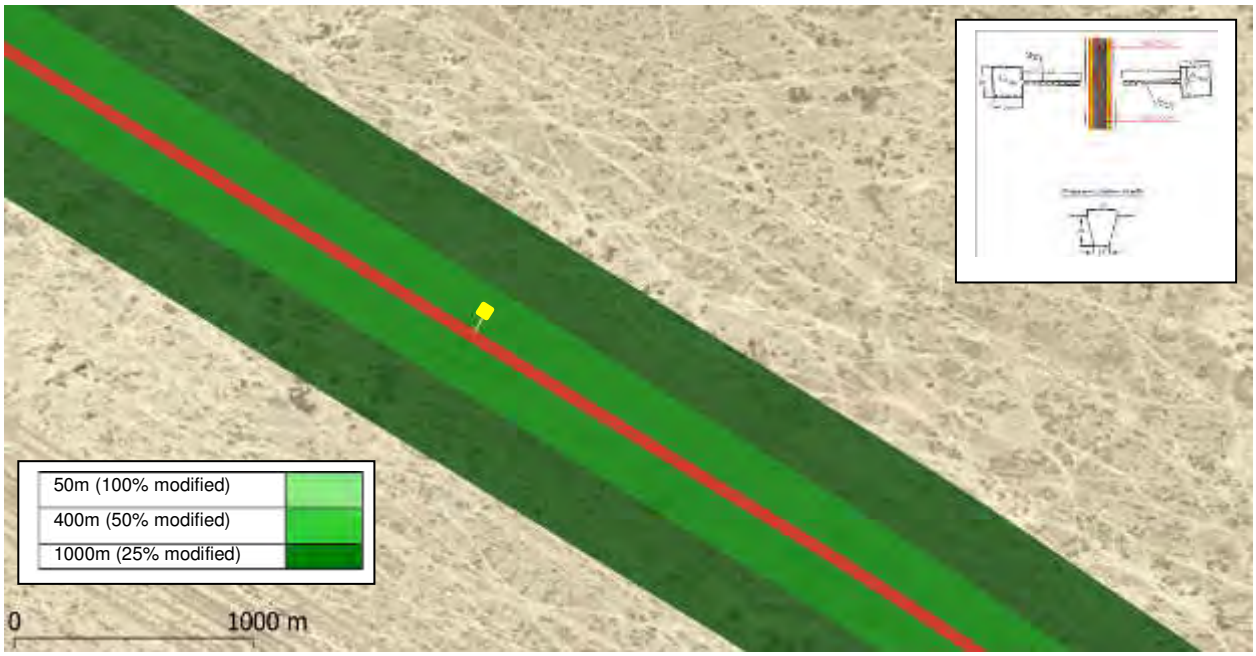

50m (100% modified)
400m (50% modified)
1000m (25% modified)
0
1000 m

Table 14: Natural Habitat Action Plan

Mit. Ref.	IM Ref	Issue	Detailed action plan	Project phase	Mitigation hierarchy				Responsibility
					Avoid	Reduce	Restore	Offset	
B.13	A.1; A.3; A.6; A.8	Clearance of the *Haloxylon* forest	• Project route alignment passes close (some 250 – 300m) to the *Haloxylon* forest, it will not directly impact upon it, however indirect and induced impacts (e.g. human disturbance from workers and road users, clearance for firewood) will need to be managed • All road improvement works will be limited to the existing right-of-way. • These areas will be demarcated as a strict protection zone and no activity, camps, equipment, or workers, will be allowed in within 100m of the *Haloxylon* forest. • Any contractor (s) working within 200m of the *Haloxylon* forest will be required to coordinate with the appropriate agencies (e.g. the Glavgosecoexpertiza) and jurisdictional local government to enforce this restriction. • A system of strict financial penalties will be in place for any worker found to violate these rules • Any individual trees (>1m tall) that do end up being removed will be replaced on a 1:3 ratio in the existing *haloxylon* forest, targeting improved habitat connectivity where possible.	C					Contractor
B.14	A.1	Vegetation Clearance	• All vegetation losses to Natural Habitat will be quantified and either restored where possible or offset through the restoration of habitat to the equivalent, or where possible higher, biodiversity value of the habitat lost. • Depending on the requirements of the Saigachy Reserve, habitat restoration efforts will be prioritised in the Reserve • All remaining restoration will be conducted elsewhere on the Ustyurt plateau (e.g. Haloxylon forest) and should be conducted in line with Section 4.4 of this BAP • Offsets in the form of restoration will be designed to achieve no net loss of biodiversity	C					Executing Agency

			• All construction camps and facilities will be placed on already modified land wherever possible.						

5 Monitoring

Table 15: Project monitoring requirements

Biodiver-sity	Project phase	Impact	Mitigation	What is to be monitored?	Where will monito-ring take place?	How will monitoring take place?	When will monitoring take place?	Who is responsible for monitoring?
Critical Habitat / Natural Habitat	C	A.1 Vegetation Clearance	Marking of zones to be cleared, prioritizing already modified habitat wherever possible	Clearance zones marked, prioritizing modified habitat	Project AoI	Inspection of Project records; visual inspection	Unannounced inspections at least quarterly, during preparation and construction phases	Environmental specialist of construction supervision consultant (CSC) reporting to Project Management Unit (PMU)
			Minimization of use of areas outside marked zones to be cleared	Vegetation disturbance by Project vehicles and contractors; mortality of priority bird and plants	Project AoI	Review of Project incident logbook; visual inspection of clearance versus pre-clearance surveys	Unannounced inspections at least quarterly, during preparation, construction and worksite closure phases	Environmental specialist of CSC reporting to PMU
				No clearance of *Haloxylon* trees > 1m height	Project AoI	Review of Project incident logbook; visual inspection	Unannounced inspections at least quarterly, during preparation, construction and	Environmental specialist of CSC reporting to PMU

Biodiver-sity	Project phase	Impact	Mitigation	What is to be monitored?	Where will monito-ring take place?	How will monitoring take place?	When will monitoring take place?	Who is responsible for monitoring?
							worksite closure phases	
			Pre-clearance site surveys for sensitive biodiversity, including threatened species and priority biodiversity	Total area of Natural Habitat cleared	Project AoI	Review of pre-clearance survey documents; visual inspection	Unannounced inspections at least quarterly, during preparation, construction and worksite closure phases	Environmental specialist of CSC reporting to PMU
			Workforce educated on preventing bush fires and this will not be used as a clearance method	Staff adherence to best practice – number of clearance fires started by workforce	Worksite	Review of training records; review of Project incident logbook; visual inspections	Unannounced inspections quarterly during preparation and construction phases	Environmental specialist of CSC reporting to PMU
			Restoration of temporarily disturbed areas (borrow pits, construction camps, laydown areas, etc.)	Topsoil and subsoils removed and stored separately	At all Project temporarily -disturbed areas	Inspections	Unannounced inspections quarterly during preparation and construction phases	Environmental specialist of CSC reporting to PMU

Biodiver-sity	Project phase	Impact	Mitigation	What is to be monitored?	Where will monito-ring take place?	How will monitoring take place?	When will monitoring take place?	Who is responsible for monitoring?
				Physical restoration of sites to their original state	At all Project temporarily -disturbed areas	Inspections	Before the end of the worksite closure phase	Environmental specialist of CSC reporting to PMU
				Successful progress of re-vegetation using locally collected/ grown seeds/ plants, and need for any additional re-vegetation	At all Project re-vegetation sites	Surveys by specialist sub-contractor	Annually, in summer, from the last year of the worksite closure phase until the fifth year of the operations phase, inclusive	Environmental specialist of CSC reporting to PMU
		A.2 Impacts from vehicle movements	GIIP to minimize impacts associated with dust and pollution (e.g. use of drip trays, designated refuelling areas with hardstanding)	Implementation of GIIP detailed in the Construction Management Plan	Worksite	Review of training records; review of Project incident logbook; inspections	Unannounced inspections quarterly during preparation and construction phases	Environmental specialist of CSC reporting to PMU
Saiga antelope /	C	A.3 Impacts from working compounds and camps;	Location of construction camps away from sensitive areas	Construction camps located in modified habitat	Worksite	Review of pre-clearance surveys; visual inspection	Unannounced inspections at least quarterly, during preparation and construction	Executing Agency

Biodiver-sity	Project phase	Impact	Mitigation	What is to be monitored?	Where will monito-ring take place?	How will monitoring take place?	When will monitoring take place?	Who is responsible for monitoring?
Other species		A.6 Contractor Behaviour	Biodiversity awareness training	Adherence to best practice detailed in the Construction Management Plan	Worksite	Review of training records; review of Project incident logbook; inspection	Unannounced inspections quarterly during preparation and construction phases	Environmental specialist of CSC reporting to PMU
			Total ban on guard dogs and firearms. Financial penalties for violation	Presence of guard dogs and firearms Number of penalties imposed	Constructio n camps and associated facilities	Random checks	Unannounced inspections weekly	Environmental specialist of CSC reporting to PMU
			Total ban on hunted / trapped animals. Financial penalties for any incidents of violation	Presence of hunted / trapped animals. Number of penalties imposed				
Saiga antelope	O	A.8 Increased disturbance/ mortality due to increased accessibility	Train and develop checklists and toolkits for the border police	Training undertaken, and improved practice undertaken by border police	Border posts	Review of training records, border police inspection/ seizure records	Unannounced inspections annually during construction and first ten years of operations phase	Environmental specialist of CSC reporting to PMU
Saiga antelope	C, O	A.2 Impacts from Vehicle Movements	Minimization of use of areas outside marked zones to be cleared	Vegetation disturbance by Project vehicles and contractors; mortality	Project AoI	Review of Project incident	Unannounced inspections at least quarterly, during	Environmental specialist of

Biodiver-sity	Project phase	Impact	Mitigation	What is to be monitored?	Where will monito-ring take place?	How will monitoring take place?	When will monitoring take place?	Who is responsible for monitoring?
				of priority bird and plants		logbook; visual inspection	preparation, construction and worksite closure phases	CSC reporting to PMU
			Restriction of construction vehicles to appropriate speed	Speed limits observed	Project AoI	Review of Project incident logbook; visual inspection	Unannounced inspections at least quarterly, during preparation, construction and worksite closure phases	CSC in cooperation with traffic police
			Pre-clearance site surveys for sensitive biodiversity	Surveys undertaken before clearance; clearance delayed where sensitive biodiversity found	Project AoI	Review of Project incident logbook; visual inspection	Unannounced inspections at least quarterly, during preparation, construction and worksite closure phases	Environmental specialist of CSC reporting to PMU
			Historical crossing points, 50 metres in width and with a 1:10 slope ratio, to maximise visibility to the other side of the road	Crossing points identified; embankment lowered to 1:10 slope ratio in those locations and 50m in length	Worksite	Review of survey documents; visual inspection	Unannounced inspections at least quarterly, during preparation, construction and	CSC

Biodiver-sity	Project phase	Impact	Mitigation	What is to be monitored?	Where will monito-ring take place?	How will monitoring take place?	When will monitoring take place?	Who is responsible for monitoring?
							worksite closure phases	
			Road signage at each of the four crossing locations warning of random speed checks (considered to be more effective than wildlife-specific signage) Road markings to inform drivers to slow down at the four crossing points	Road signage and road markings in place	Worksite	Visual inspection	Unannounced inspections at least quarterly, during preparation, construction and worksite closure phases	CSC
			Legally enforce traffic management system by the local police through financial penalties (fines) given to drivers found not adhering to the traffic calming measures above.	Financial penalties administered	Local police headquarters	Visual inspection	Arranged quarterly monitoring agreed with the law authority	CSC in cooperation with traffic police
			Adaptive management approach implemented to assess long-term effectiveness of mitigation. Alternatives to be considered include an intelligent traffic management system, backed by GPS data	Number of wildlife deaths from vehicle collisions	TBC	TBC	TBC	TBC

Biodiver-sity	Project phase	Impact	Mitigation	What is to be monitored?	Where will monito-ring take place?	How will monitoring take place?	When will monitoring take place?	Who is responsible for monitoring?
	C	A.5 Waterbodies	Avoid water leakage and formation of permanent surface water; ensure no depressions in the roadbed which accumulate rainwater		Worksite	Review of Project incident logbook; visual inspection	Unannounced inspections at least quarterly, during preparation, construction and worksite closure phases	Environmental specialist of CSC reporting to PMU
Saiga antelope	C	A.7 Habitat fragmentation	Restrict fencing to work compounds and associated areas	No fences away from work compounds and associated areas	Project AoI	Visual inspection	Unannounced inspections at least quarterly, during preparation, construction and worksite closure phases	Environmental specialist of CSC reporting to PMU
	O		Historical crossing points, 50 metres in width and with a 1:10 slope ratio, to maximise visibility to the other side of the road	Crossing points identified; embankment lowered to 1:10 ratio in those locations	Worksite	Camera trapping at the four crossing points; visual inspection	Unannounced inspections at least quarterly, during preparation, construction and worksite closure phases	Environmental specialist of CSC reporting to PMU
				Presence of Saiga in proximity to road	Project AoI	Interview-based survey of key informants	Every two years	Environmental specialist of

Biodiver-sity	Project phase	Impact	Mitigation	What is to be monitored?	Where will monito-ring take place?	How will monitoring take place?	When will monitoring take place?	Who is responsible for monitoring?
						(reserve staff, hunters, etc.) by specialist sub-contractor		CSC reporting to PMU

6 Additional Conservation Actions

6.1 Saiga Additional Conservation Actions

This BAP includes measures that will encourage the growth of the Saigachy Reserve Saiga antelope population and support the project in achieving NNL, and potentially to achieve net gain, for this critically endangered species. Projected loss-gain calculations for Saiga habitat and Saiga connectivity are not calculated here, as the uncertainties in Saiga population dynamics and distribution are too great. Rather, the measures are proposed qualitatively in an effort to prevent any net loss for the Saiga antelope.

The impacts of the road can be mitigated, and conservation of the Saiga supported, by supporting the management and the resources of the Saigachy Reserve. This has the potential to incentivise the Saiga antelope to remain in the reserve, and away from the road. Supporting a Management Plan that will include the creation of a watering hole and resourcing anti-poaching capacity will mitigate the serious risks of induced poaching due to improved accessibility, vehicular collisions, and habitat fragmentation.

Support to the Saigachy Reserve will be provided through a Phase 1 of financial support (Q2 2020) for the development of a Management Plan (MP). MP development will need to initially completed in conjunction with the Goscomecology of Uzbekistan and the Goscomecology of Karakalpakstan in Tashkent. The MP is to include the following long-term activities (>5 years) to be undertaken as part of Phase 2 of financial support (Q4 2020):

Measure	Risks / Benefits
Artificial watering hole (s)	The region has seen extensive desertification in the recent decades. Artificial watering holes could help to encourage growth of the local Saiga population. Watering holes within the reserve should also incentivise Saiga to stay in the protected area, helping to prevent them from encountering the project road, and other threats, in search of water. Artificial watering holes have been used for Saiga in the Stepnoi wildlife refuge in Russia (funded by WWF Wildlife Adaptation innovation fund). This was intended to boost the Saiga population, and also to decrease poaching, as Saiga should spend more time inside the protected area. Currently monitoring Saiga within the reserve is difficult as there is just a small population of animals which move around a very large area. Therefore, the creation of watering holes should increase the ease of monitoring, as it provides areas where Saiga will congregate and thus can be recorded by reserve staff or camera traps. Camera traps installed at the 3 watering holes in Stepnoi refuge have been successful at monitoring Saiga groups. Further detail on camera trap provisioning is provided later. Watering holes will also be beneficial for a large range of other species. This includes the Goitered Gazelle and Caracal (if present), as well as resident birds and potentially migratory birds, which may stop to rest and rehydrate.

	As Saiga will likely congregate at watering holes, these areas may become easy targets for poachers. Therefore, instillation of watering holes must be twinned with effective anti-poaching measures, especially near the watering holes. Support of anti-poaching measures is detailed later Other antelope species have been known to become trapped in artificial watering holes. Therefore, it will be ensured that watering holes have shallow gradients to avoid entrapment.
Resource support measures for anti-poaching capacity	As the number of Saiga antelope in Uzbekistan at present is extremely low, any increase in poaching as a result of the road upgrade could have a catastrophic impact on the species. Therefore, it is crucial to increase the anti-poaching capacity of the Saigachy reserve to protect the small number of individuals still found here. In Q1 2020 a ranger training programme is underway between the Government's of Russia and Kazakhstan, for the protection of Saiga. It is proposed that in Q4 2020 a similar programme is implemented with the Government of Kazakhstan to train the rangers of the Saigachy Reserve in anti-poaching approaches. Additional resource support could include vehicle upgrades or maintenance, equipment, and/or funds for hiring of new staff. Resource requirements to be confirmed in consultation with the Goscomecology of Uzbekistan and Goscomecology of Karakalpakstan, before being confirmed with the Saigachy Reserve, Saiga Conservation Alliance and the Institute of Natural Sciences, University of Nukus
Resource support for monitoring and evaluation capacity	As the number of Saiga antelope in Uzbekistan at present is extremely low, any increase in poaching as a result of the road upgrade could have a catastrophic impact on the species. Therefore, it is crucial to increase the anti-poaching capacity of the Saigachy reserve to protect the small number of individuals still found here. This support for monitoring is not designed to mitigate the impacts of the road but is an additional conservation action that could potentially support improving anti-poaching efforts and net gain for the project. Potential funds could be provided for camera traps. Camera traps could be placed at known preferred areas for the Saiga, and/or at the proposed watering holes. They can help to give population size estimates as well as an idea of Saiga movements within the reserve. There is potential for radio collaring. This would be invaluable in answering questions about the movements of the population, for example whether they look to cross the border fence or interact with the project road. It would also help understanding of Saiga movement patterns within the reserve and enlighten researchers as to which areas they prefer within the reserve, which could target conservation action.

As discussed, the Saiga antelope is critically endangered and one of the most significant barriers to conservation of the Ustyurt Saiga antelope population is linear infrastructure, specifically the Kazakh – Uzbek border fence and the Shalkar – Beyneu railway in Kazakhstan. Habitat

fragmentation from linear infrastructure has isolated two groups of the Ustyurt Saiga and has contributed significantly to numbers of the species south of the border fence to reduce dramatically.

Kazakh – Uzbek Border Fence
In 2006, as part of efforts to reduce regional drug smuggling, Kazakhstan built a barbed-wire fence along the border with Uzbekistan and they subsequently upgraded this in 2012 to create an extensive border fence which now runs for some 215km in a NE-SW alignment and a further 400km in a North-South alignment (Olsen, 2012). The fence has generally limited Ustyurt saiga access to winter habitat in Uzbekistan as they have found it difficult to pass through. Existing mitigation measures have been applied to the fence to open it up for the Saiga, including openings in the fence every kilometre and a section of 11km without a lower strand of barbed wire. Mitigation was targeted at the known Saiga crossing point between the two countries, prior to the drop-off in 2010. The assumption is this mitigation will allow easier crossing for the Saiga however the total barrier the Shalkar-Beyneu railway to the north has formed means its effectiveness has not been completely tested. *Saiga that attempt to pass through the fence do still face a number of challenges, and even walking along the fence looking for a suitable crossing point uses additional energy and can weaken animals. Whilst crossing between remaining barbed wire strands a Saiga is also likely to snag hair and leave bare skin that is exposed directly to extremely cold temperatures, and the animals can become entangled and die or be seriously injured in looser wires. Animals unable to cross may starve lose body condition when overwintering in less than optimal conditions and the fence can be used to trap saiga by predators or poachers.*

Shalkar – Beyneu Railway

The Shalkar-Beyneu railway in Kazakhstan experiences high volumes of rail traffic and is proving to be essentially a total barrier to the southernly migration of the Ustyurt Saiga population. A further railway is said to be planned for construction in the area. The figure below shows satellite data of movement of the Kazakh sub-population of the Ustyurt Saiga to the north of the Shalkar-Beyneu railway (red line), with no successful movement past it. The Shalkar-Beyneu railway is part of the ADB's CAREC programme.

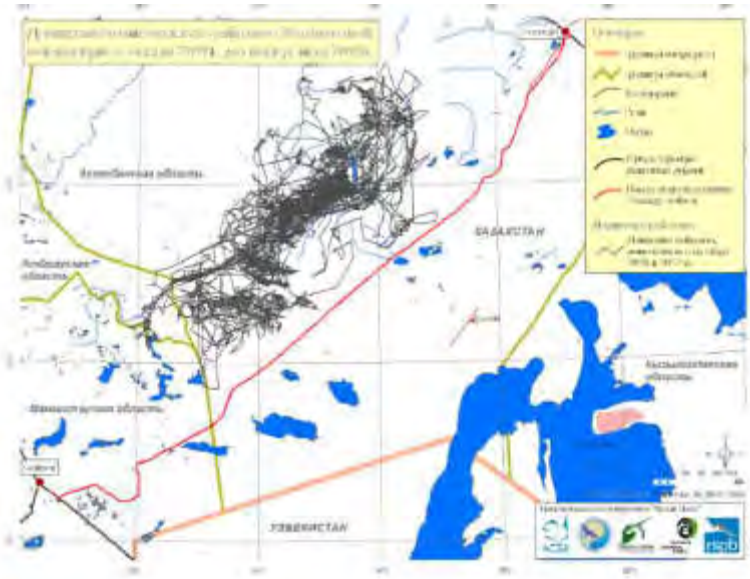


Figure 15: Saiga movement around the Shalkar - Beyneu railway

Figure 16: CAREC cooperation corridor

ADB and the project are well-placed to generate significant conservation gains for the Ustyurt Saiga population by using their leverage to catalyse further cooperation between the Governments of Uzbekistan and Kazakhstan, building on existing initiatives, to improve the permeability of the linear infrastructure discussed (railway and border fence). Considering the terrible condition of the Saiga antelope in Uzbekistan, efforts will be under-taken by ADB immediately to work with the CAREC programme in inserting mitigation to the Shalkar – Beyneu railway and the border fence.

Improvements in permeability should be carried out in line with the research conducted by Kirk A. Olsen, in ' Saiga Crossing Options: Guidelines and Recommendations to Mitigate Barrier Effects of Border Fencing and Railroad Corridors on Saiga Antelope in Kazakhstan', 2012. Additional mitigation to the Shalkar – Beyneu railway (or any other railroads) for Saiga crossing shall be completed following consultation with Kirk Olson (Conservation Ecology Center, Smithsonian Conservation Biology Institute) and Chimeddorj Buyanaa (WWF Mongolia) – experts with research and application experience of mitigation efforts to linear infrastructure for the benefit of the Saiga antelope.

6.2 Monitoring of Additional Conservation Actions

With the implementation of the activities in the Management Plan (Phase 2) will come an extended monitoring programme in the Saigachy Reserve. Resourcing of monitoring will significantly improve understanding of the population numbers and needs of species found in the Reserve and will be amalgamated into ongoing regional conservation efforts by the Institute for Natural Resources, University of Nukus.

Monitoring of the efficacy of the Reserve's Management Plan will be conducted annually and an adaptive management approach will be applied to assess if resourcing efforts for Management Plan activities, and approaches to monitoring themselves, need to be re-directed.

Specifically, monitoring of the additional conservation outcomes will include:

- A system of camera traps at watering holes to compliment the already existing camera trapping work being done by the Saigachy Reserve
- Bi-annual transects by four-wheel drive conducted by experts from the Saigachy Reserve

Population tracking is conducted annually by the Association for the Conservation of Biodiversity in Kazakhstan (ACBK) of the Ustyurt Saiga population. Tracking is only conducted on the Kazakh-side of the border however due to flying restrictions in Uzbekistan. Monitoring results will be amalgamated with regional conservation efforts, including the tracking conducted by the ACBK.

An adaptive management approach will be applied over the long-term, and should flying restrictions be lifted in Uzbekistan, and the Saiga herd in the Reserve grows large enough, the following approaches to monitoring should be considered:

- Collaring – accurately monitor movement in the Reserve and could potentially be tied into an intelligent traffic management system for the project. Any collaring efforts should be completed in close cooperation with the ACBK (where they have adapted a collaring

methodology specifically for the Saiga), Saiga Conservation Alliance, and Goscomecology of Uzbekistan.

- Drone surveys
- Low flying aircraft