Bash 52MW Wind Farm
Republic of Uzbekistan

Environmental & Social Impact Assessment:
Volume 2 - Addendum to the Bash 500MW WF ESIA

December 2023

Document Information

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5Cs Project Director	Ken Wade

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LIST OF ABBREVIATIONS

ABBREVIATION	MEANING
BoP	Balance of Plant
CESMP	Construction Environmental & Social Management Plan
E&S	Environmental & Social
EBRD	European Bank for Reconstruction and Development
EHS	Environment, Health & Safety
EIA	Environmental Impact Assessment
EPC	Engineering, Procurement and Construction
ESIA	Environmental & Social Impact Assessment
ESMS	Environmental & Social Management Systems
GBVH	Gender Based Violence and Harassment
IFC	International Finance Corporation
LLA	Land Lease Agreement
LNTP	Limited Notice to Proceed
MEEPCC	Ministry of Ecology, Environmental Protection and Climate Change
MoE	Ministry of Energy
OESMP	Operational & Social Environmental Management Plan
PD	Presidential Decree
PR	Performance Requirement
RAP	Resettlement Action Plan
WF	Wind Farm
5 Capitals	5 Capitals Environmental and Management Consultancy

1 INTRODUCTION

The Uzbekistan Ministry of Energy and ACWA Power signed a terms of agreement in January 2023 to develop a green hydrogen facility in Tashkent[1]. This agreement is in line with the Uzbekistan Resolution No. PP-5063 "*On measures for the development of renewable and hydrogen energy in the Republic of Uzbekistan*", 2021. The decree outlines measures to:

- Support widespread introduction of innovative technologies to develop hydrogen energy and renewable energy sources;
- Build hydrogen energy infrastructure to promote energy efficiency and security; and
- Enable Uzbekistan's transition to a green economy.

The green hydrogen facility is expected to generate 3,000 tonnes of green hydrogen a year and is expected to reduce the country's dependence on natural gas. In addition to developing this hydrogen facility, ACWA Power will also develop a 52MW wind farm (with a maximum capacity of 80MW) in Bash, Bukhara region. The purpose of the wind farm will be to supply power to the grid and wheeling power to the hydrogen plant in Tashkent.

These projects, align with the government of Uzbekistan commitment under the Paris Agreement to develop clean energy sources by reducing greenhouse emissions per unit of GDP by 10%, compared to 2010.

1.1 The Project

The Bash 52MW Wind Farm (herein referred to as 'the Project') will be developed and operated through a joint consortium between ACWA Power and "Uzkimyosanoat" JSC (UKS). The shareholding between ACWA Power and "Uzkimyosanoat" will be 80% and 20% respectively for both the hydrogen plant and the Bash 52MW WF. According to details provided by the Client, UKS will be responsible for the following maters in connection with the obligations of the Company:

[1] *The hydrogen plant will be an integrated facility and will be connected to an existing ammonia plant in Chirchiq which is an industrial complex located approximately 45km from Tashkent. It is noted that a separate ESIA has been prepared for the hydrogen plant.*

- Use in its reasonable endeavours to obtain licenses, approvals, and permits for the Project;
- Provide information and support relating to local engineering, procurement and construction contractors and suppliers;
- Procure the relevant land for the Project;
- Secure 10% off-take of Project through its affiliate;
- Facilitate grid connectivity, utilities and supply of necessary infrastructures associated with the deployment of the electrolyser and its ancillaries.

ACWA Power and "Uzkimyosanoat" has since established a Project Company (for both the hydrogen plant & wind farm), 'ACWA Power UKS Green H2' with the registration number 2050941. The Project scope will include the development financing, construction, operation and maintenance of the Wind Farm including an auxiliary power building, step up transformer from 33kV and internal access roads (refer to section 2.3 for more details).

1.1.1 Key Project Information

Table 1-1 Key Project Information

PROJECT TITLE	Bash 52MW Wind Farm (with a maximum capacity of 80MW)
PROJECT DEVELOPER	ACWA Power (80%) UKS (20%)
PROJECT COMPANY	ACWA Power UKS Green H2
REGISTRATION NUMBER	2050941
EPC CONTRACTOR	HDEC (China Power)
O&M COMPANY	First National Operation and Maintenance Co. Ltd (NOMAC)
ENVIRONMENTAL & SOCIAL CONSULTANT	5 Capitals Environmental and Management Consulting (5 Capitals) PO Box 119899, Dubai, UAE Tel: +971 (0) 4 343 5955, Fax: +971 (0) 4 343 9366 www.5capitals.com
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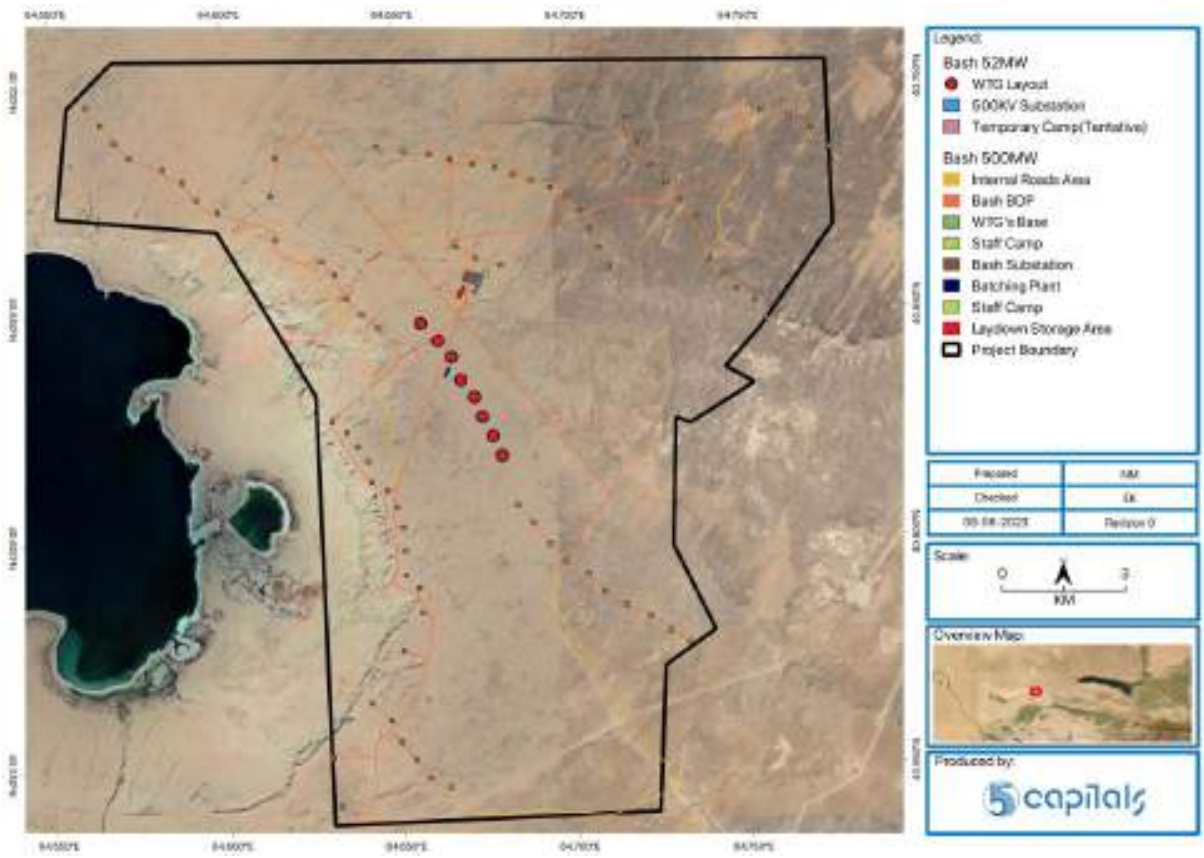
1.2 Background of the ESIA Report

The Bash 52MW WF will be located within the same project boundary as the ACWA Power Bash 500MW WF (refer to the figure below). The Bash 500MW WF is currently under construction after receiving positive conclusions for the National Environmental Impact Assessment (EIA-OVOS) in September 2021 from the then State Committee on Ecology and Environmental Protection (SCEEP) now Ministry of Ecology, Environmental Protection and Climate Change of the Republic of Uzbekistan.

Figure 1-1 Bash 500MW & Bash 52MW WFs location (within the same boundary)



In addition to the above, the Bash 500MW WF also went through a robust Environmental & Social Impact Assessment (ESIA) process and extensive review by prospective project lenders and their advisors. The assessment aligned with the following key lenders' requirements:

- European Bank for Reconstruction and Development (EBRD) Environmental & Social Policy (2019) that has specific Performance Requirements (PRs) ;
- Asian Development Bank Safeguard Policy Statement (SP 2009);
- International Finance Corporation (2012) Performance Standards (PS); and
- World Bank Group Environmental, health and Safety Guidelines (2007).
  - General EHS Guidelines (2007)
  - EHS Guidelines for 'Wind Energy' (2015)
  - EHS Guideline for 'Electric Power Transmission and Distribution' (2007)

It is noted that the Bash 500MW ESIA package was approved by the lenders in August 2022[2].

***Note**: Since the Bash 52MW WF will be located within the same boundary as the Bash 500MW WF, the Project will adopt and implement all the mitigation, management measures and monitoring and reporting requirements as provided in the Bash 500MW ESIA package and management plans/procedures during the construction and operational phases. This will also include any additional mitigation requirements identified in this Addendum specific to the Bash 52MW WF..*

1.2.1 Lenders ESIA

A Project kick-off meeting was held between the European Bank for Reconstruction and Development (EBRD), ACWA Power and 5 Capitals on 19th August 2023 to discuss the approach to the Bash 52MW WF ESIA package. The outcome of the meeting is as summarised below:

- An ESIA addendum (to the existing Bash 500MW WF ESIA) will be prepared for the Bash 52MW WF in order to provide Project specific information, assess Project specific impacts and the cumulative impacts of both Bash 500MW & Bash 52MW WFs (this document).
    - This will also include the updating of the Bash 500MW WF Non-Technical Summary, Framework for Environmental & Social Management, Stakeholder Engagement Plan and the Resettlement Action Plan.
- An update of the existing Bash 500MW WF management plans would be undertaken in order to include the requirements for the Bash 52MW WF including any additional mitigations required as a result of the ESIA Addendum assessments.
- ACWA Power (and its Project Companies under Bash WFs) will be required to align with all the mitigations, management, monitoring and reporting requirements identified in the Bash 500MW WF and the associated management plans. This is in addition to any additional requirements identified in the ESIA Addendum as a result of cumulative impact assessment and outcome of stakeholder consultations.
- EBRD confirmed that the bash 52MW WF is categorised as a Category A Project whose ESIA package will require to be publicly disclosed for a period of 60 days.

[2] The Bash 500MW Environmental & Social Impact Assessment was approved by its financing lenders in October 2022 and the ESIA package can be found on ACWA Power's website: https://acwapower.com/en/projects/bash-wind-ipp/.

1.3 National EIA (OVOS)

A meeting was held between the Ministry of Ecology, Environmental Protection and Climate Change (MEEPCC), ACWA Power and the local Consultant Juru Energy Limited on 2nd February 2023 to discuss the approach to the national EIA (OVOS) for Bash 52MW WF. The outcome of the meeting is as summarised below:

- The Ministry required the Bash 500MW National EIA to be updated to include the details and assessments of the proposed Bash 52MW WF Project.
- The updated EIA must include details of the turbine specifications and justification of why the 8 WTGS are required.
- The Project must submit the Collison Risk Modelling Reports for both the Bash 52MW and Bash 500MW as part of the resubmission package.

After this meeting, Juru Energy Limited updated the Bash 500MW EIA and resubmitted it to the Ministry for review and approval. The Ministry issued positive conclusions for the Projects under Stage 1 of the National EIA 'Preliminary Statement of the Environmental Impact (PSEI) in august 2023 (Refer to Appendix A for the National EIA positive conclusions). These conclusions provide the conditions for the construction phase.

Note: *The Projects are not required to undertake the Stage 2 National EIA process 'Statement of the Environmental Impact (SEI)' but they will be required to submit the National EIA stage 3 'Statement on Environmental Consequences (SEC)' before the start of the operational phase.*

1.4 Objective of the ESIA Addendum

The objectives of this ESIA Addendum in relation to this Project include the following:

- To provide an overview of the Project design, identification of sensitive receptors in the Project's area of influence and assessment of Project alternatives.
- To assess the project's environmental & social impacts for the construction and operational phases based on the environmental and social aspects that have been scoped in to this addendum;
- To engage with key stakeholders and project affected people to disclose Project information, study outcomes, gain lay knowledge about the local environmental & social context, seek feedback on proposal and to understand & map any livelihood restoration requirements.
- Determination of applicable additional mitigation and management measures including monitoring requirements to be implemented beyond those identified in the Bash 500MW ESIA in order to avoid or minimise potential impacts and maximise potential environmental and social gains;
- Assessment of cumulative impacts based on the development of the Bash 500MW and Bash 52MW within the same Project boundary.

2 PROJECT INFORMATION

2.1 Project Location

The Bash 52MW WF is located within the same boundary as the Bash 500MW WF. These two WFs are located to the north-eastern part of Ayakagitma reservoir (depression), in Gijduvan district of Bukhara region. The proposed project location is provided in the figures below:

Figure 2-1 Project Location – National Context

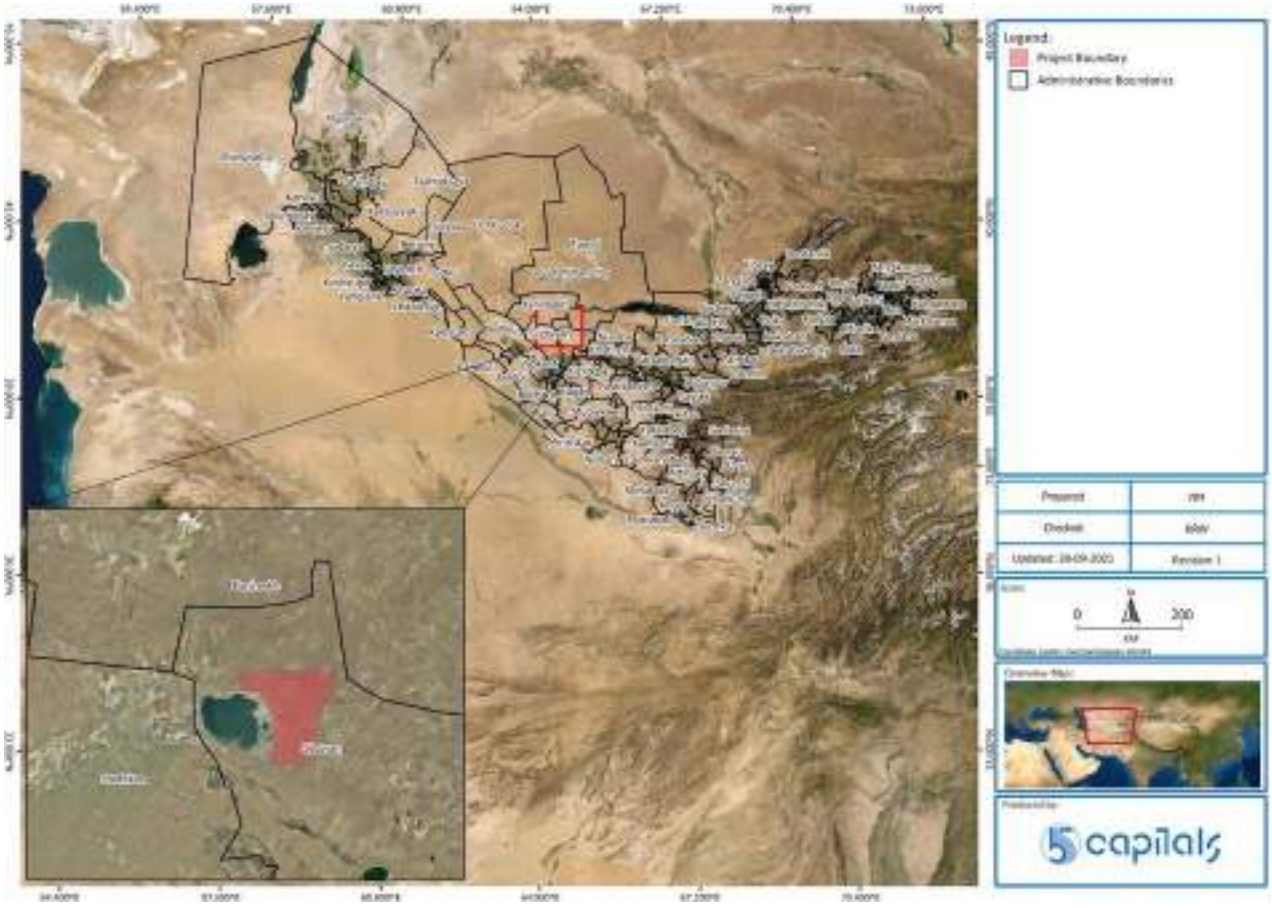


Figure 2-2 Project Location – Local Context

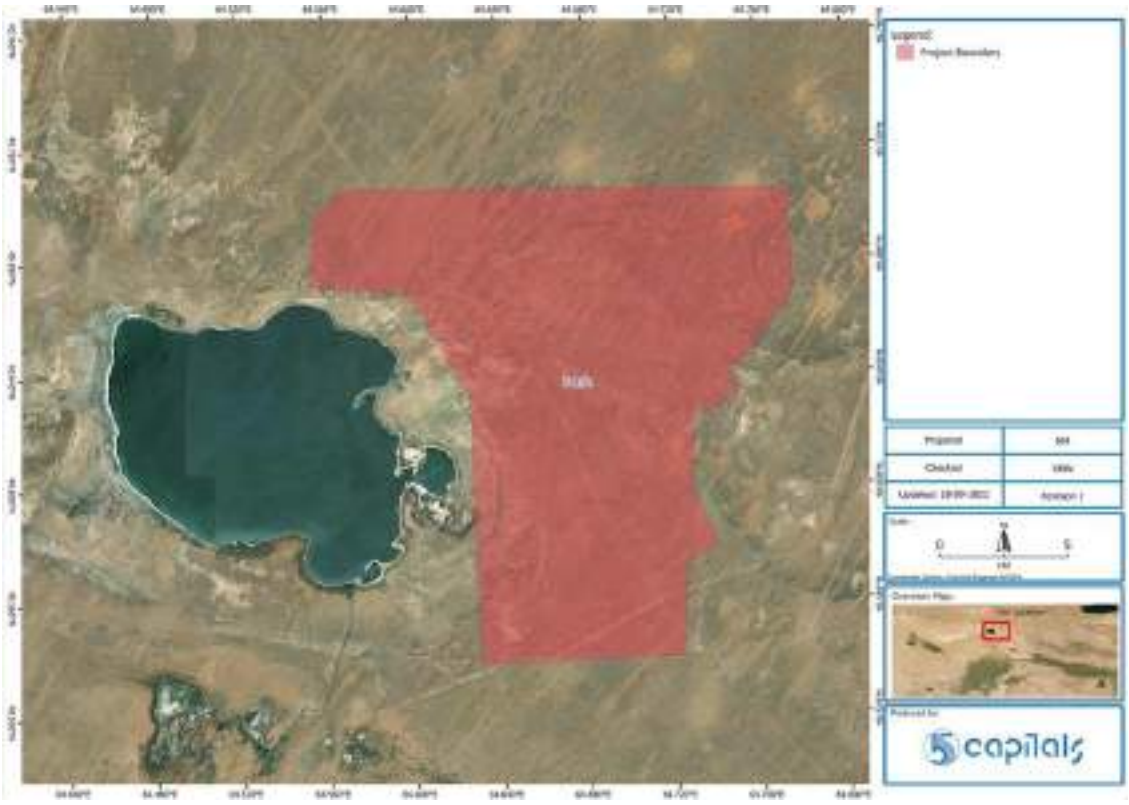


Figure 2-3 Project Location – Layout

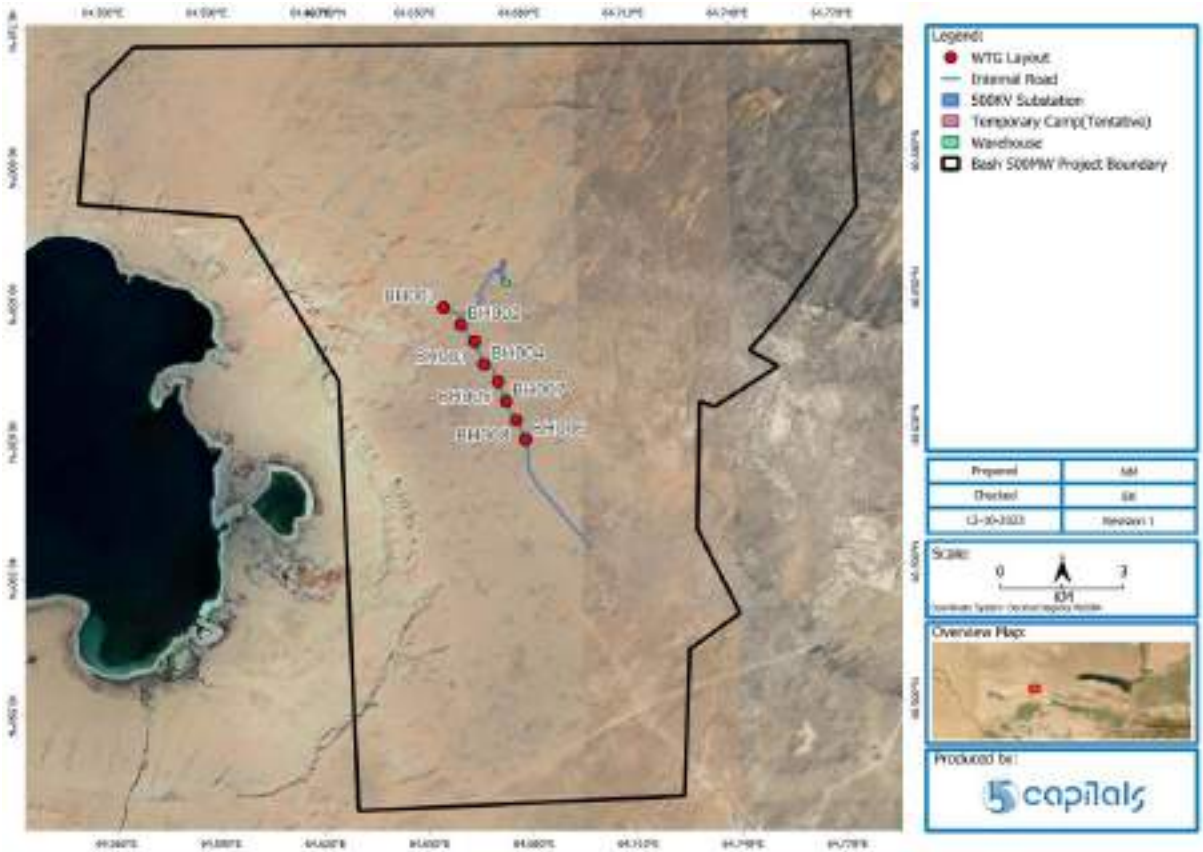
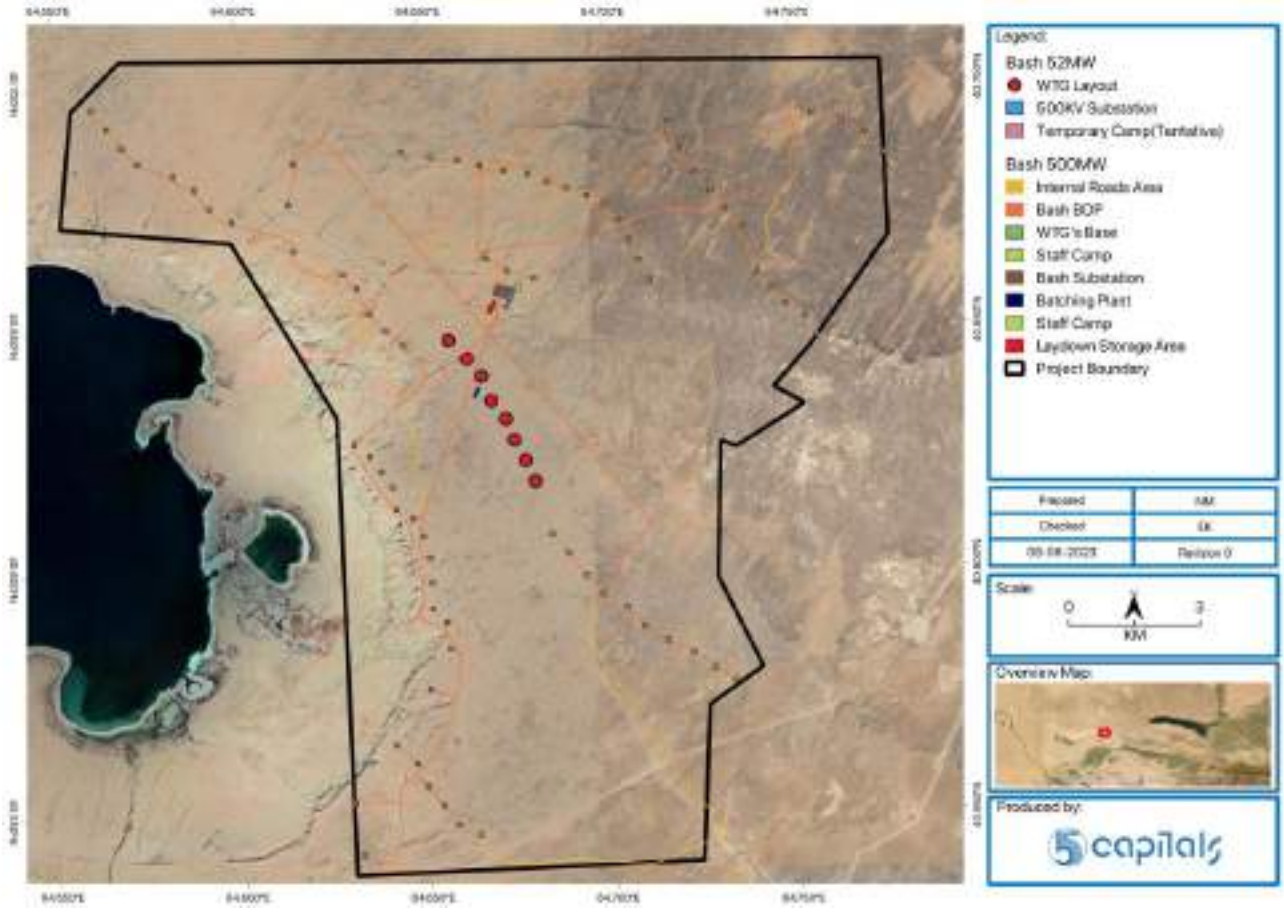


Figure 2-4 Project Location – Bash 52 MW & Bash 500MW WFs



2.2 Land Use and Site Condition

2.2.1 Land Ownership

According to the draft lease agreement between the Ministry of Energy of Uzbekistan and FE 'ACWA Power UKS Green H2' LLC (Project Company), the site and the laydown area will be leased for the purpose of implementing the Project (the lease will be based on the Project footprint). According to the draft LLA, the Project Company will be required to undertake some of the following key actions:

- Pay rent in accordance with the set terms of agreement;
- Keep the Project site and improvements thereon clean and in good working order at all times;
- To construct, complete, operate and maintain the Project to be located on the Project site in accordance with the set requirements.
- Not to use or permit the Project site to be used for any purposes other than those set in the LLA.
- To comply with the laws of Uzbekistan affecting the Project and the LLA.

- To obtain and maintain all the necessary approvals required for the Project.

According to information provided by ACWA Power, the Bash WF has been allocated 21.673ha based on the Project layout. The land allocation for the different Project components is as provided in the table below.

Table 2-1 Land Allocated to the Bash 52MW WF

Project Facility	Per WTG Area/Per km	No. of WTGs/Total km	Total Area (ha)
WTGs. (Including foundation & hardstand and WTG transformer	0.76ha per WTG	8 WTGS	6.08ha
Roads	1.2ha per km	5.804km	6.965ha
Underground cable trench	-	-	Included in the land allocated to the roads land plots
Wind farm sub-station	-	-	2.618ha (including the switchyard
Lay down area (temporary laydown area, yard, office, storage, camp, batching plant)	-	-	4.0ha
Met mast	-	-	2.01ha
Total	-	-	**21.673**

Refer to Appendix B for the draft LLA.

2.2.1.1 Land Leases

The land within the Project boundary (outside of the Bash 500MW & Bash 52MW WF footprint) is used by Kokcha LLC who are a cluster under the Committee for the Development of Sericulture and Wool Industry (Refer to Bash 500MW ESIA section 4.1.2 for more details on the relationship between this Committee and Kokcha LLC). Consultations undertaken during the Bash 500MW ESIA phase revealed that they have been allocated 267,398.1ha of grazing land under their management which includes the land within the Project boundary.

According to the Presidential Decree of the Republic of Uzbekistan No 314 dated 8th July 2022 the Bash 500MW WF was allocated 149.93ha of land while the Bash 52MW has been allocated 21.673ha of land as shown in the table below.

Table 2-2 Land Allocated to the Bash 52MW & Bash 500MW

Project Facility	Bash 52MW	Bash 500MW	Type of Ownership
WTGs. (Including foundation & hardstand and WTG transformer	6.08ha for 8 WTGs	39.58ha for 79WTGS	Land lease for the Projects lifetime
Roads	6.965ha	63.53ha	

Project Facility	Bash 52MW	Bash 500MW	Type of Ownership
Underground cable trench	Included in the land allocated to the roads land plots	28.03ha	
Wind farm sub-station	2.618ha	9.7618ha	
Lay down area (temporary laydown area, yard, office, storage, camp, batching plant)	4.0ha	9.0287	During the construction phase
Met mast	2.01ha	-	Land lease for the Projects lifetime
Total	**21.673**	**149.9305**	**n/a**

The total land allocated to both Bash 52MW and Bash 500MW is equal to 171.6035ha. This includes the following:

- 17.673ha and 4ha allocated to the Bash 52MW for the lifetime of the Project and during construction respectively.
- 140.9018ha and 9.0287ha allocated to the Bash 500MW for the lifetime of the Project and during the construction phase respectively.

A cumulative impact assessment undertaken for the land allocated to both Projects show that there will be limited impact on grazing land (refer to section 16.4.1 of this Addendum for more details on the cumulative impact assessment).

2.2.1.2 Land Use and Site Condition

During the preparation of the Bash 500MW WF RAP, 10 herders were identified as using the land within the Projects boundary for grazing purposes. Three herders had constructed structures within the site while the rest of the herders only used the site for grazing. It is noted that the herders were provided with the applicable compensation entitlements as per the RAP and they have since moved to other suitable grazing areas outside of the Project boundaries.

It is noted that grazing within the Project site will be possible during the operational phase apart from areas impacted by the project footprint. Reference the Project specific RAP for more details on land users, impact and compensation entitlements etc.

2.2.2 Local Context & Potential Receptors

In addition to the existing infrastructure corridors within the Project site, other receptors have been identified within a 5km radius of the site. These include two (2) mining areas approximately 0.9km west and 1.4km east of the site. The mine at the western boundary was operated by Lucent Centre LLC and the other is operated by Navoi Sanoat Savdo.

The above-mentioned features/receptors including those identified within the Project site are presented in the table and figures below.

Note: *The Bash 500MW WF ESIA identified herders with structures within the Project site as receptors. These herders have since been relocated to suitable alternative grazing land as per the RAP and are therefore not considered as receptors within this ESIA Addendum.*

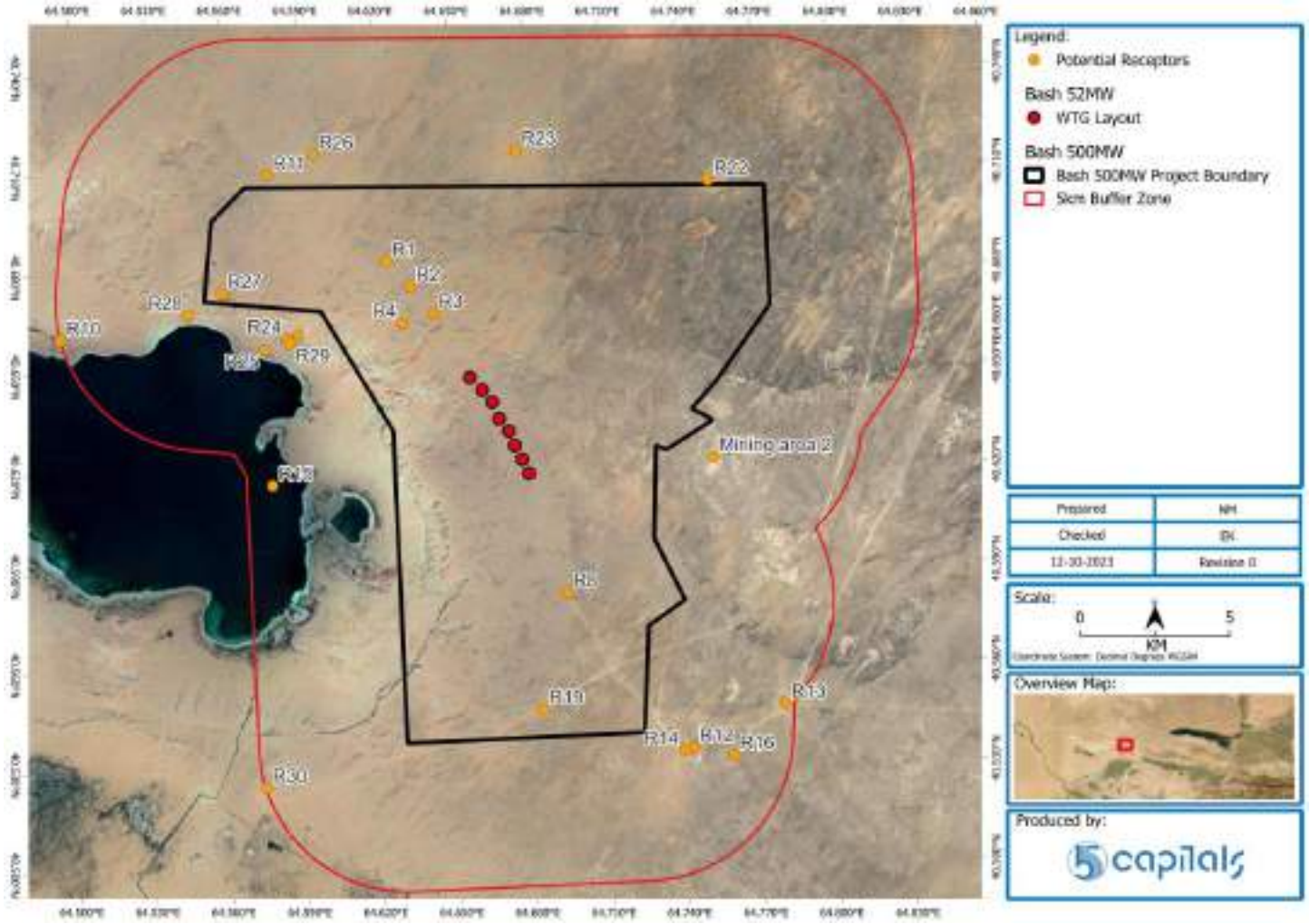
Table 2-3 Potential Receptors Within 5km of the Project Site

ID	Receptor Type	Proximity to Project	Description
R1	Infrastructure	Within the project site	Overhead transmission lines running through the north central area of the Project site.
R2			
R3			
R4	Infrastructure	Within the project site	A small railway station located towards the north-west of the site
R8	Infrastructure	Within the project site	Railway line that splits the site in a south-east to north-west direction.
R10	Structures	Approx. 4.9km to the west	Animal holding area used by herders in Ayakagitma village
R11	Infrastructure	Runs through the project site	A dirt road that runs parallel to the railway line
R12	Residential	Approx. 1.6km south east	Kuklam village
R13	Commercial	Approx. 4.55 south east	A substation located to the south east of the site
R14	Commercial	Approx. 1.26km to the south east	Gas storage facilities belonging to Asia Trans Gas.
R15	Ecological	Approx. 0.5km to the west of the Project boundary	An IBA lake with important bird species
R16	Commercial	Approx. 1.5km south east	Asia Trans Gas facility storage tanks
R19	Commercial	Within the Project site	Gas pipeline running through the southern section of the site.
R22	Structure	Approximately 175m north-east of the project site boundary	Herders' animal holding areas houses used for accommodation all year round.
R23	Structure	Approximately 1.25km to the north of the project site boundary	
R24	Structure	Approximately 1.2 km north west	Herder's accommodation area
R25	Structure	Approximately 1.5km north west	Accommodation structure used for shelter by fishermen in Lake Ayakagitma
R26	Structure	Approx. 1.2km north west of the project site	Animal holding area for a local herder called Isa
R27	Structure	Within the project site boundary	Animal holding area belonging to a herder from Ayakagitma village

ID	Receptor Type	Proximity to Project	Description
R28	Ecological	Approx. 0.7km west of the project site	Well used by herders as a water source for their livestock
R29	Ecological	Approx. 1.3km north west of the project site	A water well used by locals as a source of water for their livestock.
R30	Structure	Approximately 5km south west of the Project site	Structure used by one of the herders who uses the Project site for grazing.
Mining Area 1	Industrial	Approx. 1.4km east	Mining areas belonging to Lucent Centre LLC and Navoi Sanoat Savdo LLC respectively. It is noted that Navoi Sanoat is active while Lucent Centre LLC is inactive. Mining area 2 also includes workers accommodation areas.
Mining Area 2	Industrial	Approx. 0.9km west	

Note: *This ESIA Addendum uses the same receptor codes as the Bash 500MW ESIA to ensure consistency.*

Figure 2-5 Potential Human Receptors Within 5km of the Project Site



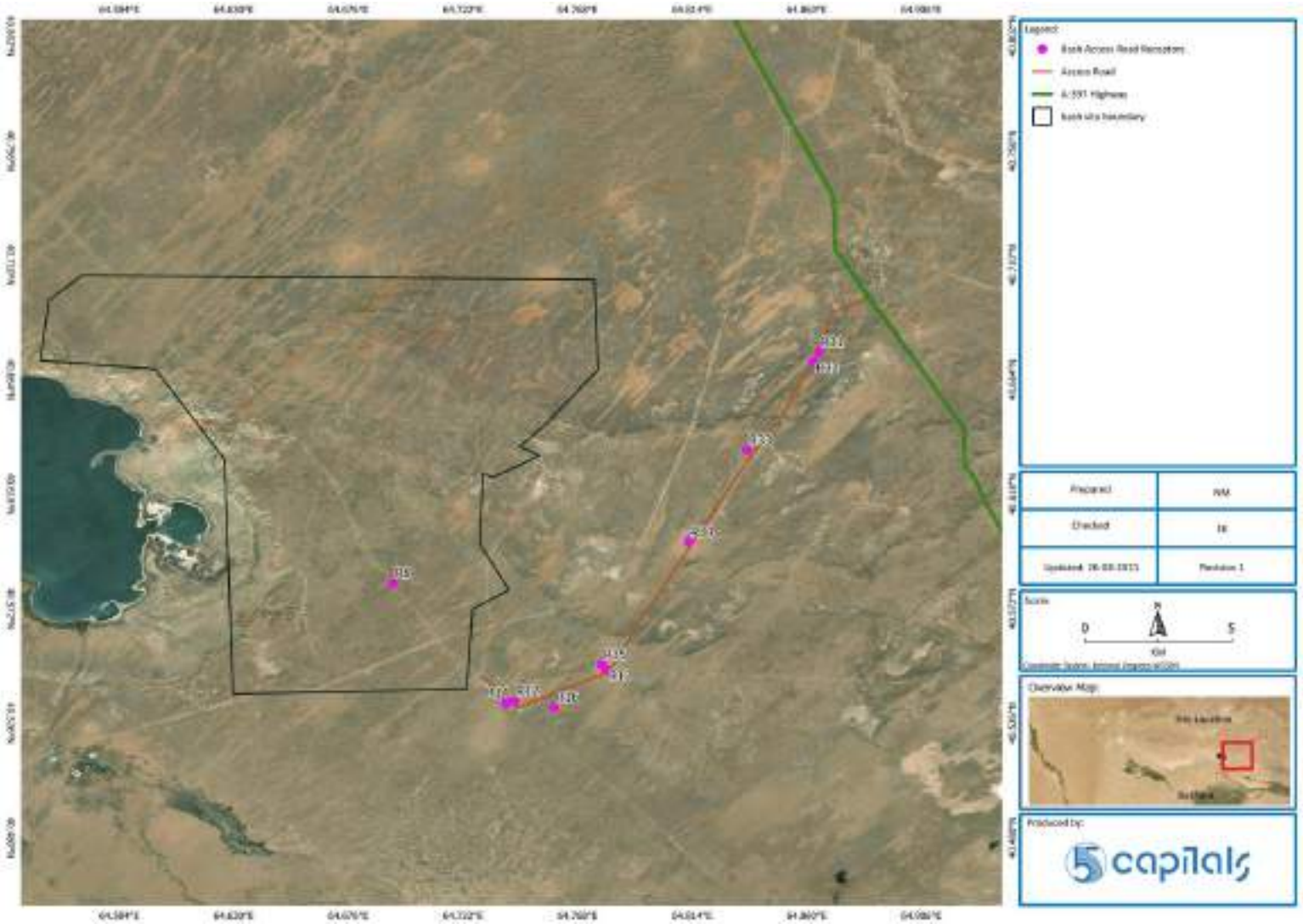
2.2.3 External Access Road

The 27.5km access road from A-379 highway to the Project site that will be used by the Project for the transportation of construction materials and workers. The receptors identified along the access road are provided in the table below.

Table 2-4 Potential Receptors along the Access Road

ID	DESCRIPTION	RECEPTOR TYPE	APPROXIMATE DISTANCE TO ACCESS ROAD
R31	Overhead Transmission Line including facility owned by grid operator	Infrastructure	Runs parallel to the access road
R32	Memorial	Cultural	Along the access road approximately 7m to the west.
R33	Herder's structure	Residential	This structure is located along the access road with a holding area for animals.
R34	Herder's structure	Residential	Located along the access road.
R13	Substation	Commercial	Located along the access road approximately 26m to the north west.
R35	Herder's structure	Residential	Located approximately 300m north west of the access road and includes an animal holding area.
R16	Asia Trans Gas facility storage tanks	Commercial	Approximately 500m south west of the access road
R12	Kuklam village	Residential	Found along the access road
R14	Gas storage facilities belonging to Asia Trans Gas on each side of the railway line	Commercial	Found along the access road approximately 177m to the west.
R8	Railway line	Infrastructure	Approximately 2.5km from the access road runs parallel to the railway line before getting into the Project site.
Note: *some of the receptors along the access road are also found within the Project 5kms area of influence. These receptors have retained their ID to match that identified in table 3-3 above.*			

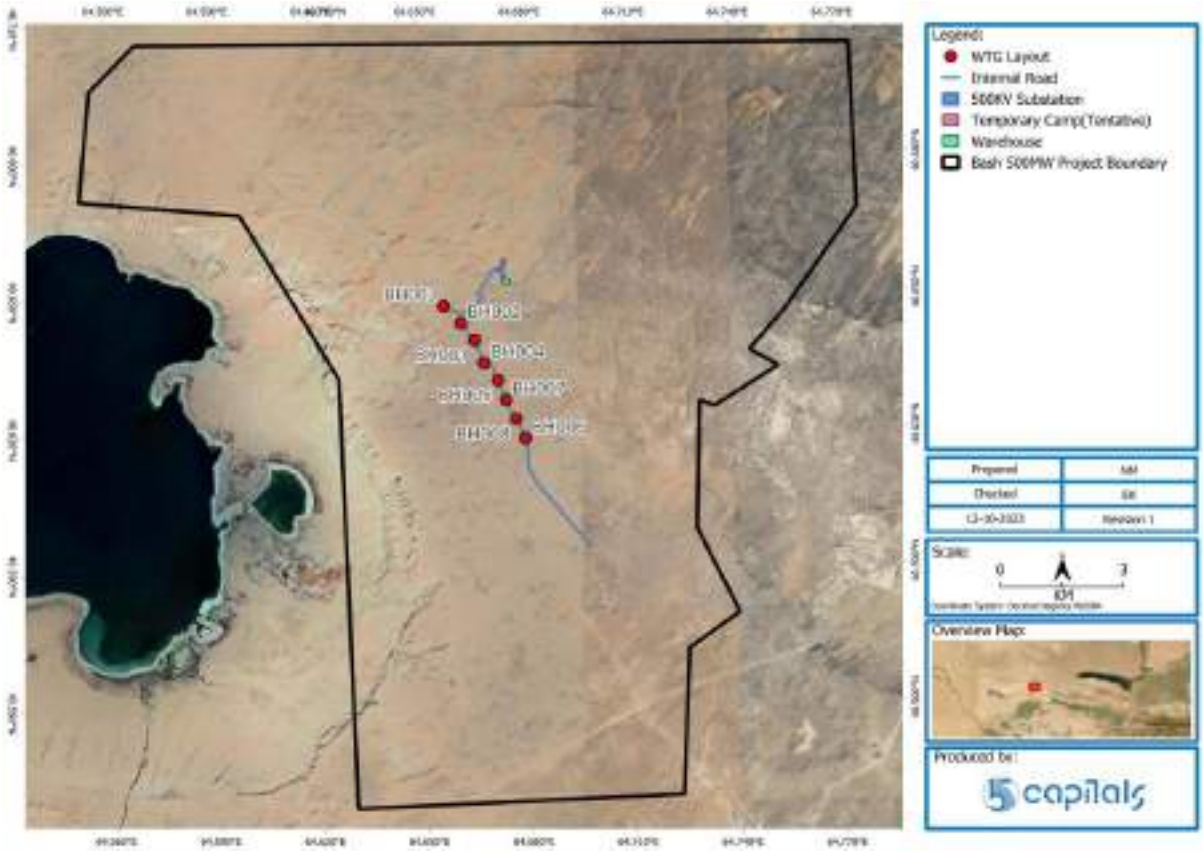
Figure 2-6 Receptors along the Access Road



2.3 Project Description

The proposed Bash 52MW WF will have 8WTGs which will utilize EN 171 6.5MW wind turbines similar to the Bash 500MW WF. The layout is as shown in the figure below.

Figure 2-7 Proposed WTG Locations within the Project Site (October 2023)



The technical description of the proposed Project is summarised in the table below.

Table 2-5 Technical Description

ITEM	DATA
WTGs	
WTG Type	ENVISION EN171 6.5
WTG Power Rating (MW)	6.5
WTG Tower Height	100
Number of WTGs	8
WTG Manufacturer and Model	ENVISION, EN171 6.5
MV Transformer	
Number of Transformers	8
Transformer Rating (KVA)	1140
Manufacturer	ENVISION
HV Transformer	

ITEM	DATA
Number of Transformers	1
Transformer Rating (MVA) (ONAN/ONAF)	50-70 MVA at ONAF rating

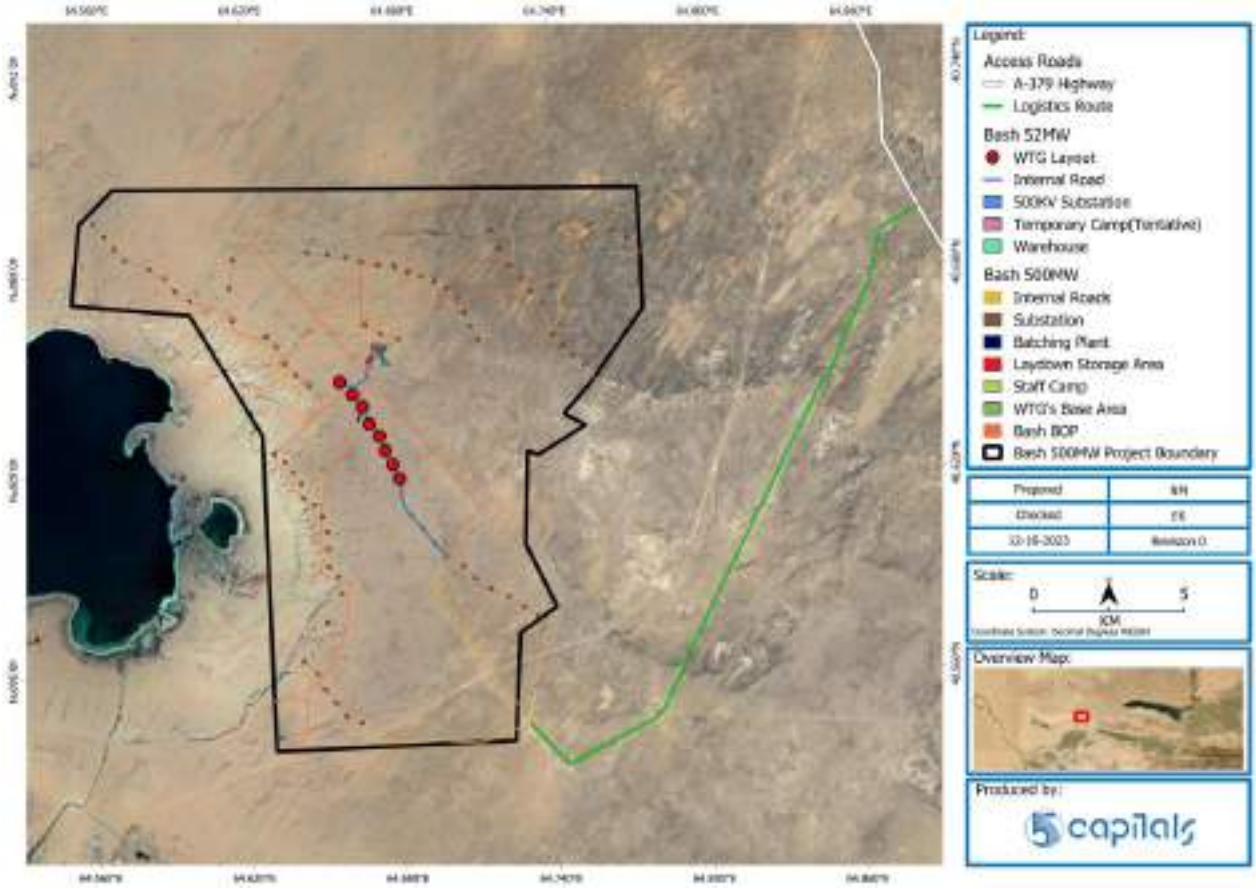
SUBSTATION

The Bash 52MW WF will include an auxiliary power building and set up transformer from 33kV required before interconnection to the bash 500MW switching station and AIS.

INTERNAL ACCESS ROADS

Internal access roads between turbines will be developed by the EPC Contractor to enable easy access within the Project site. The internal access roads will have a width of 8.5m and will cover a total area of 6.965ha.

Figure 2-8 Proposed Routing Network of Internal Access Roads



2.3.1 Project Associated Facilities

Associated facilities are those which are not funded as part of the Project, but without which (or without their expansion) the Project would not be viable. As discussed in the sections above, the Bash 52MW WF will be constructed within the same boundary as the Bash 500MW WF. In addition, the proposed Project will connect to the Bash 500MW WF sub-station before

connecting to the grid through the Bash – Karakul 162km Overhead Transmission Line (OHTL). These associated facilities are also being developed by ACWA Power and they have an approved lenders' ESIA in place. The approved ESIA can be accessed through the links provided in the table below.

Table 2-6 Website Links to Disclosed Bash 500MW WF ESIA Documents

ENTITY	WEBSITE
EBRD	https://www.ebrd.com/work-with-us/projects/esia/uzbekistan-bash-wpp.html
ADB	https://www.adb.org/projects/documents/uzb-56085-001-esia
ACWA Power	https://acwapower.com/en/projects/bash-wind-ipp/

2.4 Project Construction Requirements

The land requirement for the construction works and construction facilities at the wind farm is 21.673ha. See section 3.2.1 for a breakdown of the land requirements at the wind farm.

2.4.1 Primary Construction Works

The principal construction activities and associated requirements in relation to civil works are anticipated to include the following;

- Detailed project planning, design and consideration of wind farm components by the EPC Contractor;
- Transportation of components to the project site;
- Delivery of machinery & equipment to the site;
- Site preparation (comprising excavation, grading, levelling, and land clearing at WTG platforms) to create flat land area for preparation of turbine pads, installation of wind turbine towers and various project components;
- Additional facilities to facilitate construction work (comprising excavation and levelling etc.) for access road, internal road network, construction of any building infrastructure (if required);
- Construction of temporary laydown facilities and building site equipment (e.g. containers at the Project site);
- Installation of permanent meteorological towers (as necessary);
- Commissioning tests of electrical infrastructure (including wind turbine generators) and inspection of civil engineering quality records.

2.4.2 Temporary Construction Facilities

A temporary construction laydown area will be established within the Project site. This area will be required during the construction phase of the Project for the Wind for the storage of materials by the Engineering Procurement and Construction (EPC) contractor as well as sub-

contractors. After completion of construction, the construction laydown area will be disassembled, and the area will be returned to its original condition. The laydown area will include:

- Office containers;
- Storage areas for equipment;
- Parking areas;
- Bathroom and waste collection facilities;
- Equipment for power generation;
- Communications equipment; and
- Other miscellaneous small items as required.

2.4.3 Batching Plant

It is understood from the ACWA Power that the bash 52MW will use the same batching plant as the Bash 500MW WF. As such, no additional batching plant will be constructed.

***Note**: Impacts associated with the construction and operation of the batching plant have been assessed within the Bash 500MW WF ESIA.*

2.4.4 Utility Requirements

The EPC will be solely responsible for all construction utilities required for the wind farm including power supply, potable water, firefighting supplies and systems, erosion and sedimentation control, waste management and temporary medical and welfare facilities etc.

FUEL SUPPLY

It is anticipated that diesel electric power generators will be used as the source of electricity during construction and as backup. Currently, It is estimated that about 230,000 litres of diesel will be used for the entire construction phase. The estimated total electricity consumption will be confirmed by the EPC Contractor before the start of the construction phase.

WATER SUPPLY

It is estimated that the entire construction phase of the Project will use approximately 1,000,000 litres of water supplied by a third-party. This includes construction and potable water requirements. Based on this, it is expected that the EPC Contractor (and sub-contractors) will be able to meet the workers water needs based on the IFC & EBRD's Guidance on Worker's accommodation which states that 80 to 180lit of water per person per day should be made available (depending on the weather and accommodation standards).

In addition, the EPC Contractor will undertake a water availability assessment (depending on where the water will be sourced) to make sure that this does not impact other users. This

assessment will also include cumulative impacts of the Bash 500MW WF and other proposed development projects that may also depend on similar water sources. In addition, the EPC Contractor will be required to obtain the necessary water permits as required.

SANITARY FACILITIES

The site will require on site sanitation facilities for the construction workers (expected to be toilets and washrooms with collection septic tanks). Sanitary wastewater will be stored in bunded septic tanks on-site, prior to removal by a licensed contractor for treatment at licensed facilities off-site. The EPC Contractor will undertake a capacity assessment of the local waste facilities (for wastewater and other waste streams) before signing a contract with any waste contractors. This will be critical to ensure that these facilities are not overloaded considering the development of different projects that are on-going in the area such as Bash 500MW and Dzhankeldy 500MW WF (which is also an ACWA Power project).

2.4.5 Workforce

At this stage it is understood that the Project will have 85 employees during the construction phase. According to the EPC Contractor, up to 50% of the workforce will be recruited locally during the peak construction period. At this point, the EPC expects to hire 2 skilled and 8 unskilled female employees. However, the EPC is still finalising the organogram and there is a chance that more female employees will be recruited.

E&S PERSONNEL

The Bash 52MW WF EPC Contractor will be required to have a dedicated E&S team in order to ensure that the requirements herein and within the Bash 500MW ESIA, management plans etc are implemented, monitored and reported in accordance with the lenders requirements. The key E&S personnel will include an E&S Manager, Ecologist and a Community Liaison Officer including the Health & Safety and Human Resources personnel.

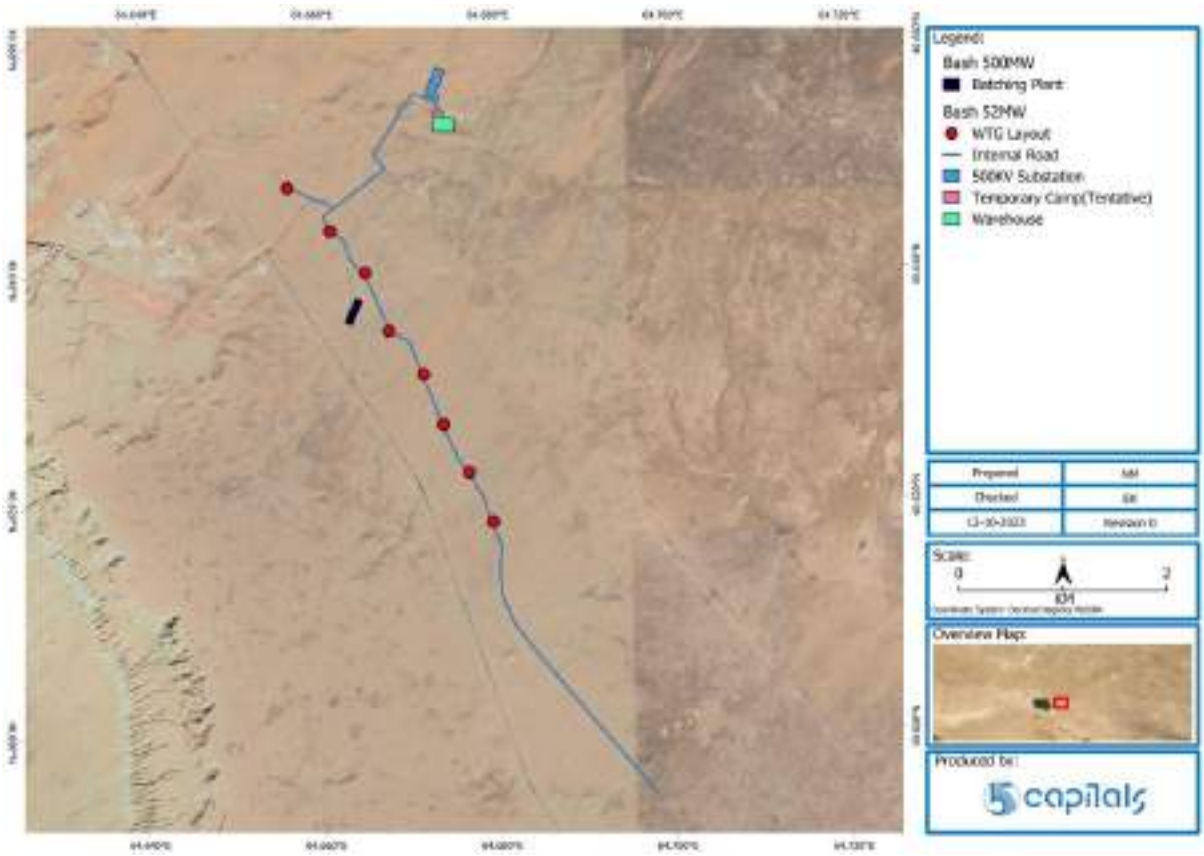
Note: *The Bash 52MW WF and Bash 500MW WFs will each have their own dedicated E&S team.*

2.4.6 Worker Accommodation

The worker accommodation for the Bash 52MW WF will be located within the Project site approximately 1.7km from the Bash 500MW batching plant (please see proposed location in the figure below). Such worker accommodation is expected to house EPC Contractor staff.

At this stage, the exact location of the subcontractor worker accommodation and other workers accommodation requirements for the subcontractor have not been confirmed. However, it is expected that the necessary facilities and standards of facilities for all worker accommodation/camp will be specified by the Project Company and will be in accordance with the IFC/EBRD Worker Accommodation Guideline.

Figure 2-9 Location of the Batching Plant (under Bash 500MW), Bash 52MW Laydown Area and Worker Accommodation for EPC Contractor Staff



2.4.7 Vehicles, Equipment and Heavy Machinery Requirements

EPC Contractors/sub-contractors responsible for different construction activities within the site will make use of various kinds of vehicles, equipment and heavy machinery during the construction phase of the wind farm. The anticipated vehicles, equipment and machinery to be used on site during the site preparation and construction activities include but not limited to:

Table 2-7 Vehicles & Construction Equipment During the Construction Phase

NAME	QUANTITY
Main crane	1
Auxiliary crane	2
Truck	6
Roller	2
Loader	4
Excavator	4
Plate trailer	2
Mobile crane	2
Car	6

***Note**:*

- *The equipment/machinery listed above is anticipated to be used by the EPC Contractor only. The sub-contractors are expected to have additional equipment/machinery depending on their area of work. The final selection of equipment/machinery might slightly differ from those proposed in the table above.*
- *The EPC will use the same crane as the bash 500MW WF subject to availability.*

2.5 Project Operation & Maintenance Requirements

The duration of the PPA is 25 years from the Project Commercial Operation Date (similar to the Bash 500MW WF) and operations and maintenance activities will be undertaken by The First National Operations and Maintenance Company (NOMAC), a wholly owned subsidiary of ACWA Power.

The operation of the wind farm will require limited operational activities such as the following:

- Operation and maintenance to include normal daily operation of equipment including maintenance (electromechanical and housekeeping) to optimise energy yield and life of the system;
- Remotely activated turbine shutdown during excessive wind speeds;
- Management of operations in relation to resident bird and bat species and migration periods during Spring and Autumn.

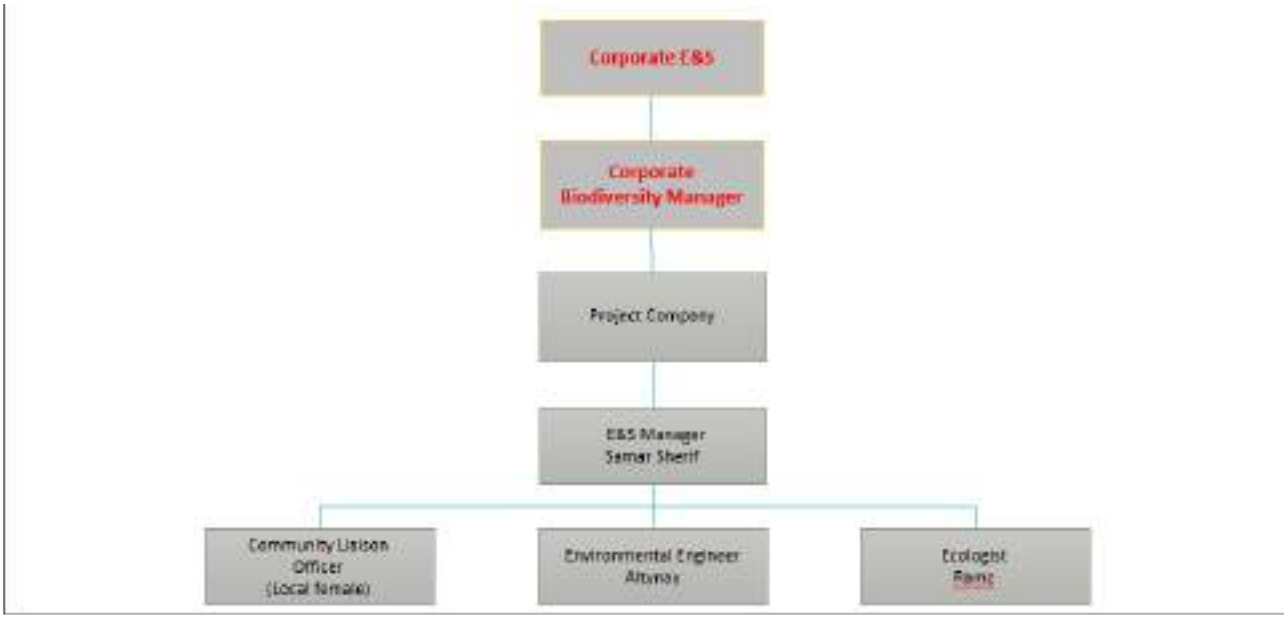
2.5.1 Workforce

The Bash 52MW WF will be operated by the same team under NOMAC as the Bash 500MW WF. At this stage, it is understood that about 35-40 workforce will be engaged to carry out operation and maintenance activities for both wind farms.

2.6 Project Company E&S Staff

The Bash 52MW WF and Bash 500MW WF Project Companies will share the same Environmental and Social experts as shown in the organisational chart below. It is understood that the roles and responsibilities of these personnel as defined under the Bash 500MW WF will be expanded to include the requirements under Bash 52MW WF.

Figure 2-10 **Preliminary Organisational Chart**



Source: Bash 500MW WF Project Company

2.7 Project Milestone

The indicative Project milestones are as provided in the table below.

Table 2-8 Key Project Milestone/Timeline

MILESTONES	DATE
Limited Notice to Proceed (LNTP)	November 2023
Notice to Proceed	March 2024
Commercial Operation Date	March 2025

3 PROJECT ALTERNATIVES

In accordance with good practice methodologies for ESIA, the evaluation of various project design and activity alternatives should be considered, in order to ensure that the objectives of the proposed project have accounted for social, environmental, economic and technological options. The following project alternatives were considered at the feasibility stage:

- No Project Option;
- Alternative Project Site;
- Project Technology; and
- Wind Farm Project Layout

3.1 No Project Option

According to the Uzbekistan Resolution No. PP-5063 "*On measures for the development of renewable and hydrogen energy in the Republic of Uzbekistan*", 2021, the government of Uzbekistan aims to:

- Support widespread introduction of innovative technologies to develop hydrogen energy and renewable energy sources;
- Build hydrogen energy infrastructure to promote energy efficiency and security; and
- Enable Uzbekistan's transition to a green economy.

As such, the Bash 52MW WF and the Hydrogen plant are part of the government strategy to enable Uzbekistan to transition to a green economy. Given the government strategy, a 'No Project' option has not been considered further as considering this option would Uzbekistan Paris Agreement Commitment of developing clean energy sources by reducing greenhouse emissions per unit of GDP by 10% compared to 2010.

Looking at the anticipated impacts as a result of the development of this project although the construction phase may likely result in potential temporary negative impacts, the operational phase of the project will result in an overall positive impact, particularly as this is going to be the first hydrogen facility in Uzbekistan with further similar projects in the pipeline.

3.2 Alternative Project Site

The process of site selection was undertaken by ACWA Power in consultation with the Ministry of Energy (MoE). ACWA Power is understood to have considered developing the proposed WF in their other on-going wind farm sites such as Dzhankeldy WF and Nukus WF. However, after further analysis of the

- The Bash site has a higher capacity factor of 1-1.5%;
- The Bash 500MW WF site allows for ACWA Power to reduce any additional habitat loss impact under the Bash 52MW WF as only an auxiliary power building and step up transformer will be required prior to interconnection to the Bash 500MW switching station and AIS.
- The topography in the ACWA Power Dzhankeldy 500MW WF site is more complex and would require higher level of earth works compared to the bash site; and
- The NUKUS site has limitations in the evacuation of the transmission system and the Project is under a PPP which would be extremely challenging to amend.
    - In addition, the land in NUKUS was not available for ACWA Power to undertake construction of the 52MW WF.

3.3 Project Technology

The Bash 52MW WF will use the same turbine technology as the Bash 500MW WF project (Envision EN 171-6.5 model). During the Bash 500MW ESIA phase, several technologies were considered as shown in the table below:

Table 3-1 Different Technologies Considered under the Bash 500MW WF

WIND TURBINE MODEL	MANUFACTURER
GW 165-6.0	Goldwind
EN171-6.5	Envision
GW165-5.2 & 5.6	Goldwind
GW155-4.5	Goldwind
EN156-5.0	Envision
MySE5.0-166	Mingyang
MySE4.0 -156	Mingyang
W4800-146	Shanghai Electric
DEW-D4500-155	Dongfang
SG6.0-170	Siemens Gamesa
V150-6.0	Vestas

The Envision EN 171-6.5 model was finally selected for both Bash 500MW and the Bash 52MW WFs based on the following:

- Technology options for flexible use and maximising energy generation during high and low wind conditions;
- Least Cost of Energy (LCOE) which results in highest generation at lowest cost;
- Site Suitability of the chosen WTG Model; and
- Project Schedule.

3.4 Wind Farm Project Layout

The siting of the Wind Turbine Generators (WTGs) was based on the following:

- Potential environmental impacts including ecological impacts;
- Location of existing infrastructure and utilities and;
- Land Use

3.4.1 Ecological Considerations

The location of the 8 WTGs under the Bash 52MW WF Project was undertaken in consideration of all the ecological buffer zones established under the Bash 500MW WF ESIA. They key ecological consideration undertaken include:

- All the WTGs are located more than 2km from Lake Ayakagitma and the cliffs.
- All the WTGs are located over 750m from Category 1 species' nests.
- All WTGS apart from two are located outside the 500m construction buffer zone for Category 2 species nests.
    - Two Kestrel nesting locations are located within 500m from a planned road alignment and a met mast. As such, construction scheduling will consider the breeding season and pre-construction surveys and monitoring in line with the Breeding Bird Protection Plan.
- All WTGs are located outside of the 200m construction buffer zone for Category 3 species nests.
- All the WTGs are located over 2km away from suitable Southern Even-fingered Gecko habitat which lies in the valley adjacent to Lake Ayakagitma. The proposed WF BoP and infrastructure is on the highland area away from this critical habitat.

In addition to the above considerations, ACWA Power will also install four (4) additional Identiflight camera systems for the 8 WTGS (in addition to the towers within the Bash 500MW WF) and implement Shut Down on Demand. In addition, the bash 52MW WF will also be required to implement all the requirements under the Breeding Bird Protection Plan (BBPP). Reference Chapter 6 for more details on the ecological assessment for the Project.

3.4.2 Existing Infrastructure

The bash 52MW WF WTGs are located within the infrastructure buffer zones identified the Bash 500MW ESIA consultations. In addition, consultations are currently on-going with the operators of the infrastructure found within the Project site in order to inform them about the proposed Project.

- All Wind Farm facilities are within 350m of Asian Trans Gas facilities which includes gas pipeline.

- Consultations with Asian Trans Gas regarding the Bash 52MW WF are scheduled for 13th October 2023.

- The design adheres to a 12m and 15m buffer zone between the Wind Farm facilities and the railway line and railway station respectively.
  - After consultations with the Bukhara Railway Authority, they asked for a site visit to be arranged so that they can visit the proposed BoP areas after which they will issue a site report. This site visit is currently being arranged by the bash 500MW Community Liaison Officer.
- No Wind Farm structures located below existing OHTLs.

3.4.3 Land Use Considerations

The Wind Farm boundary is located 1.6km to Kuklam village and 4.9km from Ayakagitma village. The siting of the 8WTGs ensures that a distance of 1000m is in place which is required as part of the noise health protection zone (from nearest WTGs) during the operational phase of the Project.

In addition, the construction activities will be limited to the Project BoP areas which will ensure minimum disturbance on the land used for grazing. . It is estimated that the 158.5748ha of land permanently allocated to Bash 52MW and Bash 500MW WFs will only impact 0.059% of the total grazing land allocated to Kokcha LLC within and outside the Project boundary (refer to section 16.4 for more details) This means that there will be minimal disruption to herding activities during the construction and operational phase of the Project.

It is noted that the Bash 500MW WF RAP includes provision for impacted herders to be relocated to suitable grazing areas and any additional impacts on grazing land as a result of the Bash 52MW WF will be assessed in the updated RAP. Grazing in areas outside the Projects BoP will be possible during the operational phase of the Projects.

4 REGULATORY FRAMEWORK

The regulatory framework for the Bash 52MW WF remains the same as that of the Bash 500MW WF. As such, reference should be made to the Bash 500MW WF ESIA chapters 3 and 5 for the applicable national and lenders requirements.

5 APPROACH TO THE ESIA ADDENDUM

5.1 Baseline Surveys Undertaken as part of the Bash 500MW ESIA

During the Bash 500MW WF ESIA phase, extensive environmental and social baseline surveys were undertaken within the boundaries of the Bash 500MW WF and in communities living within the defined Area of Influence (AoI) between March 2020 and October 2022 as shown in the table below.

These baseline studies were undertaken within the area of the project boundary and not based on the project footprint. As such, the data collected is a representative of the whole site including the proposed Bash 52MW footprint. As such, no additional ESIA surveys have been undertaken for the Bash 52MW WF. It is however noted that stakeholder consultations have been undertaken as part of the Bash 52MW WF outcome of which will be provided in the respective ESIA chapters and in the Stakeholder Engagement Plan (SEP).

Table 5-1 Environmental and Social Baseline Surveys Undertaken within bash 500MW Boundary

SITE SURVEYS		PERIOD
Project Site		
Ecology Surveys	Installation of bat detectors on wind mast	8th April 2021 – 30th June 2021
	Flora survey	9 – 11th April 2021 18th -21st June 2021
	Reptile survey	19th -21st April 2021 22nd -25th June 2021
	Invertebrates	19th – 21st April 2021
	Mammals including deployments of 5 photo traps	20th to 22nd April 2021 20th to 23rd June 2021
	Bat roost search	19th to 21st April 2021 23rd to 25th June 2021
	Houbara survey	14th to 16th April 2021 1st to 5th June 2021
	Raptor Nest survey	22nd – 24th April 2021
Bird Survey	Spring Survey	14th March 2020 – 15th May 2020

Site Surveys		Period
	Rapid Water Birds Survey	23rd March, 17-18th May, 6-8th August 2020
	Rapid Raptor Nests Survey	21st May 2020, 5th to 6th 2020
	Summer Survey	16th May 2020 – 31st August 2020
	Autumn Survey	1st September 2020 – 23rd November 2020
	Rapid Winter One Day Survey	5th January 2021
	Winter Bird Survey	November 2021 – March 2022
Bats Monitoring		2 to 7th July 2020 14th to 21st July 2020 5th to 8th August 2020
Noise Survey	Construction Noise Monitoring Survey	15th to 18th April 2021
	Detailed Noise Survey	10th August to 9th September 2021
Herders Survey		10th March 2021
Soil Survey		6th April 2021
Water samples from Lake Ayakagitma		6th April 2021
Archaeological Survey		28th May to 21st June 2021
Landscape Survey		11th March 2021 18th April 2021 30th July 2021
Socio Economic Survey	36 households in Ayakagitma village	19th – 22nd April 2021
	6 households in Chulobod village	
	6 households in Kuklam village	
Stakeholder Consultations		Stakeholder consultations were undertaken as part of the ESIA phase and there are requirements for the same during construction and operational phases.
Public Consultations as part of the National EIA		15th April 2021
Public Consultations as part of the ESIA (project site)		23rd to 24th June 2021
Overhead Transmission Line		
Ecology Surveys along OHTL	Reconnaissance Survey	21st– 22nd April 2021
	Flora survey	14th May 2021 29th June to 1st July 2021
	Reptile survey	3rd May 2021 28th to 30th June 2021
	Invertebrates	3rd May 2021
	Mammals	24 – 25th June 2021

SITE SURVEYS		PERIOD
	Bird Monitoring	7th May 2021, June, July, August, September, October and November 2021
Soil Survey		21st & 22nd August 2021
Landscape Survey		31st July– 1st August 2021
Archaeological Survey Walkover		To be determined
Water Sampling		21st & 22nd August 2021
Socio-economic Surveys		To be determined
Stakeholder Consultations	Interest Based Stakeholders	July 2021 – November 2021
	Public Consultations	6th to 7th October 2021
	Draft ESIA disclosure	22nd to 25th February 2022
	ESIA disclosure	27th June to 7th July 2022
Resettlement Action Plan		
Resettlement Action Plan		Completed in October 2022 and the implementation process is ongoing.

5.2 ESIA Addendum Methodology

This Addendum is aligned with the same ESIA methodology used in the Bash 500MW ESIA (Ref. Chapter 4 and 33 of the ESIA).

5.2.1 Cumulative Impacts

The Cumulative Impact Assessment (CIA) in this Addendum has been undertaken following guidelines in the IFC CIA Handbook, 2013.

Cumulative impacts are those that '*result from the successive, incremental, and/or combined effects of an action, project, or activity when added to other existing, planned, and/or reasonably anticipated future ones*'. CIA is therefore the process of:

- Analysing the potential impacts and risks of proposed developments in the context of the potential effects of other human activities and environmental and social external drivers on the chosen Valued Environmental and Social Components (VECs) over time; and
- Proposing concrete measures to avoid, reduce, or mitigate such cumulative impacts and risk to the extent possible.

The purpose of this cumulative impact assessment is to determine how the potential impacts of the proposed Project may potentially combine cumulatively, with the impacts of other projects or human activities, natural stressors etc in the Project area.

The objectives and expected outcomes of this Cumulative Impact Assessment process are as follows:

- Identification of VECs such as air, water, soil etc. that may be affected by the Project and the selected VECs the assessment will focus on;
- Identification of existing and reasonably anticipated and/or planned developments, as well as natural environmental and external social drivers, that could affect the selected VECs;
- Assessment and/or estimation of the future condition of selected VECs, as the result of the cumulative impacts that the project is expected to have, when combined with those of other reasonably predictable developments;
- Avoidance and minimization of cumulative impacts of the Project on the VECs; and
- Monitoring and management measures to ensure the VEC viability over the life span of the Project or its impacts.

5.3 Identification of Valued Environmental and Social Components (VECs)

VECs are those prevailing environmental and social conditions within areas that are potentially impacted by the proposed Project (during all phases). VECs have been identified through the ESIA process undertaken for the Bash 500MW WF and in this Addendum.

Consistent with the guidance, the CIA is limited to the environmental and social impacts on which the Proposed Project itself is assessed to have potentially significant effects. This also include impacts that have been raised as being of concern by stakeholders such as the local communities and Project workers.

A summary of the VECs that are considered in this Addendum, and thus within the CIA, comprise of the following:

- Physical (i.e., air quality, infrastructure, noise etc);
- Terrestrial ecology; and
- Human (i.e., local communities, local economy, workers etc).

5.4 Identification of Other Activities and Environmental Drivers

For the purpose of this ESIA Addendum, the CIA is incorporated to applicable assessment chapters to establish whether there are barriers to both current and future development within the projects area of influence, such as:

- Is there sufficient environmental carrying capacity available for future development?
- Are there any factors that may restrict future development?

- Are there any key factors of concern that may relate to the development/operation of other projects in tandem with the proposed Bash 52MW Wind Farm Project?

The above will be undertaken in consideration of the Bash 500MW WF, Dzhankeldy 500MW WF and the two mining areas near the Bash WFs boundaries.

Table 5-2 Known and/ Future Projects in the Project's Area of Influence

PROJECT	DESCRIPTION	DISTANCE TO PROJECT
Bash 500MW WF	A wind farm project that is being developed by ACWA Power alongside the Bash 52MW WF.	Within the same Project boundary as the bash 52MW WF.
Mining	Mining area 1 – This mine is currently inactive but the owner of the mine; Lucent Centre LLC has obtained a license for the extraction of gypsum valid from 2020 until 2076. There is a potential for mining works to commence anytime in the nearest future	1.4km east
	Mining area 2 - This mine is currently inactive but the owner of the mine; Navoi Sonoat Saydo LLC has obtained a license for the extraction of gypsum valid from 2020 until 2040. There is a potential for mining works to commence anytime in the nearest future	0.9km west
Dzhankeldy Wind Farm & OHTL	A wind farm project that is being developed by ACWA Power alongside the Bash Project 500MW WF & Bash 52MW WF	94km west

The different chapters of this ESIA Addendum assess the potential construction and operation impacts of on-going activities and existing facilities within the Project's area of influence on environmental and social components or aspects.

6 TERRESTRIAL ECOLOGY

6.1 Foreword

The 8 turbines under the Bash 52MW project will be located in within the same boundaries as the Bash 500MW WF. The baseline data was collected from the comprehensive ecology surveys undertaken for the Bash 500 MW project which spanned multiple seasons and are compliant with Lender Requirements. Therefore, additional surveys were not required for the Bash 52MW project.

The assessment of the impact on breeding birds in the following sub-section has been brought forward as it is recognized as one of the potential impacts of highest concern from a biodiversity perspective.

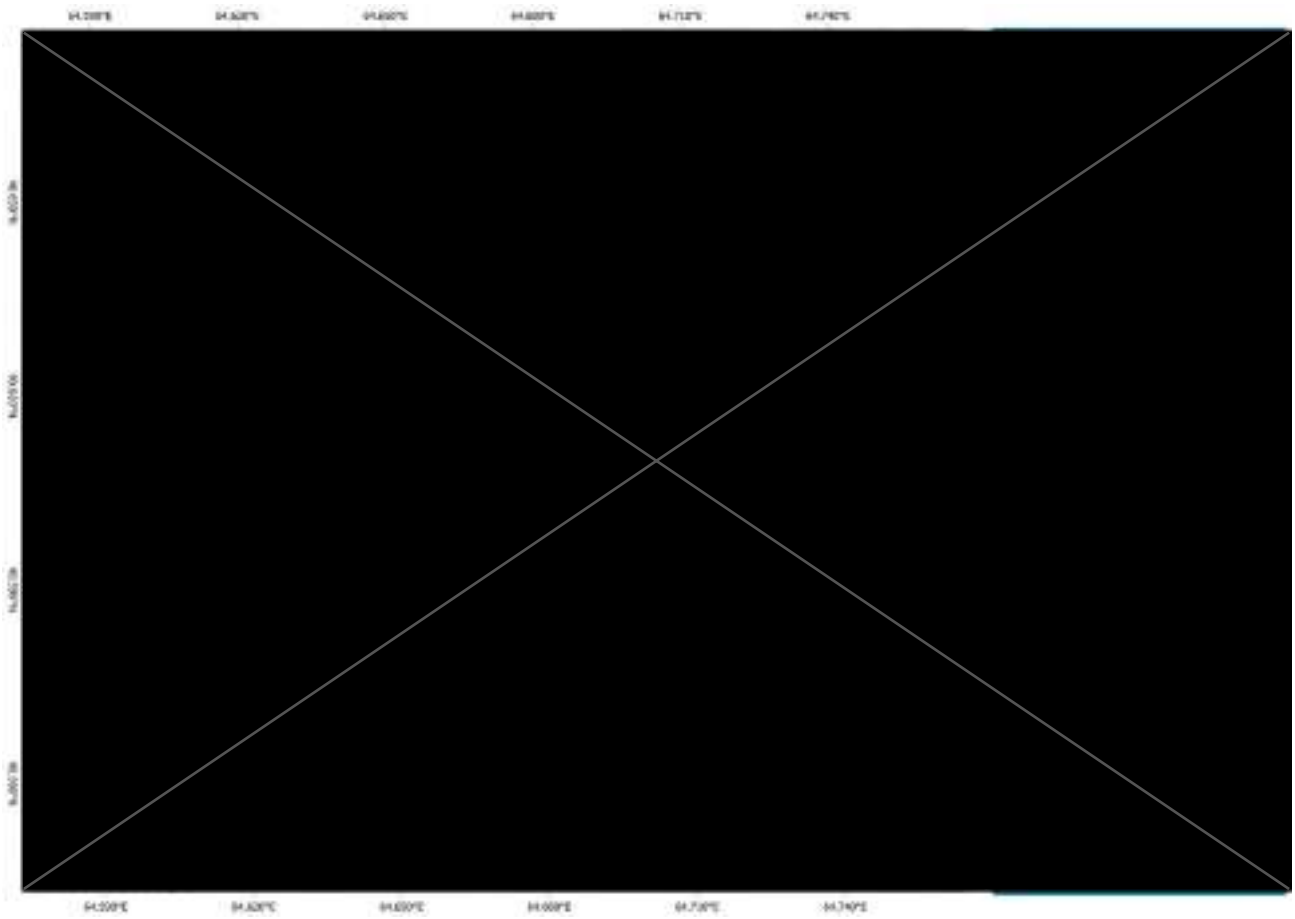
6.1.1 Breeding Birds - Known Raptor Nests

The Bash 52MW WTG siting and associated facilities layout were finalised with consideration for known nests location and applicable buffer zones as established during the Bash 500MW ESIA phase. As such, the Bash 52MW WF BoP does not fall within any of Category 1 protection zones (refer to the figure below). As such, no micrositing will be required.

It is noted that two Category 2 (Kestrel) nesting locations are located within 500m from a planned road alignment and the Project met-mast each. As such, construction scheduling will consider the breeding season and undertake the pre-construction surveys and on-going monitoring accordingly (refer to the Breeding Bird Protection Plan for more details on the Protocols required).

The requirements set out in the Bash 500MW & Bash 52MW WF Breeding Bird Protection Plan will apply in full to ensure no significant impacts on breeding birds from the addition of Bash 52MW turbines.

Figure 6-1 Nests recorded in the project area including the ecological buffer zones in relation to the bash 52MW WF



6.1.2 Houbara Bustard

The additional turbines under Bash 52MW WF occur in what is considered as potential Houbara Bustard breeding habitat as shown in the figure below. In addition, Houbara sightings were also made during the 2021 surveys undertaken as part of the Bash 500MW WF (refer to the figure below).

Since the Bash 52MW WF is located within the same boundaries as the Bash 500MW WF, the EAAA for this species and population, as developed for the entire Bash 500MW project area and area of influence, is considered to already account for Bash 52MW impacts on Houbara Bustard breeding habitat.

There are no buffer zones for Houbara Bustard in the project area and the impact mitigation strategy and net gain strategy for this species is outlined in the Bash 500MW & Bash 52MW Compensation Offset Plan.

Figure 6-2 Potential Houbara Bustard Breeding Area

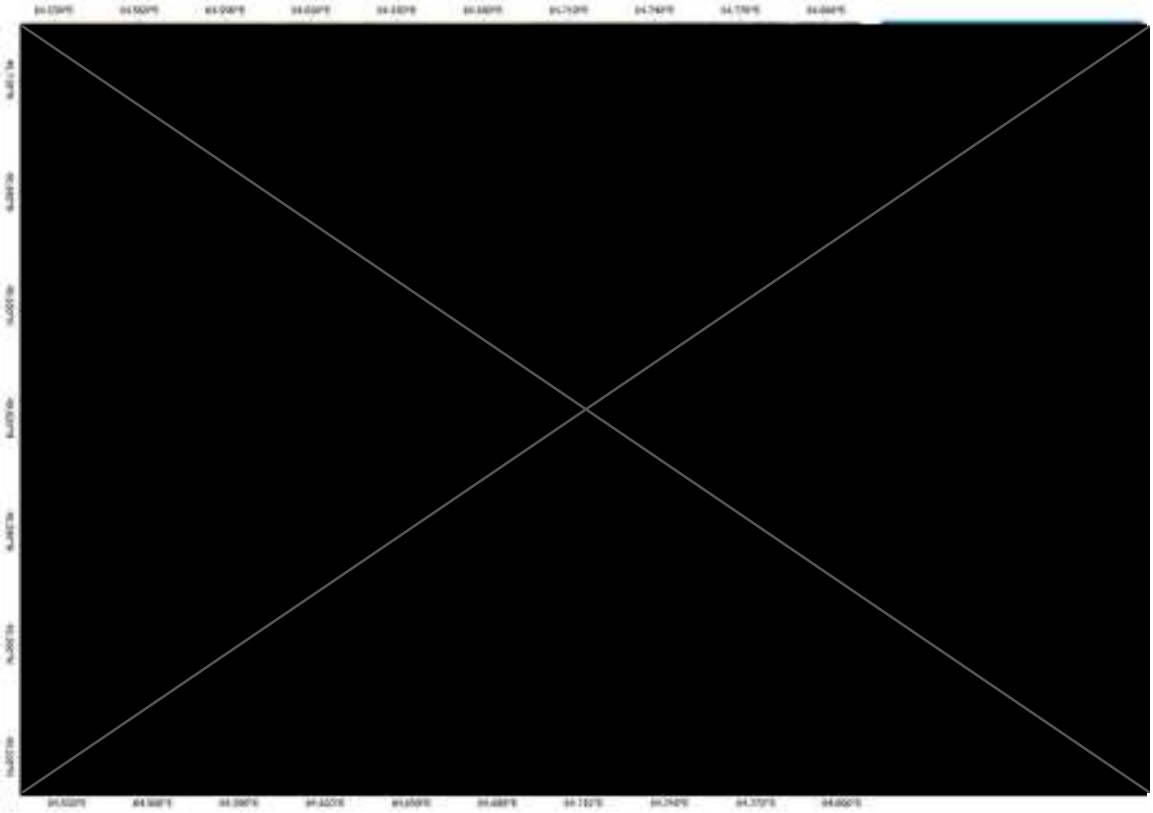
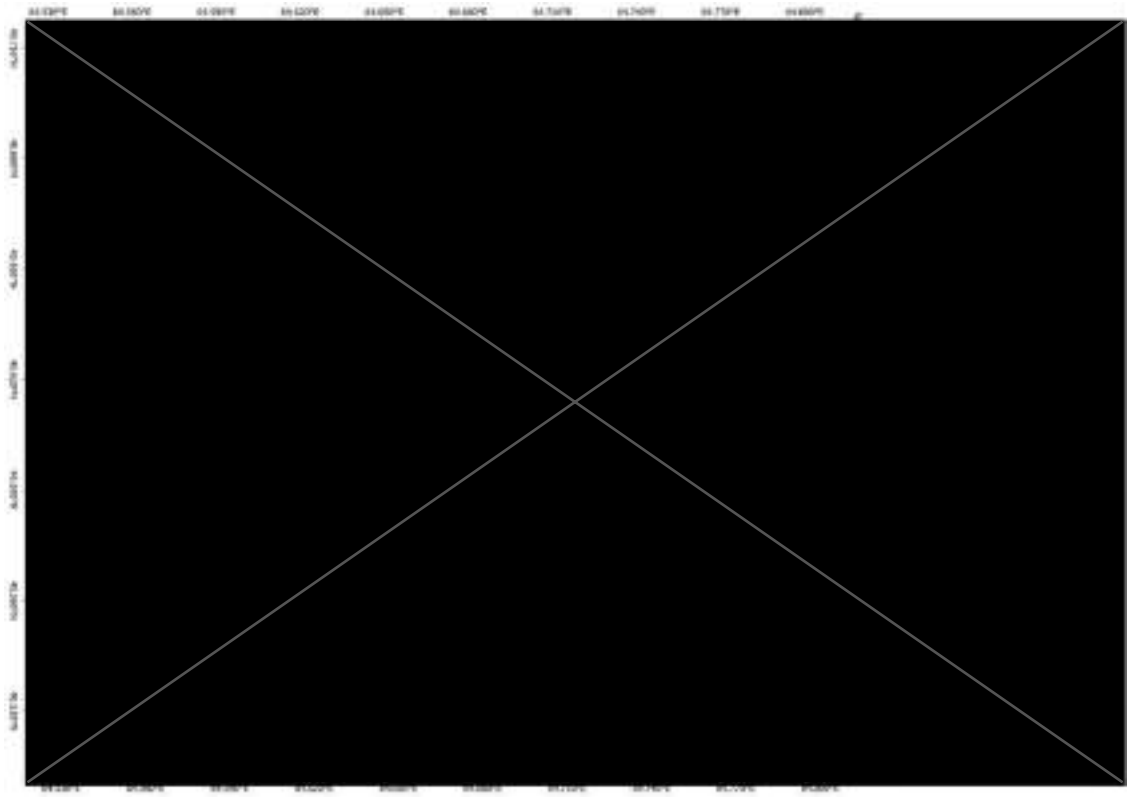


Figure 6-3 Houbara sightings during 2021 surveys undertaken for Bash 500 MW WF



6.2 Baseline Surveys

The results of the following surveys undertaken as part of the Bash 500MW WF ESIA were used to design the layout and assess the impacts of the Bash 52MW project:

- Bird Surveys (2020 – 2022)
  - Seasonal Vantage Point (VP) Surveys covered 8 vantage points in the Bash 500MW project area which also cover the Bash 52MW project area. Each VP was surveyed for 36 hours over 4 seasons in accordance Scottish Natural Heritage (now NatureScot) guidelines
  - Raptor Nest Surveys
  - Water Bird Surveys of the Lake Ayakagytma
  - Houbara Bustard Breeding Surveys
- Bat Surveys (2020- 2021)
  - Passive Acoustic Surveys covering Summer, Autumn and Spring seasons at heights of 90m and 5m
  - Roost Search Surveys
- Habitat and Vegetation Surveys (2021)
  - Vegetation and Flora surveys were undertaken in the Spring and Summer seasons in the WF and OHTL areas.
- Mammal Surveys (2021)
  - Mammal surveys were conducted using camera trapping and transect survey methods in accordance with expert guidance in the Spring and Summer seasons in the WF and OHTL areas.
- Reptile Surveys (2021)
  - Reptile surveys were conducted using diurnal and nocturnal transect survey methods in accordance with expert guidance during the Spring and Summer seasons in the WF and OHTL areas.
- Invertebrate Surveys
  - Invertebrate surveys were undertaken using a combination of transect surveys and net trapping based on expert guidance during the Spring seasons in the WF and OHTL areas of the project.

The results of the baseline surveys identified the sensitive receptors and habitats in the study area. The layout of the Bash 52MW project was designed such that siting of the turbines avoided proximity to the IBA Lake Ayakagytma and the adjacent cliffs surrounding the lake use by nesting raptors.

Additionally, the additional turbines also avoided the Critical Habitat used by the Critically Endangered Southern Even-fingered Gecko. None of the turbines are located within the 'takyr' patches of suitable habitat for the gecko, as these are located on the west side of the cliffs, whilst all turbines are located on the east side Bash 500MW Project boundary. As this

species does not occur in the Bash 52MW project area, it is not considered as a sensitive receptor for this project.

6.3 Receptors

AREA OF INFLUENCE

The area of influence is the area within which project activities may affect receptors. As different aspects carry differing spatial extents, the AoI varies considerably. The below provide the AoI that was considered for each type of predicted potential impact.

The area of influence for Habitat Loss impacts is inclusive of the full project construction and operation footprint, including associated facilities, laydown areas, and any existing or new roads utilized for incoming and outbound transport.

The area of influence for Direct Mortality impacts is inclusive of the full project construction and operation footprint, including associated facilities, laydown areas, and any existing or new roads utilized for incoming and outbound transport, as well as the airspace of the wind farm and OHTL corridor.

The area of influence for Habitat Degradation impacts extends beyond the footprint of the project inclusive of a 1km buffer, to account for the phenomenon of edge effect.

The area of influence for Habitat Fragmentation and Disturbance impacts extends beyond the footprint of the project inclusive of a 5 km buffer, to account for the phenomenon of barrier effect.

The area of influence for Displacement impacts extends beyond the footprint of the project inclusive of a 100km buffer, to account for the secondary impacts of displaced wildlife into adjacent territories.

The area of influence for Introduced Species / Proliferation of Species impacts extends beyond the footprint of the project inclusive of a 100km buffer, to account for (1) potential major invasive spread and (2) secondary impacts caused by displacement of less competitive fauna into adjacent areas.

SENSITIVE RECEPTORS

The following overview table groups the conservation value of ecological receptors that may be impacted by project works. It includes species registered during the WF surveys as well as sensitive species that are anticipated to possibly occur within the area of influence.

Table 6-1 Bash Wind Farm – Sensitive Ecological Receptors

GROUP		RECEPTOR(S)	JUSTIFICATION	VALUE
Natural Habitats		Sandy and sandy-loamy desert plain	The plant species diversity is low (8 to 18 species). The canopy cover is 20–50%. The vegetation is more or less uniform. The main type of land use is pasture; impact of grazing is medium.	Medium
		Relic uplands	Gently sloping stony relic hills with blown sandy cover are situated in the eastern part of the project site, and small insular uplands are found in the north-western part, at the border of saline depression Ayakagitma. The canopy cover varies from 10–20% on stony areas to 30–40% on sabulous places.	Medium
Threatened Flora		*Tulipa lehmanniana*	Listed as Vulnerable on the Uzbekistan Red Book.	High
Protected Flora		Black Saxaul *Haloxylon ammodendron* White Saxaul *Haloxylon persicum*	Nationally Protected	High
All other Flora		All other flora species	Listed as Least Concern, not considered to be of national importance.	Low / Lower
Endangered Birds	**Raptors**	Egyptian Vulture (PBF) Steppe Eagle (PBF) Saker Falcon (PBF) Pallas's Fish-eagle (not confirmed within AoI)	Listed as critically endangered or endangered on IUCN Red List,	Very High
	Waterbirds	Sociable Lapwing (not confirmed within AoI) White-headed Duck (PBF)	Listed as critically endangered or endangered on IUCN Red List.	Very High
Threatened Birds	**Raptors**	Eurasian Griffon (PBF) Cinereous Vulture (PBF) Greater Spotted Eagle (PBF) Eastern Imperial Eagle (PBF)	Listed as vulnerable or near threatened on IUCN Red List.	High
	Waterbirds	Marbled Teal (not confirmed) Lesser White-fronted Goose (not confirmed)	Listed as vulnerable or near threatened on IUCN Red List.	High

Group		Receptor(s)	Justification	Value
		Common Pochard (not confirmed) Dalmatian Pelican (not confirmed) Ferruginous Duck (not confirmed) Eurasian Oystercatcher (not confirmed) Great Snipe (not confirmed)		
	Groundbirds	Houbara Bustard (Critical) Great Bustard (not confirmed) Little Bustard (not confirmed)	Listed as vulnerable or near threatened on IUCN Red List.	High
	Songbirds/ Allies	European Turtle-dove (not confirmed) Yellow-eyed Pigeon (not confirmed) Meadow Pipit (not confirmed) Redwing (not confirmed)	Listed as vulnerable or near threatened on IUCN Red List.	High
Nationally-threatened Birds	**Raptors**	White-tailed Sea Eagle (PBF) Booted Eagle (PBF) Golden Eagle (PBF) Lesser Kestrel	Classified as Least Concern on the global IUCN Red List but listed as vulnerable or near-threatened under Uzbekistan Red Data Book.	Medium
	Waterbirds	Great White Pelican (PBF)		
Non-threatened Birds	**Raptors**	Eurasian Marsh-harrier Hen Harrier Eurasian Sparrowhawk Shrikra Common Buzzard Long-legged Buzzard Eurasian Kestrel	Classified as Least Concern on the global IUCN Red List, but listed as vulnerable or near-threatened under Uzbekistan Red Data Book.	Medium
	Waterbirds	Common Crane Tufted Duck		
All other Birds		All other Bird species	Listed as Least Concern on the IUCN Red List, not of national importance.	Low / Lower

Group		Receptor(s)		Justification	Value
Bats		*Eptesicus serotinus* *Pipistrellus kuhli,* *Pipistrellus pipistrellus* *Vespertilio murinus* *Rhinolophus bocharicus* *Plecotus sp* *Hypsugo savii* *Eptesicus bottae*	PBF	These species are not threatened, and generally common and widespread. Bats however are important for ecosystem function and are generally understudied, with many global populations thought to be on the decline; classified as PBFs	Medium
Threatened Mammals	**Artiodactyl**	Goitored Gazelle (PBF)		This species is listed as Vulnerable on the IUCN Red List	High
	Insectivores	Brandt's Hedgehog		This species is listed as near threatened in the Uzbekistan Red Book. Hedgehogs are an important top-down control for various invertebrate populations.	Medium
	Carnivores	Striped Hyaena (Not confirmed)		This species is listed as near-threatened on the IUCN Red List.	
	Mustelids	Marbled Polecat *Vormela peregusna* (Not Confirmed within AoI)		Mustelids act as top-down control on prey populations and help control disease. This species listed as VU on the IUCN Red List Book.	
Non-threatened Mammals	**Carnivores**	Red Fox		This carnivore acts as top-down control on prey populations and help control disease. However, these species are not threatened or endemic and are common and widespread. As a generalist species, population increase near anthropogenic areas is typical.	Low / Lower
		Asiatic Wildcat		This carnivore acts as top-down control on prey populations and help control disease. Further as a shy and secretive species, populations near anthropogenic areas tend to decline. However, this species is not threatened or endemic.	Medium
	Insectivores	Long-eared Hedgehog *Hemiechinus auritus*		Hedgehogs are an important top-down control for various invertebrate populations. However, this species is not threatened or endemic and are common and widespread.	Low / Lower

GROUP		RECEPTOR(S)	JUSTIFICATION	VALUE
	Mustelids	Asian Badger	Mustelids act as top-down control on prey populations and help control disease. However, this species is not threatened or endemic and are common and widespread.	Medium
	Rodents & Small Herbivories	Tolai hare *Lepus totai* Yellow ground squirrel *Spermophilus fulvus* Zaisan Mole Vole *Ellobius tancrei* Small five-toed jerboa *Allactaga elater* Severtzov's jerboa *Allactaga severtzovi* Great gerbil *Phombomys opimus* Libyan jird *Meriones libycus*	Rodents are an important prey species and also contribute to soil health via burrow aeration and vegetation spread via seed banking. However, these species are not threatened or endemic and are common and widespread.	Low / Lower
Endangered Herptiles		Southern Even-fingered Gecko *Alsophylax laevis*	This species is listed as critically endangered on the IUCN Red List and is considered regionally endemic; This species is not present in the Bash 52MW WF project area due to the absence of the niche ecological habitat (Takyr) required by this species. This has been further confirmed by the EPC Contractor Team for the Bash 50MW Project. Therefore this species has not been further assessed against potential impacts in the following sections.	Very High
Threatened Herptiles		Russian tortoise *Testudo horsfieldii* (PBF)	This tortoise is listed as Vulnerable on the IUCN Red List. Meets criteria for PBF.	High
Nationally important Herptiles	**Lizards**	Caspian Monitor *Varanus griseus caspius*	This species is listed as vulnerable in the Uzbekistan Red Data Book.	Medium
	Snakes	Desert sand boa *Eryx miliaris*	This species is listed as near threatened in the Uzbekistan Red Data Book.	Medium
	Amphibians	Turan Toad *Bufotes turanensis*	This species is not threatened and are common and widespread.	Low / Lower

Group		Receptor(s)	Justification	Value
Non-threatened Herptiles	**Geckos and Lizards**	Caspian Bent-Toed Gecko *Tenuidactylus caspius* Comb-toed Gecko *Crossobamon eversmanni* Turkestan thin-toed gecko *Tenuidactylus fedtschenkoi* Common Wonder Gecko *Teratoscincus scincus* Steppe agama *Trapelus sanguinolentus* Sunwatcher toad-headed agama *Phrynocephalus helioscopus* Lichtenstein's Toadhead Agama *Phrynocephalus interscapularis* Rapid Lizard *Eremias velox* Aralo-Caspian racerunner *Eremias intermedia* Sand Racerunner *Eremias scripta*	These species are not threatened and are common and widespread.	Low / Lower
	Snakes	Sand racer *Psammophis lineolatus* (Not Confirmed) Spotted whip snake *Hemorrhois ravergieri* (Not Confirmed) Spotted desert racer *Platyceps karelinii* Dice Snake *Natrix tessellata*	These species are not threatened and are common and widespread.	Low / Lower
Non-threatened Invertebrates		Hymenoptera (Wasps/Bees/Ants) Coleoptera (Beetles) Diptera (True Flies) Lepidoptera (Butterflies/Moths) Hemiptera (True Bugs) Blattodea (Cockroaches) Scorpiones (Scorpions) Scolopendromorpha (Centipedes)	Some of the species found are important predators whilst others are important pollinators. However, these species are not threatened or endemic and are common and widespread.	Low / Lower

6.4 Potential Impacts, Mitigation, Management & Residual Impacts

6.4.1 Construction Phase

6.4.1.1 Ecosystem Function Degradation

HABITAT LOSS

Clearing, grading, excavation and other earthworks during early construction stages results in habitat loss over the full construction footprint of the project, including temporary structures, lay-down areas, and new and existing roads used for incoming and outbound traffic.

Habitat loss affects both vegetation and wildlife species that currently use the affected areas as well as overarching ecosystem function on a wider regional scale. Vegetation cannot re-establish in impermeable paving or compacted soils, and wildlife dependent upon natural features and resources cannot utilize the converted land which restricts available habitat regionally. Ecosystem function will be degraded as a result.

Construction footprint typically involves some degree of buffer. However, maintaining strict requirements to minimize the construction buffer as much as practicable will reduce the magnitude of habitat loss impact.

A buffer of 30 meters has been calculated around the 8 WTGs and substation to encompass the footprint as well as a buffer for construction activity.

The EPC Contractor will maintain the following to restrict the construction footprint as much as possible:

- The access roads within the wind farm will be a width of 7m. The allowed construction buffer will not exceed 5m to each side of the permanent road footprint.
- The allowed construction buffer for the substation footprint will not exceed 10m buffer from the edges of the permanent built-up area.
- The allowed construction buffer around the wind turbine pads will not exceed a maximum 30m buffer.

Table 6-2 Extent of Habitat Loss (ha) for Bash 52

HABITAT	HABITAT LOSS BASED ON 7M ROAD +5M BUFFER, 65X65M WTG +30M BUFFER AND SUBSTATION + 30M BUFFER (REALISTIC SCENARIO)
Sandy and sandy loamy desert plains	0.10
Relic Uplands	0.33
Total	0.43

Habitat loss within the footprint of the structures will be permanent or at least until the project is eventually decommissioned. Habitat loss is certain to occur; the extent of which is presented in the following table. The Magnitude of loss of each type of habitat has been based on the overall amount of loss, as calculated in the previous table.

Table 6-3 Significance of Unmitigated Habitat Loss

RECEPTOR	VALUE/ SENSITIVITY	MAGNITUDE	SIGNIFICANCE
Natural Habitats (Sandy and sandy-loamy desert plains)	Medium	Minor	**Minor**
Natural Habitats (Relic uplands)	Medium	Minor	**Minor**

The extent of habitat loss due to Bash 52MW and Bash 500MW projects combined are provided below:

Table 6-4 Extent of Habitat Loss (ha) for Bash 52 and Bash 500 combined

HABITAT	HABITAT LOSS BASED ON 7M ROAD +5M BUFFER, 65X65M WTG +30M BUFFER AND SUBSTATION + 30M BUFFER (REALISTIC SCENARIO) FOR BASH 500	TOTAL HABITAT LOSS
Cliffs and Eroded slopes of Saline Depression	0.08	0.08
Fixed and Semi-fixed sands	1.69	1.69
Sandy and sandy loamy desert plains	0.36	0.69
Relic Uplands	0.27	0.37
Total	2.40	2.83

Given that the 8 additional WTGs of the Bash 52MW Project are being added within the boundaries of the original Bash 500MW Project, there is no significant increase in the cumulative impacts of habitat loss due to both projects.

Table 6-5 Significance of Cumulative Unmitigated Habitat Loss

RECEPTOR	VALUE/ SENSITIVITY	MAGNITUDE	SIGNIFICANCE
Cliffs and Eroded slopes of Saline Depression	High	No Change	**Neutral**
Fixed and Semi-fixed sands	High	No Change	**Neutral**
Natural Habitats (Sandy and sandy-loamy desert plains)	Medium	Moderate	**Moderate**
Natural Habitats (Relic uplands)	Medium	Minor	**Minor**

Habitat loss impact will be further mitigated by the following mitigation measures which are identical to those applied for the Bash 500MW project:

- The EPC contractor will commit to the restoration of habitat post-construction in unused land areas that are not required for O&M maintenance. The Restoration Action Plan will provide the restoration measures that will be undertaken for natural habitats, post-construction restoration via seeding, re-planting, and landscaping with native, high-value species, monitoring and reporting requirements of the plan.

With post-construction restoration and compensatory restoration of the same amount of land and/or habitats as much as possible, the residual significance is Negligible to Minor.

Table 6-6 Residual Significance of Mitigated Habitat Loss

RECEPTOR	VALUE/ SENSITIVITY	MAGNITUDE	RESIDUAL
Natural Habitats (Sandy and sandy-loamy desert plains)	Medium	Negligible	**Negligible to Minor**
Natural Habitats (Relic uplands)	Medium	Negligible	**Negligible to Minor**

Therefore, the residual cumulative impacts of mitigated habitat loss are considered as Negligible to Minor.

Table 6-7 Residual Cumulative Significance of Mitigated Habitat Loss

RECEPTOR	VALUE/ SENSITIVITY	MAGNITUDE	RESIDUAL
Cliffs and Eroded slopes of Saline Depression	High	No Change	**Neutral**
Fixed and Semi-fixed sands	High	No Change	**Neutral**
Natural Habitats (Sandy and sandy-loamy desert plains)	Medium	Minor	**Minor**
Natural Habitats (Relic uplands)	Medium	Negligible	**Negligible to Minor**

6.4.1.2 Biodiversity Loss – Direct Mortality and Lowered Survivorship

CLEARING, EXCAVATION AND EARTHWORKS

Clearing of existing vegetation will result in direct loss and mortality of removed specimens. Further, wildlife such as burrowing rodents and herptiles may be directly crushed during earthworks, or may suffer stress-induced mortality.

The Russian Tortoise (VU) is a burrowing species considered a Priority Biodiversity Feature (PBF), respectively. Active only during a few of months of the spring season, the Russian tortoise spends majority of the year in a dormant state in burrows below ground which makes it all the more susceptible to earthworks. The niche habitat type of the Southern Even-fingered Gecko is not present in the Bash 52MWproject area, therefore there are no expected impacts to this species.

The magnitude and unmitigated significance calculations are presented in the table below.

Table 6-8 Significance of Direct Loss and Mortality

RECEPTOR	VALUE/ SENSITIVITY	MAGNITUDE	SIGNIFICANCE
Threatened Flora	High	Minor	**Minor to moderate**
Protected Flora	High	Minor	**Minor to moderate**
Non-threatened Flora	Low / Lower	Minor	**Negligible to minor**
Non-threatened Mammals	Low / Lower	Minor	**Negligible to minor**
Russian Tortoise	High	Minor	**Moderate to Major**
Nationally Important Herptiles	Medium	Minor	**Minor**
Non-threatened Herptiles	Low / Lower	Minor	**Negligible to minor**
Non-threatened Invertebrates	Low / Lower	Minor	**Negligible to minor**

Given that the 8 additional WTGs of the Bash 52MW Project are being added within the boundaries of the original Bash 500MW Project, there may be a minor increase in the cumulative impacts due to direct loss and mortality.

Table 6-9 Cumulative Significance of Direct Loss and Mortality

RECEPTOR	VALUE/ SENSITIVITY	MAGNITUDE	SIGNIFICANCE
Threatened Flora	High	Moderate	**Moderate to Major**
Protected Flora	High	Moderate	**Moderate to Major**
Non-threatened Flora	Low / Lower	Moderate	**Minor**
Non-threatened Mammals	Low / Lower	Moderate	**Minor**
Russian Tortoise	High	Major	**Major**
Nationally Important Herptiles	Medium	Moderate	**Moderate**
Non-threatened Herptiles	Low / Lower	Moderate	**Minor**
Non-threatened Invertebrates	Low / Lower	Moderate	**Minor**

The following mitigation measures which are identical to those applied for the Bash 500MW project will be implemented to reduce the impacts on floral species:

- As part of the Biodiversity Management Program (BMP), a Flora Conservation Action Plan has been prepared, which outlines the locations, timings and methodology of pre-construction flora surveys to be undertaken for the purposes of seed collection, seed storage, demarcation of areas to be protected, and translocation of whole specimens if deemed feasible for endangered and threatened flora during appropriate season.
- The EPC contractor will commit to the restoration of habitat post-construction in unused land areas that are not required for O&M maintenance. The Restoration Action Plan will provide the restoration measures that will be undertaken for natural habitats, post-construction restoration via seeding, re-planting, and landscaping with native, high-value species, monitoring and reporting requirements of the plan.

The following mitigation measures which are identical to those applied for the Bash 500MW project will be implemented to reduce the impacts on fauna species:

- A Reptile Relocation Plan has been prepared for the Russian Tortoise which the outlines the methodology and results of the identification of release sites, erection of fencing to exclude relocated tortoises in the construction footprint, monitoring and reporting requirements as well as assigned roles and responsibilities. Full-time Ecologist as part of EPC contractor team to be on site throughout all construction works from the time of LNTP, inclusive of all early site preparation works, and throughout the entirety of the construction period.
- Chance Find Procedure has been included within the CESMP to provide general guidance on potential ecological triggers for work stoppage and will be implemented by the Ecologist and EPC contractor team. For non-threatened species such as other herptiles, rodents, and invertebrates, chance-find procedures with individual relocations as deemed necessary may be sufficient;
- The Biodiversity Action Plan (BAP) provides the strategy designed to No Net Loss (NNL) for the Russian Tortoise

With the above measures, the residual significance is presented in the following table.

Table 6-10 Residual Significance of Direct Loss and Mortality

RECEPTOR	VALUE/ SENSITIVITY	MAGNITUDE	RESIDUAL
Threatened Flora	High	No Change	**Neutral**
Protected Flora	High	No Change	**Neutral**
Non-Threatened Flora	Low / Lower	Negligible	**Negligible to Minor**
Non-threatened Mammals	Low / Lower	Negligible	**Negligible to Minor**
Russian Tortoise	High	Negligible	**Minor**
Nationally Important Herptiles	Medium	Negligible	**Negligible to Minor**
Non-threatened Herptiles	Low / Lower	Negligible	**Negligible to Minor**
Non-threatened Invertebrates	Low / Lower	Negligible	**Negligible to Minor**

Therefore, the residual cumulative impacts of mitigated habitat loss are considered as Negligible to Minor.

Table 6-11 Residual Significance of Cumulative Direct Loss and Mortality

RECEPTOR	VALUE/ SENSITIVITY	MAGNITUDE	RESIDUAL
Threatened Flora	High	Negligible	**Minor**
Protected Flora	High	Negligible	**Minor**
Non-Threatened Flora	Low / Lower	Minor	**Negligible to Minor**
Non-threatened Mammals	Low / Lower	Minor	**Negligible to Minor**
Russian Tortoise	High	Minor	**Minor to Moderate**
Nationally Important Herptiles	Medium	Minor	**Minor**
Non-threatened Herptiles	Low / Lower	Minor	**Negligible to Minor**
Non-threatened Invertebrates	Low / Lower	Minor	**Negligible to Minor**

VEHICULAR COLLISION

Wildlife can be runover or collide with, motorized vehicles and equipment. Vehicle-related death from trucks and machinery are less of a concern for larger mammals such as Gazelle, and Fox which are more likely to disperse in time to avoid collision (as the site vehicles will be traveling under speed restrictions and large equipment movement such as cranes and turbine parts will be very slow).

Small to medium sized wildlife such as to hare, hedgehog and rodents, tortoise, lizards, snakes and amphibians have a higher chance of mortality from vehicular and machinery collisions. This could also apply to endangered, threatened and non-threatened raptors which may scavenge from road-kill.

As per field survey records, road-kill has already been identified as an ongoing issue in some parts of the region. It will be important to ensure that the influx of traffic during construction stage does not exasperate this issue.

The magnitude and unmitigated significance calculations are presented in the table below.

Table 6-12 Significance of Vehicular Collision

RECEPTOR	VALUE/ SENSITIVITY	MAGNITUDE	SIGNIFICANCE
Endangered Raptors	Very High	Minor	**Moderate to Major**
Threatened Raptors	High	Minor	**Minor to Moderate**
Threatened Ground birds	High	Minor	**Minor to Moderate**
Nationally Threatened Raptors	Medium	Minor	**Minor to Moderate**
Non-threatened Raptors	Medium	Minor	**Minor to Moderate**
Goitered Gazelle	High	Negligible	**Minor**
Threatened Mammals	Medium	Minor	**Minor**
Non-threatened Mammals	Low / Lower	Negligible	**Negligible to Minor**
Russian Tortoise	High	Moderate	**Moderate to Major**
Nationally Important Herptiles	Medium	Moderate	**Moderate**
Non-threatened Herptiles	Low / Lower	Minor	**Negligible to Minor**

Given that the 8 additional WTGs of the Bash 52MW Project are being added within the boundaries of the original Bash 500MW Project, there may be moderate increase in the cumulative impacts due to Vehicular Collisions.

Table 6-13 Cumulative Significance of Vehicular Collision

RECEPTOR	VALUE/ SENSITIVITY	MAGNITUDE	SIGNIFICANCE
Endangered Raptors	Very High	Moderate	**Major**
Threatened Raptors	High	Moderate	**Moderate to Major**
Threatened Ground birds	High	Moderate	**Moderate to Major**
Nationally Threatened Raptors	Medium	Moderate	**Moderate**
Non-threatened Raptors	Medium	Moderate	**Moderate**
Goitored Gazelle	High	Minor	**Minor to Moderate**
Threatened Mammals	Medium	Moderate	**Moderate**
Non-threatened Mammals	Low / Lower	Minor	**Negligible to Minor**
Russian Tortoise	High	Major	**Major**
Nationally Important Herptiles	Medium	Major	**Moderate to Major**
Non-threatened Herptiles (Amphibians, Lizards, Geckos, Snakes)	Low / Lower	Moderate	**Minor**

However, the following mitigation measures which are identical to those applied for the Bash 500MW project will be implemented to reduce the risks from these impacts:

- Strict speed controls which will be enforced by EPC HSE and Security teams; especially during the active period (Late Spring – April) for the Russian Tortoise;
- Ban against driving outside of delineated access roads and restricting driving and machinery operation to daylight hours;
- The CESMP will include protocol for removal of any road-kill carcasses immediately upon observation to at least 10 meters away from the access roads during the construction phase by the EPC Contractor.

With the above measures, the residual significance is presented in the following table.

Table 6-14 Residual Significance of Vehicular Collision

RECEPTOR	VALUE/ SENSITIVITY	MAGNITUDE	RESIDUAL
Endangered Raptors	Very High	No Change	**Neutral**
Threatened Raptors	High	No Change	**Neutral**
Threatened Groundbirds	High	No Change	**Neutral**
Nationally Threatened Raptors	Medium	No Change	**Neutral**
Non-threatened Raptors	Medium	No Change	**Neutral**
Goitored Gazelle	High	No Change	**Neutral**
Threatened Mammals	High	No Change	**Neutral**
Non-threatened Mammals	Low / Lower	No Change	**Neutral**
Russian Tortoise	High	No Change	**Neutral**
Nationally Important Herptiles	Medium	No Change	**Neutral**

Receptor	Value/ Sensitivity	Magnitude	Residual
Non-threatened Herptiles (Amphibians, Lizards, Geckos, Snakes)	Low / Lower	No Change	**Neutral**

Therefore, the residual cumulative impacts of mitigated habitat loss are also considered as Negligible to Minor

Table 6-15 Residual Cumulative Significance of Vehicular Collision

Receptor	Value/ Sensitivity	Magnitude	Residual
Endangered Raptors	Very High	Negligible	**Minor**
Threatened Raptors	High	Negligible	**Minor**
Threatened Groundbirds	High	Negligible	**Minor**
Nationally Threatened Raptors	Medium	Negligible	**Negligible to Minor**
Non-threatened Raptors	Medium	Negligible	**Negligible to Minor**
Goitored Gazelle	High	Negligible	**Minor**
Threatened Mammals	High	Negligible	**Minor**
Non-threatened Mammals	Low / Lower	Negligible	**Negligible to Minor**
Russian Tortoise	High	Negligible	**Minor**
Nationally Important Herptiles	Medium	Negligible	**Negligible to Minor**
Non-threatened Herptiles (Amphibians, Lizards, Geckos, Snakes)	Low / Lower	Negligible	**Negligible to Minor**

"Take" (Poaching, Hunting, Gathering)

The presence of site workers can lead to increased hunting, poaching, or gathering on site. Flora and vegetative matter might be gathered for consumption or for fuel; eggs taken from breeding bird nests; poaching of hare, ground birds or tortoise for consumption or for domestic trade; and persecution of raptors, snakes, and carnivores could potentially take place.

The magnitude and unmitigated significance calculations are presented in the table below.

Table 6-16 Significance of "Take"

Receptor	Value/ Sensitivity	Magnitude	Significance
Protected Flora	High	Minor	**Minor to Moderate**
Non-threatened Flora	Low / Lower	Minor	**Negligible to Minor**
Endangered Birds	Very High	Negligible	**Minor**
Threatened Birds	High	Negligible	**Minor**
Nationally Threatened Birds	Medium	Negligible	**Negligible to Minor**
Non-threatened Birds	Low / Lower	Negligible	**Negligible to Minor**
Goitored Gazelle	High	Negligible	**Minor**

Receptor	Value/ Sensitivity	Magnitude	Significance
Non-threatened Mammals	Low / Lower	Negligible	**Negligible to Minor**
Russian Tortoise	High	Negligible	**Minor**
Nationally Important Herptiles	Medium	Negligible	**Negligible to Minor**
Non-threatened Herptiles	Low / Lower	Negligible	**Negligible to Minor**

The additional EPC contractor team for the smaller Bash 52MW project in addition to the EPC team for the Bash 500MW Project may cause a negligible increase in the cumulative impacts due to take.

Table 6-17 Cumulative Significance of "Take"

Receptor	Value/ Sensitivity	Magnitude	Significance
Protected Flora	High	Moderate	**Moderate to Major**
Non-threatened Flora	Low / Lower	Moderate	**Minor**
Endangered Birds (	Very High	Minor	**Moderate to Major**
Threatened Birds	High	Minor	**Minor to Moderate**
Nationally Threatened Birds	Medium	Minor	**Minor**
Non-threatened Birds	Low / Lower	Minor	**Negligible to Minor**
Goitored Gazelle	High	Minor	**Minor to Moderate**
Non-threatened Mammals	Low / Lower	Minor	**Negligible to Minor**
Russian Tortoise	High	Minor	**Minor to Moderate**
Nationally Important Herptiles	Medium	Minor	**Minor**
Non-threatened Herptiles	Low / Lower	Minor	**Negligible to Minor**

However, the following mitigation measures, which are identical to those applied for the Bash 500MW project, will be implemented to reduce the risk of these potential impacts:

- Strict controls forbidding the gathering, poaching or otherwise disturbance of any flora or fauna on site, included in induction training
- Staff training such as toolbox talks on the importance of ecosystem integrity, especially focused on species of importance such as Russian Tortoise

With the above measures, the residual significance is presented in the following table.

Table 6-18 Residual Significance of "Take"

RECEPTOR	VALUE/ SENSITIVITY	MAGNITUDE	RESIDUAL
Protected Flora	High	No Change	**Neutral**
Non-threatened Flora	Low / Lower	No Change	**Neutral**
Endangered Birds	Very High	No Change	**Neutral**
Threatened Birds)	High	No Change	**Neutral**
Nationally Threatened Birds	Medium	No Change	**Neutral**
Non-threatened Birds	Low / Lower	No Change	**Neutral**
Goitored Gazelle	High	No Change	**Neutral**
Non-threatened Mammals	Low / Lower	No Change	**Neutral**
Russian Tortoise	High	No Change	**Neutral**
Nationally Important Herptiles	Medium	No Change	**Neutral**
Non-threatened Herptiles	Low / Lower	No Change	**Neutral**

Therefore, the residual cumulative impacts of mitigated habitat loss are also considered as Negligible to Minor

Table 6-19 Residual Cumulative Significance of "Take"

RECEPTOR	VALUE/ SENSITIVITY	MAGNITUDE	RESIDUAL
Protected Flora	High	Negligible	**Minor**
Non-threatened Flora	Low / Lower	Negligible	**Negligible to Minor**
Endangered Birds	Very High	Negligible	**Minor**
Threatened Birds)	High	Negligible	**Minor**
Nationally Threatened Birds	Medium	Negligible	**Negligible to Minor**
Non-threatened Birds	Low / Lower	Negligible	**Negligible to Minor**
Goitored Gazelle	High	Negligible	**Minor**
Non-threatened Mammals	Low / Lower	Negligible	**Negligible to Minor**
Russian Tortoise	High	Negligible	**Minor**
Nationally Important Herptiles	Medium	Negligible	**Negligible to Minor**
Non-threatened Herptiles	Low / Lower	Negligible	**Negligible to Minor**

LITTERING

Improper management of solid waste such as plastic containers and plastic bags, may result in wind-blown litter, which are a danger to wildlife due to entanglement or ingestion.

The magnitude and unmitigated significance calculations are presented in the table below.

Table 6-20 Significance of Littering

RECEPTOR	VALUE/ SENSITIVITY	MAGNITUDE	SIGNIFICANCE
Endangered Birds	Very High	Negligible	**Minor**
Threatened Birds)	High	Negligible	**Minor**
Nationally Threatened Birds	Medium	Negligible	**Negligible to Minor**

RECEPTOR	VALUE/ SENSITIVITY	MAGNITUDE	SIGNIFICANCE
Non-threatened Birds	Low / Lower	Negligible	**Negligible to Minor**
Goitored Gazelle	High	Negligible	**Minor**
Non-threatened Mammals	Low / Lower	Negligible	**Negligible to Minor**
Russian Tortoise	High	Minor	**Minor to Moderate**
Nationally Important Herptiles	Medium	Negligible	**Negligible to Minor**
Non-threatened Herptiles	Low / Lower	Negligible	**Negligible to Minor**

The additional EPC contractor team for the smaller Bash 52MW project in addition to the EPC team for the Bash 500MW Project may cause a negligible increase in the cumulative impacts due to Littering.

Table 6-21 Cumulative Significance of Littering

RECEPTOR	VALUE/ SENSITIVITY	MAGNITUDE	SIGNIFICANCE
Endangered Birds	Very High	Minor	**Moderate to Major**
Threatened Birds)	High	Minor	**Minor to Moderate**
Nationally Threatened Birds	Medium	Minor	**Minor**
Non-threatened Birds	Low / Lower	Minor	**Negligible to Minor**
Goitered Gazelle	High	Minor	**Minor to Moderate**
Non-threatened Mammals	Low / Lower	Minor	**Negligible to Minor**
Russian Tortoise	High	Moderate	**Moderate to Major**
Nationally Important Herptiles	Medium	Minor	**Minor**
Non-threatened Herptiles	Low / Lower	Minor	**Negligible to Minor**

However, the following mitigation measures, which are identical to those applied for the Bash 500MW project, will be implemented to reduce the risk of these potential impacts:

- Preparation of a Waste Management Plan as one of the supplementary plans to the CESMP;
- Training will be provided to staff such as tool box meetings which include waste management
- Strict waste management supervision and controls under the HSE Team;
- Zero tolerance for littering on site;
- Daily inspections and clean-up of litter by EPC/sub-contractor(s) responsible.

With the above measures, the residual significance is presented in the following table.

Table 6-22 Residual Significance of Littering

RECEPTOR	VALUE/ SENSITIVITY	MAGNITUDE	RESIDUAL
Endangered Birds	Very High	No Change	**Neutral**
Threatened Birds	High	No Change	**Neutral**
Nationally Threatened Birds	Medium	No Change	**Neutral**
Non-threatened Birds	Low / Lower	No Change	**Neutral**

RECEPTOR	VALUE/ SENSITIVITY	MAGNITUDE	RESIDUAL
Goitored Gazelle	High	No Change	**Neutral**
Non-threatened Mammals	Low / Lower	No Change	**Neutral**
Southern Even-fingered Gecko	Very High	No Change	**Neutral**
Russian Tortoise	High	No Change	**Neutral**
Nationally Important Herptiles	Medium	No Change	**Neutral**
Non-threatened Herptiles	Low / Lower	No Change	**Neutral**

The residual cumulative impacts of mitigated habitat loss are also considered as Negligible to Minor.

Table 6-23 Cumulative Residual Significance of Littering

RECEPTOR	VALUE/ SENSITIVITY	MAGNITUDE	RESIDUAL
Endangered Birds	Very High	Negligible	**Minor**
Threatened Birds	High	Negligible	**Minor**
Nationally Threatened Birds	Medium	Negligible	**Negligible to Minor**
Non-threatened Birds	Low / Lower	Negligible	**Negligible to Minor**
Goitored Gazelle	High	Negligible	**Minor**
Non-threatened Mammals	Low / Lower	Negligible	**Negligible to Minor**
Russian Tortoise	High	Negligible	**Minor**
Nationally Important Herptiles	Medium	Negligible	**Negligible to Minor**
Non-threatened Herptiles	Low / Lower	Negligible	**Negligible to Minor**

GENERAL DISTURBANCE

The presence of anthropogenic activity is disturbing to many sensitive species, which can result in reduced survivorship, reproductive success, and ultimately, population decline.

Species particularly sensitive include the shy Goitered Gazelle and bustard species, although most wildlife which is not already habituated to anthropogenic disturbance is anticipated to be negatively affected. Particularly, breeding birds with colonies present will be negatively affected if works occur during the breeding season.

The magnitude and unmitigated significance calculations are presented in the table below.

Table 6-24 Significance of General Disturbance

RECEPTOR	VALUE/ SENSITIVITY	MAGNITUDE	SIGNIFICANCE
Endangered Birds	Very High	Minor	**Moderate to Major**
Threatened Birds	High	Minor	**Minor to Moderate**
Nationally Threatened Birds	Medium	Minor	**Minor**
Non-threatened Birds	Low / Lower	Minor	**Negligible to Minor**
All Bats	Medium	Minor	**Minor**
Goitored Gazelle	High	Minor	**Minor to Moderate**
Non-threatened Mammals	Low / Lower	Minor	**Negligible to Minor**

Receptor	Value/ Sensitivity	Magnitude	Significance
Russian Tortoise	High	Minor	**Minor to Moderate**
Nationally Important Herptiles	Medium	Minor	**Minor**
Non-threatened Herptiles	Low / Lower	Minor	**Negligible to Minor**

The additional EPC contractor team for the smaller Bash 52MW project in addition to the EPC team for the Bash 500MW Project may cause a moderate increase in the unmitigated cumulative impacts due to General Disturbance.

Table 6-25 Cumulative Significance of General Disturbance

Receptor	Value/ Sensitivity	Magnitude	Significance
Endangered Birds	Very High	Moderate	**Major**
Threatened Birds	High	Moderate	**Moderate to Major**
Nationally Threatened Birds	Medium	Moderate	**Moderate**
Non-threatened Birds	Low / Lower	Moderate	**Minor**
All Bats	Medium	Moderate	**Moderate**
Goitered Gazelle	High	Moderate	**Moderate to Major**
Non-threatened Mammals	Low / Lower	Moderate	**Minor**
Russian Tortoise	High	Moderate	**Moderate to Major**
Nationally Important Herptiles	Medium	Moderate	**Moderate**
Non-threatened Herptiles	Low / Lower	Moderate	**Minor**

However, the following mitigation measures, which are identical to those applied for the Bash 500MW project, will be implemented to minimize the magnitude of these potential impacts:

- Minimize construction footprint buffer zones and temporary laydown areas.
- A Breeding Bird Protection Plan has been prepared which provides the protection measures and protocols i.e., micrositing of turbines within close proximity to raptor nests and buffers to be implemented at known nest locations based on species sensitivity. The plan also outlines the monitoring and reporting requirements of the construction phase as well as the assigned roles and responsibilities of the involved entities.
- The Restoration Action Plan will provide the restoration measures that will be undertaken for natural habitats, post-construction restoration of temporary laydown areas and buffer zones via seeding, re-planting, and landscaping with native, high-value species, monitoring and reporting requirements of the plan as well assigned roles and responsibilities.

With the above measures, the residual significance is presented in the following table.

Table 6-26 Residual Significance of General Disturbance

RECEPTOR	VALUE/ SENSITIVITY	MAGNITUDE	RESIDUAL
Endangered Birds	Very High	Negligible	**Minor**
Threatened Birds	High	No Change	**Neutral**
Nationally Threatened Birds	Medium	Negligible	**Negligible to Minor**
Non-threatened Birds	Low / Lower	No Change	**Neutral**
All Bats	Medium	No Change	**Neutral**
Threatened Mammals (Goitored Gazelle)	High	Negligible	**Minor**
Threatened Mammals (Brandt's Hedgehog)	High	Negligible	**Minor**
Non-threatened Mammals (Red Fox)	Low / Lower	No Change	**Neutral**
Non-threatened Mammals (Asiatic Wildcat)	Medium	No Change	**Neutral**
Non-threatened Mammals (Long-eared Hedgehog)	Low / Lower	No Change	**Neutral**
Non-threatened Mammals (Asian Badger)	Medium	No Change	**Neutral**
Non-threatened Mammals (Rodents & Small Herbivores)	Low / Lower	No Change	**Neutral**
Threatened Herptiles (Russian Tortoise)	High	Negligible	**Minor**
Nationally Important Herptiles (Caspian Monitor)	Medium	Negligible	**Negligible to Minor**
Nationally Important Herptiles (Desert Sand Boa)	Medium	Negligible	**Negligible to Minor**
Non-threatened Herptiles (Amphibians, Lizards, Geckos, Snakes)	Low / Lower	No Change	**Neutral**

The residual cumulative impacts of mitigated habitat loss are also considered as Negligible to Minor.

Table 6-27 Cumulative Residual Significance of General Disturbance

RECEPTOR	VALUE/ SENSITIVITY	MAGNITUDE	RESIDUAL
Endangered Birds	Very High	Minor	**Moderate to Major**
Threatened Birds	High	Negligible	**Minor**
Nationally Threatened Birds	Medium	Minor	**Minor**
Non-threatened Birds	Low / Lower	Negligible	**Negligible to Minor**
All Bats	Medium	Negligible	**Negligible to Minor**
Threatened Mammals (Goitored Gazelle)	High	Minor	**Minor to moderate**
Threatened Mammals (Brandt's Hedgehog)	High	Minor	**Minor to moderate**
Non-threatened Mammals (Red Fox)	Low / Lower	Negligible	**Negligible to Minor**
Non-threatened Mammals (Asiatic Wildcat)	Medium	Negligible	**Negligible to Minor**
Non-threatened Mammals (Long-eared Hedgehog)	Low / Lower	Negligible	**Negligible to Minor**

RECEPTOR	VALUE/ SENSITIVITY	MAGNITUDE	RESIDUAL
Non-threatened Mammals (Asian Badger)	Medium	Negligible	**Negligible to Minor**
Non-threatened Mammals (Rodents & Small Herbivores)	Low / Lower	Negligible	**Negligible to Minor**
Threatened Herptiles (Russian Tortoise)	High	Minor	**Minor to moderate**
Nationally Important Herptiles (Caspian Monitor)	Medium	Minor	**Minor**
Nationally Important Herptiles (Desert Sand Boa)	Medium	Minor	**Minor**
Non-threatened Herptiles (Amphibians, Lizards, Geckos, Snakes)	Low / Lower	Negligible	**Negligible to Minor**

6.4.1.3 Biodiversity Displacement – Competition and Dispersal

DISPLACEMENT / DISPERSAL

Shyer species may be displaced away from the project area as a result of construction disturbance, having indirect secondary impacts on adjacent territories via increased competition for resources compromising population stability, causing ecosystem imbalances.

However, the surrounding areas on a landscape level seem to support similar habitat types and are not constrained by large-scale urban or industrial developments. Therefore, it is not anticipated that displaced individuals will have a significant impact on adjacent ecosystems.

Figure 6-4 Adjacent Habitat Availability for Potentially Dispersed Species

PROLIFERATION OF GENERALIST SPECIES

The dispersal of shyer species away from disturbed areas can lead to an increase in generalist species such as Red Fox which are well adapted to anthropogenic habitats.

Further, poor management of solid waste can result in the proliferation of pest species, such as feral dog, cat, rats, and other urban-adapted species. This can cause further competition and displacement of native fauna.

The magnitude and unmitigated significance calculations are presented in the table below.

Table 6-28 Significance of Proliferation

RECEPTOR	VALUE/ SENSITIVITY	MAGNITUDE	SIGNIFICANCE
Endangered Birds	Very High	Minor	**Moderate to Major**
Threatened Birds	High	Minor	**Minor to Moderate**
Non-threatened Birds	Medium	Minor	**Minor**
All Bats	Medium	Minor	**Minor**
Goitered Gazelle	High	Minor	**Minor to Moderate**
Non-threatened Mammals	Low / Lower	No Change	**Neutral to Minor**
Russian Tortoise	High	Minor	**Minor to Moderate**
Nationally Important Herptiles (Caspian Monitor)	Medium	Minor	**Minor**
Non-threatened Herptiles	Low / Lower	Minor	**Negligible to Minor**

Receptor	Value/ Sensitivity	Magnitude	Significance
Non-threatened Invertebrates	Low / Lower	Minor	Negligible to Minor

Given that the 8 additional WTGs of the Bash 52MW Project are being added within the boundaries of the original Bash 500MW Project, there may be moderate increase in the unmitigated cumulative impacts due to the impact of proliferation due to generalist species.

Table 6-29 Cumulative Significance of Unmitigated Proliferation

Receptor	Value/ Sensitivity	Magnitude	Significance
Endangered Birds	Very High	Major	**Major**
Threatened Birds	High	Moderate	**Moderate to Major**
Non-threatened Birds	Medium	Moderate	**Moderate**
All Bats	Medium	Moderate	**Moderate**
Goitered Gazelle	High	Moderate	**Moderate to Major**
Non-threatened Mammals	Low / Lower	Negligible	**Negligible to Minor**
Russian Tortoise	High	Moderate	**Moderate to Major**
Nationally Important Herptiles (Caspian Monitor)	Medium	Moderate	**Moderate**
Non-threatened Herptiles	Low / Lower	Moderate	**Minor**
Non-threatened Invertebrates	Low / Lower	Moderate	**Minor**

However, the following mitigation measures, which are identical to those applied for the Bash 500MW project, will be implemented to minimize the magnitude of these potential impacts:

- Preparation of a Waste Management Plan as one of the supplementary plans to the CESMP;
- Strict waste management supervision and controls under the HSE Team;
- Zero tolerance for littering on site;
- Training will be provided to staff such as tool box meetings which include waste management;
- Daily inspections and clean-up of litter by EPC/sub-contractor(s) responsible; and
- No provision of food waste for feral cats and dogs.

With the above measures, the residual significance is presented in the following table.

Table 6-30 Residual Significance of Proliferation

RECEPTOR	VALUE/ SENSITIVITY	MAGNITUDE	RESIDUAL
Endangered Birds	Very High	No Change	**Neutral**
Threatened Birds	High	No Change	**Neutral**
Non-threatened Birds	Medium	No Change	**Neutral**
All Bats	Medium	No Change	**Neutral**
Goitored Gazelle	High	No Change	**Neutral**
Non-threatened Mammals	Low / Lower	No Change	**Neutral**
Russian Tortoise	High	No Change	**Neutral**
Nationally Important Herptiles	Medium	No Change	**Neutral**
Non-threatened Herptiles	Low / Lower	No Change	**Neutral**
Non-threatened Invertebrates	Low / Lower	No Change	**Neutral**

The residual cumulative impact with the above measures is presented in the following table.

Table 6-31 Residual Cumulative Significance of Proliferation

RECEPTOR	VALUE/ SENSITIVITY	MAGNITUDE	RESIDUAL
Endangered Birds	Very High	Negligible	**Minor**
Threatened Birds	High	Negligible	**Minor**
Non-threatened Birds	Medium	Negligible	**Negligible to Minor**
All Bats	Medium	Negligible	**Negligible to Minor**
Goitored Gazelle	High	Negligible	**Minor**
Non-threatened Mammals	Low / Lower	Negligible	**Negligible to Minor**
Russian Tortoise	High	Negligible	**Minor**
Nationally Important Herptiles	Medium	Negligible	**Negligible to minor**
Non-threatened Herptiles	Low / Lower	Negligible	**Negligible to minor**
Non-threatened Invertebrates	Low / Lower	Negligible	**Negligible to minor**

6.4.1.4 Biosecurity Risks

INTRODUCTION OF PATHOGENS & INVASIVE SPECIES

Soil imports, intentional or via previously used excavation and earthworks equipment, may contain pathogens that can spread and infect native vegetation and fauna that do not have natural defence mechanisms.

Exotic seeds in soil imports can allow the spread of invasive, weedy species which outcompete native species. Secondary impacts may occur on wildlife which utilize the reduced native vegetation for foraging or shelter.

The magnitude and unmitigated significance calculations are presented in the table below.

Table 6-32 Significance of Introduced Species

RECEPTOR	VALUE/ SENSITIVITY	MAGNITUDE	SIGNIFICANCE
Endangered Flora	Very High	Moderate	**Major**
Threatened and Protected Flora	High	Minor	**Minor to Moderate**
Non threatened Flora	Low / Lower	Minor	**Minor**
Endangered Birds	Very High	Minor	**Moderate to Major**
Threatened Birds	High	Minor	**Minor to Moderate**
Nationally Threatened Birds	Medium	Minor	**Minor**
Non-threatened Birds	Medium	Minor	**Minor**
Threatened Mammals	High	Minor	**Minor to Moderate**
Nationally Threatened Mammals	Medium	Minor	**Minor**
Non-threatened Mammals (Carnivores)	Low / Lower	Minor	**Negligible to Minor**
Non-threatened Mammals (Non-carnivores)	Low / Lower	Minor	**Negligible to Minor**
Threatened Herptiles	High	Minor	**Minor to Moderate**
Nationally Important Herptiles	Medium	Minor	**Minor**
Non-threatened Herptiles & Invertebrates	Low / Lower	Minor	**Negligible to Minor**

Given that the 8 additional WTGs of the Bash 52MW Project are being added within the boundaries of the original Bash 500MW Project, there may be moderate increase in the unmitigated cumulative impacts of both projects.

Table 6-33 Cumulative Significance of Introduced Species

RECEPTOR	VALUE/ SENSITIVITY	MAGNITUDE	SIGNIFICANCE
Endangered Flora	Very High	Major	**Major**
Threatened and Protected Flora	High	Major	**Major**
Non threatened Flora	Low / Lower	Major	**Minor to moderate**
Endangered Birds	Very High	Moderate	**Major**
Threatened Birds	High	Moderate	**Moderate to Major**
Nationally Threatened Birds	Medium	Moderate	**Moderate**
Non-threatened Birds	Medium	Moderate	**Moderate**
Threatened Mammals	High	Moderate	**Moderate to Major**

RECEPTOR	VALUE/ SENSITIVITY	MAGNITUDE	SIGNIFICANCE
Nationally Threatened Mammals	Medium	Moderate	**Moderate**
Non-threatened Mammals (Carnivores)	Low / Lower	Moderate	**Minor**
Non-threatened Mammals (Non-carnivores)	Low / Lower	Moderate	**Minor**
Threatened Herptiles	High	Moderate	**Moderate to Major**
Nationally Important Herptiles	Medium	Moderate	**Moderate**
Non-threatened Herptiles & Invertebrates	Low / Lower	Moderate	**Minor**

However, the following mitigation measures, which are identical to those applied for the Bash 500MW project, will be implemented to minimize the magnitude of these potential impacts:

- Soil imports will be taken from local quarry or borrow pit as close to the site as reasonably practical to avoid risk of foreign seeds and invasive species;
- Soil imports from outside of the area will undergo checks to prevent accidental introduction of exotic species / pathogens.
- Plant and machinery will require an HSE certificate of inspection, issued by the EPC, before coming onto site and this will include necessary cleaning /washing to reduce risks of importing invasive species in mud taken from urban sites.

With the above measures, the residual significance is presented in the following table.

Table 6-34 Residual Significance of Introduced Species

RECEPTOR	VALUE/ SENSITIVITY	MAGNITUDE	RESIDUAL
Endangered Flora	Very High	Negligible	**Neutral**
Threatened & Protected Flora	High	Negligible	**Minor**
Non-threatened Flora	Low / Lower	Negligible	**Negligible to minor**
Endangered Birds	Very High	No Change	**Minor**
Threatened Birds	High	No Change	**Minor**
Nationally Threatened Birds	Medium	No Change	**Negligible to minor**
Non-threatened Birds	Medium	No Change	**Negligible to minor**
Threatened Mammals	High	No Change	**Minor**
Nationally Threatened Mammals	Medium	No Change	**Negligible to minor**

RECEPTOR	VALUE/ SENSITIVITY	MAGNITUDE	RESIDUAL
Non-threatened Mammals (Carnivores)	Low / Lower	No Change	**Negligible to minor**
Non-threatened Mammals (Non-carnivores)	Low / Lower	No Change	**Negligible to minor**
Threatened Herptiles	High	No Change	**Minor**
Nationally Important Herptiles	Medium	No Change	**Negligible to minor**
Non-threatened Herptiles & Invertebrates	Low / Lower	No Change	**Negligible to minor**

The residual cumulative impact with the above measures is presented in the following table.

Table 6-35 Cumulative Residual Significance of Introduced Species

RECEPTOR	VALUE/ SENSITIVITY	MAGNITUDE	RESIDUAL
Endangered Flora	Very High	Negligible	**Major**
Threatened & Protected Flora	High	Negligible	**Major**
Non-threatened Flora	Low / Lower	Negligible	**Minor to moderate**
Endangered Birds	Very High	Negligible	**Major**
Threatened Birds	High	Negligible	**Moderate to Major**
Nationally Threatened Birds	Medium	Negligible	**Moderate**
Non-threatened Birds	Medium	Negligible	**Moderate**
Threatened Mammals	High	Negligible	**Moderate to Major**
Nationally Threatened Mammals	Medium	Negligible	**Moderate**
Non-threatened Mammals (Carnivores)	Low / Lower	Negligible	**Minor**
Non-threatened Mammals (Non-carnivores)	Low / Lower	Negligible	**Minor**
Threatened Herptiles	High	Negligible	**Moderate to Major**
Nationally Important Herptiles	Medium	Negligible	**Moderate**
Non-threatened Herptiles & Invertebrates	Low / Lower	Negligible	**Minor**

6.4.1.5 Environmental Quality

AIR QUALITY

Dust can coat vegetation, reducing photosynthesis and respiration ability, causing desiccation. Emissions of pollutants such as NOx, SOx, PM and CO can lower survivorship and increase susceptibility of affected wildlife to disease.

The magnitude and unmitigated significance calculations are presented in the table below.

Table 6-36 Significance of Air Pollution

RECEPTOR	VALUE/ SENSITIVITY	MAGNITUDE	SIGNIFICANCE
Threatened Flora	High	Negligible	**Minor**
Protected Flora	High	Negligible	**Minor**
Non-threatened Flora	Low / Lower	Negligible	**Negligible to Minor**
Endangered Birds	Very High	Negligible	**Minor**
Threatened Birds	High	Negligible	**Minor**
Nationally Threatened Birds	Medium	Negligible	**Negligible to Minor**
Non-threatened Birds	Medium	Negligible	**Negligible to Minor**
All Bats	Medium	Negligible	**Negligible to Minor**
Goitered Gazelle	High	Negligible	**Minor**
Non-threatened Mammals)	Low / Lower	Negligible	**Negligible to Minor**
Russian Tortoise	High	Negligible	**Minor**
Nationally Important Herptiles)	Medium	Negligible	**Negligible to Minor**
Non-threatened Herptiles	Low / Lower	Negligible	**Negligible to Minor**
Non-threatened Invertebrates	Low / Lower	Negligible	**Negligible to Minor**

Given that the 8 additional WTGs of the Bash 52MW Project are being added within the boundaries of the original Bash 500MW Project, there may be a minor significant increase in the unmitigated cumulative impacts of both projects.

Table 6-37 Cumulative Significance of Air Pollution

RECEPTOR	VALUE/ SENSITIVITY	MAGNITUDE	SIGNIFICANCE
Threatened Flora	High	Minor	**Minor to Moderate**
Protected Flora	High	Minor	**Minor to Moderate**
Non-threatened Flora	Low / Lower	Minor	**Negligible to Minor**
Endangered Birds	Very High	Minor	**Moderate to Major**
Threatened Birds	High	Minor	**Minor to Moderate**
Nationally Threatened Birds	Medium	Minor	**Minor**
Non-threatened Birds	Medium	Minor	**Minor**
All Bats	Medium	Minor	**Minor**
Goitored Gazelle	High	Minor	**Minor to Moderate**

Receptor	Value/ Sensitivity	Magnitude	Significance
Non-threatened Mammals)	Low / Lower	Minor	**Negligible to Minor**
Russian Tortoise	High	Minor	**Minor to Moderate**
Nationally Important Herptiles)	Medium	Minor	**Minor**
Non-threatened Herptiles	Low / Lower	Minor	**Negligible to Minor**
Non-threatened Invertebrates	Low / Lower	Minor	**Negligible to Minor**

However, the following mitigation measures, which are identical to those applied for the Bash 500MW project will be implemented to minimize the magnitude of these potential impacts:

- Refer to air quality control measures.

All tracks will be damped down to reduce risk of dust and this will be checked daily.

With the above measures, the residual significance is presented in the following table.

Table 6-38 Residual Significance of Air Pollution

Receptor	Value/ Sensitivity	Magnitude	Residual
Threatened Flora	High	No Change	**Neutral**
Protected Flora	High	No Change	**Neutral**
Non-threatened Flora	Low / Lower	No Change	**Neutral**
Endangered Birds	Very High	No Change	**Neutral**
Threatened Birds	High	No Change	**Neutral**
Nationally Threatened Birds	Medium	No Change	**Neutral**
Non-threatened Birds	Medium	No Change	**Neutral**
All Bats	Medium	No Change	**Neutral**
Goitored Gazelle	High	No Change	**Neutral**
Brandt's Hedgehog	High	No Change	**Neutral**
Non-threatened Mammals	Low / Lower	No Change	**Neutral**
Russian Tortoise	High	No Change	**Neutral**
Nationally Important Herptiles	Medium	No Change	**Neutral**
Non-threatened Herptiles	Low / Lower	No Change	**Neutral**
Non-threatened Invertebrates	Low / Lower	No Change	**Neutral**

The residual cumulative impact with the above measures is presented in the following table.

Table 6-39 Cumulative Residual Significance of Air Pollution

Receptor	Value/ Sensitivity	Magnitude	Residual
Threatened Flora	High	Negligible	**Minor**
Protected Flora	High	Negligible	**Minor**
Non-threatened Flora	Low / Lower	Negligible	**Negligible to Minor**
Endangered Birds	Very High	Negligible	**Minor**
Threatened Birds	High	Negligible	**Minor**
Nationally Threatened Birds	Medium	Negligible	**Negligible to Minor**

Receptor	Value/ Sensitivity	Magnitude	Residual
Non-threatened Birds	Medium	Negligible	**Negligible to Minor**
All Bats	Medium	Negligible	**Negligible to Minor**
Goitored Gazelle	High	Negligible	**Minor**
Brandt's Hedgehog	High	Negligible	**Minor**
Non-threatened Mammals	Low / Lower	Negligible	**Negligible to Minor**
Russian Tortoise	High	Negligible	**Minor**
Nationally Important Herptiles	Medium	Negligible	**Negligible to Minor**
Non-threatened Herptiles	Low / Lower	Negligible	**Negligible to Minor**
Non-threatened Invertebrates	Low / Lower	Negligible	**Negligible to Minor**

Noise

Construction noise can cause acoustic masking, disturbance and displacement, and general reduction in survivorship and reproductive success in a variety of fauna. Most impacted are acoustic communicators such as bird and bat species.

The magnitude and unmitigated significance calculations are presented in the table below.

Table 6-40 Significance of Noise Impacts

Receptor	Value/ Sensitivity	Magnitude	Significance
Endangered Birds	Very High	Minor	**Moderate to Major**
Threatened Birds	High	Minor	**Minor to Moderate**
Nationally Threatened Birds	Medium	Minor	**Minor**
Non-threatened Birds	Medium	Minor	**Minor**
All Bats	Medium	Minor	**Minor**
Goitered Gazelle	High	Negligible	**Minor**
Non-threatened Mammals	Low / Lower	Negligible	**Negligible to Minor**
Russian Tortoise	High	Minor	**Minor to Moderate**
Nationally Important Herptiles	Medium	Negligible	**Moderate**
Non-threatened Herptiles	Low / Lower	Negligible	**Negligible to Minor**
Non-threatened Invertebrates	Low / Lower	Negligible	**Negligible to Minor**

Given that the 8 additional WTGs of the Bash 52MW Project are being added within the boundaries of the original Bash 500MW Project, there may be moderate increase in the unmitigated cumulative impacts of both projects.

Table 6-41 Cumulative Significance of Noise Impacts

RECEPTOR	VALUE/ SENSITIVITY	MAGNITUDE	SIGNIFICANCE
Endangered Birds	Very High	Major	**Major**
Threatened Birds	High	Major	**Major**
Nationally Threatened Birds	Medium	Major	**Moderate to Major**
Non-threatened Birds	Medium	Major	**Moderate to Major**
All Bats	Medium	Major	**Moderate to Major**
Goitored Gazelle	High	Moderate	**Moderate to Major**
Non-threatened Mammals	Low / Lower	Moderate	**Minor**
Russian Tortoise	High	Moderate	**Moderate to Major**
Nationally Important Herptiles	Medium	Moderate	**Moderate**
Non-threatened Herptiles	Low / Lower	Moderate	**Minor**
Non-threatened Invertebrates	Low / Lower	Moderate	**Minor**

However, the following mitigation measures, which are identical to those applied for the Bash 500MW project will be implemented to minimize the magnitude of these potential impacts:

- Refer to noise control measures.
- A Breeding Bird Protection Plan has been prepared which provides the protection measures and protocols i.e., buffers to be implemented at known nest locations based on species sensitivity. The plan also outlines the monitoring and reporting requirements of the construction phase as well as the assigned roles and responsibilities of the involved entities.
- Use of acoustic barriers, dampening, best available technology within construction methodology to reduce noise and vibration as much as possible. Intermittent noise is less desirable than continuous noise as it does not allow for habituation.

With the above measures, the residual significance is presented in the following table.

Table 6-42 Residual Significance of Noise Impacts

RECEPTOR	VALUE/ SENSITIVITY	MAGNITUDE	RESIDUAL
Endangered Birds	Very High	Negligible	**Minor**
Threatened Birds	High	Negligible	**Minor**
Nationally Threatened Birds	Medium	Negligible	**Negligible to Minor**
Non-threatened Birds	Medium	Negligible	**Negligible to Minor**
All Bats	Medium	Negligible	**Negligible to Minor**
Goitored Gazelle	High	No Change	**Neutral**
Non-threatened Mammals	Low / Lower	No Change	**Neutral**
Russian Tortoise	High	Negligible	**Minor**
Nationally Important Herptiles	Medium	No Change	**Neutral**
Non-threatened Herptiles	Low / Lower	No Change	**Neutral**
Non-threatened Invertebrates	Low / Lower	No Change	**Neutral**

The residual cumulative impact with the above measures is presented in the following table.

Table 6-43 Residual Cumulative Significance of Noise Impacts

RECEPTOR	VALUE/ SENSITIVITY	MAGNITUDE	RESIDUAL
Endangered Birds	Very High	Minor	**Moderate to Major**
Threatened Birds	High	Minor	**Minor to moderate**
Nationally Threatened Birds	Medium	Minor	**Minor**
Non-threatened Birds	Medium	Minor	**Minor**
All Bats	Medium	Negligible	**Negligible to Minor**
Goitored Gazelle	High	Minor	**Minor**
Non-threatened Mammals	Low / Lower	Minor	**Negligible to Minor**
Russian Tortoise	High	Minor	**Minor to moderate**
Nationally Important Herptiles	Medium	Minor	**Minor**
Non-threatened Herptiles	Low / Lower	Minor	**Negligible to Minor**
Non-threatened Invertebrates	Low / Lower	Minor	**Negligible to Minor**

LIGHT POLLUTION

Night-time lighting can impact nocturnal wildlife behaviour. It can act as an attractant, which can cause congregation and higher predation rates / change movement and migration behaviour; act as a repellent which causes displacement or interfere with the circadian cycle and cause lower survivorship and reproductive success. However, lighting will be required only at specific work areas and not across the wider area or along access roads, thereby limiting lighting to relatively small areas, where night work is required.

The magnitude and unmitigated significance calculations are presented in the table below.

Table 6-44 Significance of Light Pollution

RECEPTOR	VALUE/ SENSITIVITY	MAGNITUDE	SIGNIFICANCE
Endangered Birds	Very High	Minor	**Moderate to Major**
Threatened Birds	High	Minor	**Minor to Moderate**
Nationally Threatened Birds	Medium	Minor	**Minor**
Non-threatened Birds	Medium	Minor	**Minor**
All Bats	Medium	Minor	**Minor**
Goitered Gazelle	High	Minor	**Minor to Moderate**
Non-threatened Mammals	Low / Lower	Minor	**Negligible to Minor**
Russian Tortoise	High	Minor	**Minor to Moderate**
Nationally Important Herptiles	Medium	Minor	**Minor**
Non-threatened Herptiles	Low / Lower	Minor	**Negligible to Minor**
Non-threatened Invertebrates	Low / Lower	Minor	**Negligible to Minor**

Given that the 8 additional WTGs of the Bash 52MW Project are being added within the boundaries of the original Bash 500MW Project, there may be moderate increase in the unmitigated cumulative impacts of both projects.

Table 6-45 Cumulative Significance of Light Pollution

RECEPTOR	VALUE/ SENSITIVITY	MAGNITUDE	SIGNIFICANCE
Endangered Birds	Very High	Major	**Major**
Threatened Birds	High	Major	**Moderate to Major**
Nationally Threatened Birds	Medium	Major	**Moderate to Major**
Non-threatened Birds	Medium	Major	**Moderate to Major**
All Bats	Medium	Major	**Moderate to Major**
Goitored Gazelle	High	Moderate	**Moderate to Major**
Non-threatened Mammals	Low / Lower	Major	**Minor to Moderate**
Russian Tortoise	High	Moderate	**Moderate to Major**
Nationally Important Herptiles	Medium	Major	**Moderate to Major**
Non-threatened Herptiles	Low / Lower	Major	**Minor to Moderate**
Non-threatened Invertebrates	Low / Lower	Major	**Minor to Moderate**

However, the following mitigation measures, which are identical to those applied for the Bash 500MW project will be implemented to minimize the magnitude of potential impact:

- Minimize external lighting as much as possible as required for Health and Safety.
- Ensure lighting is fit for purpose and duration of lighting to be controlled and minimized as much as possible.
- Lights will be shielded to prevent skyglow, spill and glare.

With the above measures, the residual significance is presented in the following table.

Table 6-46 Residual Significance of Light Pollution

RECEPTOR	VALUE/ SENSITIVITY	MAGNITUDE	RESIDUAL
Endangered Birds	Very High	No Change	**Neutral**
Threatened Birds	High	No Change	**Neutral**
Nationally Threatened Birds	Medium	No Change	**Neutral**
Non-threatened Birds	Medium	No Change	**Neutral**
All Bats	Medium	Negligible	**Negligible to Minor**
Goitored Gazelle	High	No Change	**Neutral**
Non-threatened Mammals	Low / Lower	Negligible	**Negligible to Minor**
Russian Tortoise	High	No Change	**Neutral**
Nationally Important Herptiles	Medium	No Change	**Neutral**
Non-threatened Herptiles	Low / Lower	No Change	**Neutral**
Non-threatened Invertebrates	Low / Lower	No Change	**Neutral**

The residual cumulative impact with the above measures is presented in the following table.

Table 6-47 Residual Cumulative Significance of Light Pollution

RECEPTOR	VALUE/ SENSITIVITY	MAGNITUDE	RESIDUAL
Endangered Birds	Very High	Negligible	**Minor**
Threatened Birds	High	Negligible	**Minor**
Nationally Threatened Birds	Medium	Negligible	**Negligible to Minor**
Non-threatened Birds	Medium	Negligible	**Negligible to Minor**
All Bats	Medium	Minor	**Minor**
Goitored Gazelle	High	Negligible	**Minor**
Non-threatened Mammals	Low / Lower	Minor	**Negligible to Minor**
Russian Tortoise	High	Negligible	**Minor**
Nationally Important Herptiles	Medium	Negligible	**Negligible to Minor**
Non-threatened Herptiles	Low / Lower	Negligible	**Negligible to Minor**
Non-threatened Invertebrates	Low / Lower	Negligible	**Negligible to Minor**

CONTAMINATION

Fuels and solvents will be used during construction activities and maintenance. Improper use, storage and handling can result in chemical spills and contamination of the soil and groundwater. Flora and fauna that come into contact may become ill or die.

The magnitude and unmitigated significance calculations are presented in the table below.

Table 6-48 Significance of Contamination

RECEPTOR	VALUE/ SENSITIVITY	MAGNITUDE	SIGNIFICANCE
Natural Habitats (Sandy and sandy-loamy desert plains)	Medium	Minor	**Minor**
Natural Habitats (Cliffs and eroded slopes of saline depression)	High	Minor	**Minor to Moderate**
Natural Habitats (Fixed and semi-fixed sands)	High	Minor	**Minor to Moderate**
Natural Habitats (Relic uplands)	Medium	Minor	**Minor**
Threatened Flora	High	Minor	**Minor to Moderate**
Protected Flora	High	Minor	**Minor to Moderate**
Non-threatened Flora	Low / Lower	Minor	**Negligible to Minor**
Endangered Birds	Very High	Minor	**Moderate to Major**
Threatened Birds	High	Minor	**Minor to Moderate**
Nationally Threatened Birds	Medium	Minor	**Minor**
Non-threatened Birds	Medium	Minor	**Minor**
All Bats	Medium	Minor	**Minor**
Goitored Gazelle	High	Minor	**Minor to Moderate**
Non-threatened Mammals	Low / Lower	Minor	**Negligible to Minor**
Russian Tortoise	High	Minor	**Minor to Moderate**
Nationally Important Herptiles	Medium	Minor	**Minor**
Non-threatened Herptiles	Low / Lower	Minor	**Negligible to Minor**

Receptor	Value/ Sensitivity	Magnitude	Significance
Non-threatened Invertebrates	Low / Lower	Minor	**Negligible to Minor**

Given that the 8 additional WTGs of the Bash 52MW Project are being added within the boundaries of the original Bash 500MW Project, there may be moderate increase in the unmitigated cumulative impacts of both projects.

Table 6-49 Cumulative Significance of Contamination

Receptor	Value/ Sensitivity	Magnitude	Significance
Natural Habitats (Sandy and sandy-loamy desert plains)	Medium	Moderate	**Moderate**
Natural Habitats (Cliffs and eroded slopes of saline depression)	High	Moderate	**Moderate to Major**
Natural Habitats (Fixed and semi-fixed sands)	High	Moderate	**Moderate to Major**
Natural Habitats (Relic uplands)	Medium	Moderate	**Moderate**
Threatened Flora	High	Moderate	**Moderate to Major**
Protected Flora	High	Moderate	**Moderate to Major**
Non-threatened Flora	Low / Lower	Moderate	**Minor**
Endangered Birds	Very High	Moderate	**Major**
Threatened Birds	High	Moderate	**Moderate to Major**
Nationally Threatened Birds	Medium	Moderate	**Moderate**
Non-threatened Birds	Medium	Moderate	**Moderate**
All Bats	Medium	Moderate	**Moderate**
Goitored Gazelle	High	Moderate	**Moderate to Major**
Non-threatened Mammals	Low / Lower	Moderate	**Minor**
Russian Tortoise	High	Moderate	**Moderate to Major**
Nationally Important Herptiles	Medium	Moderate	**Moderate**
Non-threatened Herptiles	Low / Lower	Moderate	**Minor**
Non-threatened Invertebrates	Low / Lower	Moderate	**Minor**

However, the following mitigation measures, which are identical to those applied for the Bash 500MW project will be implemented to minimize the magnitude of potential impact:

- Refer to hazardous materials control measures, emergency action plan and spill prevention and clean up measures.

With the above measures, the residual significance is presented in the following table.

Table 6-50 Residual Significance of Contamination

RECEPTOR	VALUE/ SENSITIVITY	MAGNITUDE	RESIDUAL
Natural Habitats (Sandy and sandy-loamy desert plains)	Medium	Negligible	**Negligible to Minor**
Natural Habitats (Cliffs and eroded slopes of saline depression)	High	Negligible	**Minor**
Natural Habitats (Fixed and semi-fixed sands)	High	Negligible	**Minor**
Natural Habitats (Relic uplands)	Medium	Negligible	**Negligible to Minor**
Threatened Flora	High	Negligible	**Minor**
Protected Flora	High	Negligible	**Minor**
Non-threatened Flora	Low / Lower	Negligible	**Negligible to Minor**
Endangered Birds	Very High	Negligible	**Minor**
Threatened Birds	High	Negligible	**Minor**
Nationally Threatened Birds	Medium	Negligible	**Negligible to Minor**
Non-threatened Birds	Medium	Negligible	**Negligible to Minor**
All Bats	Medium	Negligible	**Negligible to Minor**
Goitered Gazelle	High	Negligible	**Minor**
Brandt's Hedgehog	Medium	Negligible	**Negligible to Minor**
Non-threatened Mammals	Low / Lower	Negligible	**Negligible to Minor**
Russian Tortoise	High	Negligible	**Minor**
Nationally Important Herptiles	Medium	Negligible	**Negligible to Minor**
Non-threatened Herptiles	Low / Lower	Negligible	**Negligible to Minor**
Non-threatened Invertebrates	Low / Lower	Negligible	**Negligible to Minor**

The residual cumulative impact with the above measures is presented in the following table.

Table 6-51 Residual Cumulative Significance of Contamination

RECEPTOR	VALUE/ SENSITIVITY	MAGNITUDE	RESIDUAL
Natural Habitats (Sandy and sandy-loamy desert plains)	Medium	Negligible	**Negligible to Minor**
Natural Habitats (Cliffs and eroded slopes of saline depression)	High	Negligible	**Minor**
Natural Habitats (Fixed and semi-fixed sands)	High	Negligible	**Minor**
Natural Habitats (Relic uplands)	Medium	Negligible	**Negligible to Minor**
Threatened Flora	High	Negligible	**Minor**
Protected Flora	High	Negligible	**Minor**
Non-threatened Flora	Low / Lower	Negligible	**Negligible to Minor**
Endangered Birds	Very High	Negligible	**Minor**
Threatened Birds	High	Negligible	**Minor**
Nationally Threatened Birds	Medium	Negligible	**Negligible to Minor**
Non-threatened Birds	Medium	Negligible	**Negligible to Minor**

Receptor	Value/ Sensitivity	Magnitude	Residual
All Bats	Medium	Negligible	**Negligible to Minor**
Goitored Gazelle	High	Negligible	**Minor**
Brandt's Hedgehog	Medium	Negligible	**Negligible to Minor**
Non-threatened Mammals	Low / Lower	Negligible	**Negligible to Minor**
Russian Tortoise	High	Negligible	**Minor**
Nationally Important Herptiles	Medium	Negligible	**Negligible to Minor**
Non-threatened Herptiles	Low / Lower	Negligible	**Negligible to Minor**
Non-threatened Invertebrates	Low / Lower	Negligible	**Negligible to Minor**

Soils

During construction earthworks and vehicle movement, soils may become compacted, which prohibits vegetation regrowth and use for burrowing. Further, removal of vegetation may cause an increase in wind-driven soil erosion, leading to loss of native soils.

The magnitude and unmitigated significance calculations are presented in the table below.

Table 6-52 Significance of Soil Impacts

Receptor	Value/ Sensitivity	Magnitude	Significance
Natural Habitats (Sandy and sandy-loamy desert plains)	Medium	Minor	**Minor**
Natural Habitats (Relic uplands)	Medium	Minor	**Minor**

Given that the 8 additional WTGs of the Bash 52MW Project are being added within the boundaries of the original Bash 500MW Project, there may be minor increase in the unmitigated cumulative impacts of both projects.

Table 6-53 Cumulative Significance of Soil Impacts

Receptor	Value/ Sensitivity	Magnitude	Significance
Natural Habitats (Sandy and sandy-loamy desert plains)	Medium	Moderate	**Moderate**
Natural Habitats (Relic uplands)	Medium	Moderate	**Moderate**

However, the following mitigation measures, which are identical to those applied for the Bash 500MW project, will be implemented to minimize the magnitude of potential impact:

- Minimize construction footprint and strict controls to prevent driving out of designated corridors.
- The Restoration Action Plan will provide the restoration measures that will be undertaken where appropriate, post-construction restoration of temporary laydown areas and buffer zones via seeding, re-planting, and landscaping with native, high-value species, monitoring and reporting requirements of the plan as well assigned roles and responsibilities.

With the above measures, the residual significance is presented in the following table.

Table 6-54 Residual Significance of Soil Impacts

RECEPTOR	VALUE/ SENSITIVITY	MAGNITUDE	RESIDUAL
Natural Habitats (Sandy and sandy-loamy desert plains)	Medium	No Change	**Neutral**
Natural Habitats (Relic uplands)	Medium	No Change	**Neutral**

The residual cumulative impact with the above measures is presented in the following table.

Table 6-55 Residual Cumulative Significance of Soil Impacts

RECEPTOR	VALUE/ SENSITIVITY	MAGNITUDE	RESIDUAL
Natural Habitats (Sandy and sandy-loamy desert plains)	Medium	Negligible	**Negligible to minor**
Natural Habitats (Relic uplands)	Medium	Negligible	**Negligible to minor**

6.4.2 Operation Phase

6.4.2.1 Ecosystem Function Degradation

HABITAT FRAGMENTATION (BARRIER EFFECT)

Development and operation of large-scale and linear alignment projects will fragment the landscape's existing habitats, reducing overall ecosystem connectivity and function. This in turn reduces the ability for vegetation recruitment and wildlife movement between habitat patches. Species with large home range requirements and migratory species in particular may be affected by fragmented habitat. Long-term fragmentation caused by physical barriers may also lead to a reduction in genetic exchange which is a concern for r-selected species with rapid generation turnover.

The Wind Farm will not be fenced; therefore, there will be no physical barriers to movement. However, turbines may deter migratory avifauna who exhibit macro-scale avoidance behaviour such as waterbirds; longer migratory movements can increase stress and lower survivorship of migrants that expend more energy to navigate around wind farms.

Migratory raptors do not exhibit macro-avoidance behaviour; (in fact, this is the reason that migratory raptors are at high risk for turbine collision); thus habitat fragmentation from the presence of migratory movement barriers is not considered to apply to raptors.

The magnitude and unmitigated significance calculations are presented in the table below.

Table 6-56 Significance of Habitat Fragmentation

RECEPTOR	VALUE/ SENSITIVITY	MAGNITUDE	SIGNIFICANCE
Threatened Birds (Waterbirds)	High	Negligible	**Minor**
Nationally Threatened Birds (Waterbirds)	Medium	Negligible	**Negligible to Minor**
Non-threatened Birds (Waterbirds)	Medium	Negligible	**Negligible to Minor**

Given that the 8 additional WTGs of the Bash 52MW Project are being added within the boundaries of the original Bash 500MW Project, there may be minor increase in the cumulative impacts of both projects.

Table 6-57 Cumulative Significance of Habitat Fragmentation

RECEPTOR	VALUE/ SENSITIVITY	MAGNITUDE	SIGNIFICANCE
Threatened Birds (Waterbirds)	High	Minor	**Minor to Moderate**
Nationally Threatened Birds (Waterbirds)	Medium	Minor	**Minor**
Non-threatened Birds (Waterbirds)	Medium	Minor	**Minor**

6.4.2.2 Biodiversity Loss – Direct Mortality and Lowered Survivorship

TURBINE COLLISION (BIRDS)

Wind Farms pose a unique threat to birds due to the potential for collision with moving turbines. It has been well documented at existing wind farm developments that turbine collisions result in mortality of birds. However, the magnitude of risk and significance of the potential impact is highly dependent upon the location of the wind farm and landscape context, spatial layout, height and length of turbines, and the types and numbers of birds present. In order to assess the potential impacts, separate assessments are undertaken which are species-specific, location specific and season-specific.

- Generally, larger soaring birds and 'poor fliers' with high wing-loading are thought to be at higher risk.
- Raptors have restricted forward field of view that may reduce visibility of turbines and avoidance ability.
- Research indicates that many migratory birds, particularly waterfowl, potentially avoid wind farms at macro scales.

Quantitative assessment was undertaken by utilizing a Collision Risk Model (CRM) developed as per SNH Guidelines, using Band et. al predictive modelling.

(Detailed methodology and results for the CRM is in Appendix C).

It is important to note that avoidance rates are predicted and have a large weight on the final collision risk predictions. Further, avoidance behaviour is not only species-specific but may also be influenced by (1) turbine locations and (2) weather conditions (visibility / flight ability). Therefore, even low predicted collision rates do not exclude the need for adaptive mitigation approaches (detailed subsequently).

The CRM for the species of concern is presented below.

Table 6-58 Estimated Rates of Collisions Year for Bird Species at the Bash 52 Wind Farm

English Common Name	Using lower bound CA values for each season		Using most realistic CA values for each season	
	Collisions/year	Years to 1 collision	Collisions/year	Years to 1 collision
Tier 1				
Houbara Bustard	0.619	1	0.124	8
Egyptian Vulture	0.0260	38	0.0103	97
Greater Spotted Eagle	0.00550	181	0.00122	819
Steppe Eagle	0.0945	10	0.0209	47
Golden Eagle	0.0343	29	0.00760	131
Saker Falcon	0.00417	239	0.00167	598
White-tailed Sea Eagle	0.0235	42	0.0117	85
Tier 2				
Little Bustard	0.0216	46	0.00430	232
Common Crane	1.12	<1	0.226	4
Great White Pelican	0.0711	14	0.0142	70
Cinereous Vulture	0.0240	41	0.0119	84
Eurasian Griffon	0.00133	751	0.000666	1500
Booted Eagle	0.00243	411	0.000537	1860
Eurasian Marsh-Harrier	0.195	5	0.0391	25
Hen Harrier	0.235	4	0.0470	21
Shikra	0.000936	1060	0.000468	2130
Eurasian Sparrowhawk	0.0293	34	0.0146	68
Common Buzzard	0.0844	11	0.0191	52
Long-legged Buzzard	0.187	5	0.0426	23
Lesser Kestrel	0.542	1	0.133	7
Eurasian Kestrel	3.87	<1	0.739	1
Tier 3				
Mute Swan	0.0753	13	0.0113	88
Ruddy Shelduck	0.0745	13	0.0149	67
Gadwall	0.476	2	0.0950	10
Mallard	1.35	<1	0.269	3
Green-winged Teal	0.0285	35	0.00568	176
Tufted Duck	1.09	<1	0.218	4

English Common Name	Using lower bound CA values for each season		Using most realistic CA values for each season	
	Collisions/year	Years to 1 collision	Collisions/year	Years to 1 collision
Pygmy Cormorant	0.0345	28	0.00692	144
Great Cormorant	0.0718	13	0.0144	69

Overall, the results of the CRM analysis indicate that the Bash 52MW Project has a low level of collision risk for sensitive bird species. No tier 1 target bird species are predicted to experience an annual collision frequency greater than one fatality per 47 years (Steppe Eagle) using the most likely Collision Avoidance (CA) parameter values.

For Houbara Bustard, the modelled scenario with the most likely CA parameter predicted a collision rate of 0.124 collisions per year, or one collision roughly every 8 years. However, it is important to note that this modelled scenario was based on hypothetical observations. In the actual VP data set, no observations of flying Houbara Bustards were recorded within the maximum reliable observation radius, hence the actual modelled collision risk for Houbara Bustard based on the empirical data set is zero. Similarly, Saker Falcon, the other tier 1 target species that was not actually observed during the VP survey effort but was modelled under the same hypothetical scenario has a predicted collision risk of 0.00167 collisions per year or 1 collision every 598 years.

Among tier 1 target species that were documented during the VP surveys, Greater Spotted Eagle, Steppe Eagle, Golden Eagle, White-tailed Eagle, and Egyptian Vulture, the CRM predicted fatality rates ranging from one per 47 years (Steppe Eagle) to one per 819 years (Greater Spotted Eagle), under the most realistic CA parameter values, suggesting that collision risk is low for all of these species.

For tier 2 target species, the CRM analysis predicts collision rates of 0.739 Eurasian Kestrel fatalities/year, 0.226 Common Crane fatalities/year, and 0.133 Lesser Kestrel fatalities/year, with predicted fatality rates below one per 10 years for all other tier 2 target species under the most realistic collision avoidance scenarios modelled. It should be noted that although classified as tier 2 target species, the upper bounds of predicted impacts to Common Cranes or Eurasian Kestrels would not represent a significant conservation concern or serious impact of concern for the Project, as both of these species are very abundant, widespread species with very large global populations, and neither is classified with an elevated protected/conservation status at either the national or international levels.

Some species classified as tier 2 target species, including Cinereous Vulture, Eurasian Griffon, and Booted Eagle, have elevated conservation/protected status at the national and/or international levels. Of these three species, the highest predicted fatality rate was for Cinereous Vulture, with a prediction of one collision every 84 years under the most realistic collision avoidance rate scenario, while the other two species were very rare, with predicted fatality rates of one per 1500 years or rarer.

For other (non-target) modelled bird species, the CRM analysis predicts collision rates of 0.269 collisions per year for Mallard, 0.218 per year for Tufted Duck, 0.0950 per year for Gadwall, and 0.102 per year for Black-crowned Night-Heron, using the most realistic CA parameter values. These four species are all very abundant, widespread species with large global and national populations, and no elevated conservation/protected status at national or international levels, hence these predicted collision rates do not raise a serious conservation concern or risk issue. Predicted collision rates for all other species under most realistic CA scenarios are below one per 60 years.

To conclude, the level of predicted collision risk for the Bash 52ME project has a low likelihood of generating severe, or population-level impacts to any of these species. However, the predicted fatality rates greater than one fatality per 100 years (Egyptian Vulture, White-tailed Eagle) or per 131 years (Golden Eagle) may be considered a significant concern, particularly for slow-reproducing, highly sensitive species that are known to be, or suspected of being susceptible to collisions with wind turbines, such as the three species named above. The raw data indicates that of the tier 1 target species, Egyptian Vultures are the most prevalent in the area during the Spring through Fall seasons, the most likely to be breeding within the vicinity of the Project area, and potentially the most likely to be impacted by the Project.

The magnitude and unmitigated significance calculations are presented in the table below.

Table 6-59 Significance of Turbine Collision (Birds)

RECEPTOR	CHA STATUS	VALUE/ SENSITIVITY	MAGNITUDE	SIGNIFICANCE
Steppe Eagle	PBF	Very High	Negligible	**Minor**
Golden Eagle	PBF	Medium	Negligible	**Negligible to Minor**
Egyptian Vulture	PBF	Very High	Negligible	**Minor**
Saker Falcon	PBF	Very High	No Change	**Neutral**
Houbara Bustard	Critical	High	Negligible	**Minor**
Greater Spotted Eagle	PBF	High	Negligible	**Minor**
White-tailed Sea Eagle	-	Medium	Negligible	**Negligible to Minor**
Booted Eagle	-	Medium	Negligible	**Negligible to Minor**
Eurasian Marsh-Harrier	-	Medium	Negligible	**Negligible to Minor**
Hen Harrier	-	Medium	Negligible	**Negligible to Minor**
Eurasian Sparrowhawk	-	Medium	Negligible	**Negligible to Minor**
Shikra	-	Medium	Negligible	**Negligible to Minor**
Common Buzzard	-	Medium	Negligible	**Negligible to Minor**
Long-legged Buzzard	-	Medium	Negligible	**Negligible to Minor**
Eurasian Griffon	-	High	No Change	**Neutral**
Cinereous Vulture	-	High	Negligible	**Minor**
Great White Pelican	-	Medium	Negligible	**Negligible to Minor**
Common Crane	-	Medium	Negligible	**Minor**

Receptor	CHA Status	Value/ Sensitivity	Magnitude	Significance
Eurasian Kestrel	-	Medium	Negligible	**Negligible to Minor**
Lesser Kestrel	-	Medium	Negligible	**Negligible to Minor**
Ruddy Shelduck	-	Low / Lower	Negligible	**Negligible to Minor**
Gadwall	-	Low / Lower	Negligible	**Negligible to Minor**
Mallard	-	Low / Lower	Negligible	**Negligible to Minor**
Green-winged Teal	-	Low / Lower	Negligible	**Negligible to Minor**
Mute Swan	-	Low / Lower	Negligible	**Negligible to Minor**
Tufted Duck	-	Low / Lower	Negligible	**Negligible to Minor**
Pygmy Cormorant	-	Low / Lower	Negligible	**Negligible to Minor**
Great Cormorant	-	Low / Lower	Negligible	**Negligible to Minor**
Black-crowned Night-Heron	-	Low / Lower	Negligible	**Negligible to Minor**

Given that the 8 additional WTGs of the Bash 52MW Project are being added within the boundaries of the original Bash 500MW Project, there may be significant increase in the unmitigated cumulative impacts of both projects. The tables below provide the cumulative predicted collision rates for both projects and significance of cumulative collision impacts.

English Common Name	Bash 500				Cumulative Collision Risk (Bash 500+ Bash52)			
	Using lower bound CA values for each season		Using most realistic CA values for each season		Using lower bound CA values for each season		Using most realistic CA values for each season	
	Collision s/year	Years to 1 collision	Collision s/year	Years to 1 collision	Collision s/year	Years to 1 collision	Collision s/year	Years to 1 collision
Tier 1								
Houbara Bustard	6.11	<1	1.22	<1	6.729	0	1.344	1
Egyptian Vulture	0.257	3	0.102	9	0.283	4	0.1123	9
Greater potted Eagle	0.0543	18	0.0120	83	0.0598	17	0.01322	76
Steppe Eagle	0.933	1	0.206	4	1.0275	1	0.2269	4
Golden Eagle	0.339	2	0.075	13	0.3733	3	0.0826	12
Saker Falcon	0.0412	24	0.0165	60	0.04537	22	0.01817	55
White-tailed Sea Eagle	0.232	4	0.116	8	0.2555	4	0.1277	8

English Common Name	Bash 500				Cumulative Collision Risk (Bash 500+ Bash52)			
	Using lower bound CA values for each season		Using most realistic CA values for each season		Using lower bound CA values for each season		Using most realistic CA values for each season	
	Collisions/year	Years to 1 collision	Collisions/year	Years to 1 collision	Collisions/year	Years to 1 collision	Collisions/year	Years to 1 collision
Tier 2								
Little Bustard	0.213	4	0.0425	23	0.2346	4	0.0468	21
Common Crane	11.1	<1	2.23	<1	12.22	0	2.456	0
Great White Pelican	0.702	1	0.140	7	0.7731	1	0.1542	6
Cinereous Vulture	0.237	4	0.118	8	0.261	4	0.1299	8
Eurasian Griffon	0.0131	76	0.00658	151	0.01443	69	0.00725	138
Booted Eagle	0.0240	41	0.00530	188	0.02643	38	0.00584	171
Eurasian Marsh-Harrier	1.93	<1	0.386	2	2.125	0	0.4251	2
Hen Harrier	2.32	<1	0.464	2	2.555	0	0.511	2
Shikra	0.00924	108	0.00462	216	0.01018	98	0.00509	197
Eurasian Sparrowhawk	0.289	3	0.144	6	0.3183	3	0.1586	6
Common Buzzard	0.833	1	0.189	5	0.9174	1	0.2081	5
Long-legged Buzzard	1.85	<1	0.421	2	2.037	0	0.4636	2
Lesser Kestrel	5.35	<1	1.31	<1	5.892	0	1.443	1
Eurasian Kestrel	38.2	<1	7.30	<1	42.07	0	8.039	0
Tier 3								
Mute Swan	0.744	1	0.112	8	0.8193	1	0.1233	8
Ruddy Shelduck	0.736	1	0.147	6	0.8105	1	0.1619	6
Gadwall	4.70	<1	0.938	1	5.176	0	1.033	1
Mallard	13.3	<1	2.66	<1	14.65	0	2.929	0

English Common Name	Bash 500				Cumulative Collision Risk (Bash 500+ Bash52)			
	Using lower bound CA values for each season		Using most realistic CA values for each season		Using lower bound CA values for each season		Using most realistic CA values for each season	
	Collisions/year	Years to 1 collision	Collisions/year	Years to 1 collision	Collisions/year	Years to 1 collision	Collisions/year	Years to 1 collision
Green-winged Teal	0.281	3	0.0561	17	0.3095	3	0.06178	16
Tufted Duck	10.8	<1	2.15	<1	11.89	0	2.368	0
Pygmy Cormorant	0.341	2	0.0683	14	0.3755	3	0.07522	13
Great Cormorant	0.709	1	0.142	7	0.7808	1	0.1564	6
Black-Crowned Night-Heron	4.14	<1	1.01	<1	4.14	0	1.01	1

Table 6-60 Cumulative Significance of Turbine Collision (Birds)

Receptor	CHA Status	Value/ Sensitivity	Magnitude	Significance
Steppe Eagle	PBF	Very High	Minor	**Moderate to Major**
Golden Eagle	PBF	Medium	Minor	**Negligible to Minor**
Egyptian Vulture	PBF	Very High	Minor	**Moderate to Major**
Saker Falcon	PBF	Very High	Negligible	**Minor**
Houbara Bustard	Critical	High	Minor	**Minor to Moderate**
Greater Spotted Eagle	PBF	High	Negligible	**Minor**
White-tailed Sea Eagle	-	Medium	Minor	**Minor**
Booted Eagle	-	Medium	Negligible	**Negligible to Minor**
Eurasian Marsh-Harrier	-	Medium	Negligible	**Negligible to Minor**
Hen Harrier	-	Medium	Negligible	**Negligible to Minor**
Eurasian Sparrowhawk	-	Medium	Negligible	**Negligible to Minor**
Shikra	-	Medium	Negligible	**Negligible to Minor**
Common Buzzard	-	Medium	Negligible	**Negligible to Minor**
Long-legged Buzzard	-	Medium	Negligible	**Negligible to Minor**
Eurasian Griffon	-	High	Negligible	**Minor**
Cinereous Vulture	-	High	Negligible	**Minor**
Great White Pelican	-	Medium	Negligible	**Negligible to Minor**
Common Crane	-	Medium	Minor	**Minor**
Eurasian Kestrel	-	Medium	Negligible	**Negligible to Minor**
Lesser Kestrel	-	Medium	Negligible	**Negligible to Minor**
Ruddy Shelduck	-	Low / Lower	Negligible	**Negligible to Minor**

Receptor	CHA Status	Value/ Sensitivity	Magnitude	Significance
Gadwall	-	Low / Lower	Minor	**Negligible to Minor**
Mallard	-	Low / Lower	Negligible	**Negligible to Minor**
Green-winged Teal	-	Low / Lower	Negligible	**Negligible to Minor**
Mute Swan	-	Low / Lower	Negligible	**Negligible to Minor**
Tufted Duck	-	Low / Lower	Minor	**Negligible to Minor**
Pygmy Cormorant	-	Low / Lower	Negligible	**Negligible to Minor**
Great Cormorant	-	Low / Lower	Negligible	**Negligible to Minor**
Black-crowned Night-Heron	-	Low / Lower	Minor	**Negligible to Minor**

The following mitigation measures, which are identical to those applied for the Bash 500MW project, will be implemented to further reduce collision risk:

- Planned infrastructure within the wind farm will not include elements attractive for birds, such as lattice towers that provide perching possibilities;
- The Livestock Management Plan will ensure the management of livestock carcasses so as to reduce food availability to vultures in the project footprint in close proximity to the wind turbines
- The Post-construction Biodiversity Management Program (BMP) includes a Post Construction Fatality Monitoring Plan (PCFM) which will entail detailed and intensive carcass searches will take place throughout the wind farm. Best international practice will be followed in determining the appropriate level of search efforts as well as formulas for searcher-bias adjustments. The Post-construction Fatality Monitoring Program will be continued for up to 5 years or until the risk to birds is considered 'negligible' in consultation with the lenders;
- A Potential Biological Removal Analysis was undertaken to determine the thresholds for acceptable levels of annual losses. Should the PCFM prove that thresholds for any particular species are reached, this will trigger an upscaling of mitigation as provided in the Collision Risk Management Plan (CRMP).
- The Collision Risk Management Plan provides details of the automated Shut-Down On Demand (SDOD) system, Identiflight, and shut-down protocols that will be implemented at the project site. The plan details process of the Adaptive Management that will be implemented as necessary, roles and responsibilities of entities involved as well as the resourcing requirements to fulfil the management protocols outlined the CRMP.
- The Biodiversity Action Plan (BAP) provides the strategy for No Net Loss (NNL) for PBF species and Net Gain (NG) for the CH species, Asian Houbara.
- The Compensation Offset Plan details the offset measures that will be implemented for the Asian Houbara if the PCFM exceeds the PBR thresholds. The plan includes the preferred option for the project to sponsor a Project-generated addition to an existing Asian Houbara captive breeding and wild release program located within Uzbekistan. This collaboration leverages the pre-existing facility, resources, knowledge and experience of the program to generate the required conservation gains for the HB through their production and release to the wild.

MITIGATION FOR NESTING BIRDS

- A Breeding Bird Protection Plan has been prepared which provides the protection measures and protocols such as implementation of ecological buffers within close proximity to raptor nests.
- As per the Breeding Bird Protected Plan, nests of species classified as VU, EN and CR at the International and National levels also considered as Priority Biodiversity Features for the project are distinguished as Category 1 species, whereas other birds of prey are Category 2 and other species Category 3.
- For each of the above categories, ecological buffers will be implemented within which erection of turbines and/or construction activities will be prohibited
- The layout of the Bash 52MW project was designed such that none of the turbines of the Bash 52MW Project are located within 750 m of Category 1 species nests. The nests closest to the project are of Little Owl, Long-legged Buzzard and Common Kestrel and all of which are Category 2 species all of which lay beyond the ecological buffers. Therefore, all 8 additional turbines of the Bash 52 project adhere to the ecological buffers implemented for the protection of breeding birds.

If required, mitigation will be upscaled as per the Adaptive Mitigation detailed in the Collision Risk Management Plan.

With the above measures, the residual significance is presented in the following table.

Table 6-61 Residual Significance of Turbine Collision (Birds)

RECEPTOR	VALUE/ SENSITIVITY	MAGNITUDE	RESIDUAL
Steppe Eagle	Very High	No change	**Neutral**
Golden Eagle	Medium	No change	**Neutral**
Egyptian Vulture	Very High	No change	**Neutral**
Saker Falcon	Very High	No change	**Neutral**
Houbara Bustard	High	No change	**Neutral**
Booted Eagle	Medium	No change	**Neutral**
Eurasian Marsh-Harrier	Medium	No change	**Neutral**
Hen Harrier	Medium	No change	**Neutral**
Eurasian Sparrowhawk	Medium	No change	**Neutral**
Shikra	Medium	No change	**Neutral**
Common Buzzard	Medium	No change	**Neutral**
Long-legged Buzzard	Medium	No change	**Neutral**
Eurasian Griffon	High	No change	**Neutral**
Cinereous Vulture	High	No change	**Neutral**
Great White Pelican	Medium	No change	**Neutral**
Common Crane	Medium	No change	**Neutral**
Eurasian Kestrel	Medium	No change	**Neutral**
Lesser Kestrel	Medium	No change	**Neutral**

Receptor	Value/ Sensitivity	Magnitude	Residual
Ruddy Shelduck	Low / Lower	No change	**Neutral**
Gadwall	Low / Lower	No change	**Neutral**

The residual cumulative impact with the above measures is presented in the following table.

Table 6-62 Cumulative Residual Significance of Turbine Collision (Birds)

Receptor	Value/ Sensitivity	Magnitude	Residual
Steppe Eagle	Very High	No change	**Neutral**
Golden Eagle	Medium	No change	**Neutral**
Egyptian Vulture	Very High	No change	**Neutral**
Saker Falcon	Very High	No change	**Neutral**
Houbara Bustard	High	No change	**Neutral**
Booted Eagle	Medium	No change	**Neutral**
Eurasian Marsh-Harrier	Medium	No change	**Neutral**
Hen Harrier	Medium	No change	**Neutral**
Eurasian Sparrowhawk	Medium	No change	**Neutral**
Shikra	Medium	No change	**Neutral**
Common Buzzard	Medium	No change	**Neutral**
Long-legged Buzzard	Medium	No change	**Neutral**
Eurasian Griffon	High	No change	**Neutral**
Cinereous Vulture	High	No change	**Neutral**
Great White Pelican	Medium	No change	**Neutral**
Common Crane	Medium	No change	**Neutral**
Eurasian Kestrel	Medium	No change	**Neutral**
Lesser Kestrel	Medium	No change	**Neutral**
Ruddy Shelduck	Low / Lower	No change	**Neutral**
Gadwall	Low / Lower	No change	**Neutral**
Mallard	Low / Lower	No change	**Neutral**
Green-winged Teal	Low / Lower	No change	**Neutral**
Mute Swan	Low / Lower	No change	**Neutral**
Tufted Duck	Low / Lower	No change	**Neutral**
Pygmy Cormorant	Low / Lower	No change	**Neutral**
Great Cormorant	Low / Lower	No change	**Neutral**
Black-crowned Night-Heron	Low / Lower	No change	**Neutral**

Turbine Collision (Bats)

Bat fatalities from wind turbine collisions are documented world-wide. However, the driving impetus behind this (when considering that bats rarely collide with other man-made structures) is still unknown and being researched. The patterns that have been observed thus far include:

- Migratory bats making long-distance movements are at higher risk of collision than resident "sedentary" bats.
- "Tree" bats, those that roost in trees, are at higher risk of collision fatalities.
- The majority of fatalities occur during late summer and autumn, which coincides with breeding, increased foraging, and migration.
- Collision Risk is higher for species adapted for foraging insects in open spaces.
- Wind turbines may be acting as an attractant to specific bat species. A recent study undertaken in England found that P. pipistrellus activity was 37% higher at turbines than at control locations, whereas P. pygmaeus activity was consistent with no attraction or repulsion by turbines. This may be due to the attraction of aerial insects to lights and heat associated with turbines.
- Fatalities increase at low wind speeds, and before and after the passage of storm fronts.
- Mortality increases with turbine tower height and rotor diameter.
- Barotrauma does not appear to be a significant contributing factor to mortality.
- Sensitivity to wind turbine collision is strongly influenced by preferred flight altitudes, with lower flying species at less risk of collision than higher flying species.
    - *Vespertilio murinus* and *Nyctalus noctula* (25-200 m, majority activity at 50-100 m (Voigt etal., 2021)) are a high-flying species;
    - Eptesicus and Pipistrellus species (5-65 m and above (Wellig et al., 2018)) are a medium-flying species;
    - Rhinolophus is a low-flying species - a few meters above the ground (Roemer et al., 2017).

The magnitude and **unmitigated** significance calculations are presented in the table below.

Table 6-63 Significance of Turbine Collision (Bats)

RECEPTOR	VALUE/ SENSITIVITY	MAGNITUDE	SIGNIFICANCE
Vespertilio murinus	Medium	Moderate	**Moderate**
Pipistrellus pipistrellus	Medium	Moderate	**Moderate**
Eptesicus bottae	Medium	Moderate	**Moderate**
Eptesicus serotinus	Medium	Moderate	**Moderate**
Plecotus sp.	Medium	Moderate	**Moderate**
Nyctalus noctula	Medium	Moderate	**Moderate**
Rhinolophus bocharicus	Medium	Negligible	**Negligible to Minor**

Given that the 8 additional WTGs of the Bash 52MW Project are being added within the boundaries of the original Bash 500MW Project, there may be minor increase in the unmitigated cumulative impacts of both projects.

Table 6-64 Cumulative Significance of Turbine Collision (Bats)

RECEPTOR	VALUE/ SENSITIVITY	MAGNITUDE	SIGNIFICANCE
Vespertilio murinus	Medium	Major	**Moderate to Major**
Pipistrellus pipistrellus	Medium	Major	**Moderate to Major**
Eptesicus bottae	Medium	Major	**Moderate to Major**
Eptesicus serotinus	Medium	Major	**Moderate to Major**
Plecotus sp.	Medium	Major	**Moderate to Major**
Nyctalus noctula	Medium	Major	**Moderate to Major**
Rhinolophus bocharicus	Medium	Negligible	**Negligible to Minor**

The following mitigation measures, which are identical to those applied for the Bash 500MW project will be implemented to reduce collision risk:

- Prevention of elements that may attract bats, or insects and therefore bats:
  - All wind turbines, particularly the nacelles, will be designed, constructed and maintained in such a manner that they do not support roosting bats – all the gaps and interstices will be made inaccessible to bats;
  - Use lighting only as needed and use wavelengths and designs that do not attract insects or bats;
- Bright white or bluish lights (mercury vapor, white incandescent and white florescent) and high sodium vapour light are the most attractive to insects and will not be used.
- Post-construction Biodiversity Management Program will include a Post Construction Fatality Monitoring Plan (PCFM) which will entail detailed and intensive carcass searches will take place throughout the wind farm. Best international practice will be followed in determining the appropriate level of search efforts as well as formulas for searcher-bias adjustments (Rodrigues *et al.*, 2015a). The Post-construction Fatality Monitoring Program will be continued for up

to 5 years or until the risk to bats is considered 'negligible' in consultation with the lenders;

- A Potential Biological Removal Analysis was undertaken to determine the thresholds for acceptable levels of annual losses. Should the PCFM findings indicate that thresholds for any particular species are reached, this will trigger an upscaling of mitigation as provided in the Collision Risk Management Plan (CRMP).
- The Collision Risk Management Plan has been prepared that provides a detailed adaptive Cut-in Speed Curtailment Program, wherein turbines are shut-down and prevented from moving, during periods of high bat activity.
- The proposed Cut-in Speed Curtailment Program, if triggered, would be an increase in cut-in speed to 6m/s during the hours as timings as follows:
  - During the 6-week period of August 1-September 15
  - One hour immediately preceding and 3 hours immediately following sunset, as well as the 3 hours immediately preceding and 1 hour immediately following sunrise.
- However, adaptive management will take place such that the findings of acoustic monitoring, meteorological studies and fatality monitoring will be used to determine the best cut in speed curtailment regime so that it may be modified if needed.

With the above measures i.e. careful monitoring of fatalities post-construction and the adaptive management program, the **residual** significance is presented in the following table.

Table 6-65 Residual Significance of Turbine Collision (Bats)

RECEPTOR	VALUE/ SENSITIVITY	MAGNITUDE	RESIDUAL
Vespertilio murinus	Medium	No Change	**Neutral**
Pipistrellus pipistrellus	Medium	No Change	**Neutral**
Eptesicus bottae	Medium	No Change	**Neutral**
Eptesicus serotinus	Medium	No Change	**Neutral**
Plecotus sp.	Medium	No Change	**Neutral**
Nyctalus noctula	Medium	No Change	**Neutral**
Rhinolophus bocharicus	Medium	No Change	**Neutral**

The residual cumulative impact with the above measures is presented in the following table.

Table 6-66 Cumulative Residual Significance of Turbine Collision (Bats)

RECEPTOR	VALUE/ SENSITIVITY	MAGNITUDE	RESIDUAL
Vespertilio murinus	Medium	Negligible	**Negligible to minor**
Pipistrellus pipistrellus	Medium	Negligible	**Negligible to minor**
Eptesicus bottae	Medium	Negligible	**Negligible to minor**
Eptesicus serotinus	Medium	Negligible	**Negligible to minor**
Plecotus sp.	Medium	Negligible	**Negligible to minor**
Nyctalus noctula	Medium	Negligible	**Negligible to minor**

Receptor	Value/ Sensitivity	Magnitude	Residual
Rhinolophus bocharicus	Medium	Negligible	**Negligible to minor**

6.4.2.3 Biodiversity Displacement – Competition and Dispersal

Displacement / dispersal

Shyer species may be displaced away from the project area, having indirect secondary impacts on adjacent territories via increased competition for resources compromising population stability, causing ecosystem imbalances.

However, the surrounding areas on a landscape level support similar habitat type and are not constrained by large-scale urban or industrial developments. Therefore, it is not anticipated that displaced individuals will have a significant impact on adjacent ecosystems.

Houbara Bustard are significantly shy species and may show to avoidance of tall structures (WTGs) in the WF area. Therefore, dispersal and permanent displacement from the WF area is a possible impact. Mitigation for this impact is addressed in the BAP and the Compensation Offset Plan.

Figure 6-5 Adjacent Habitat Availability for Dispersed Species

PROLIFERATION OF SPECIES

The dispersal of shyer species away from disturbed areas can lead to an increase in generalist species such as Red Fox which are well adapted to anthropogenic habitats.

Further, poor management of solid waste can result in the proliferation of pest species, such as feral dog, cat, rats, and other urban-adapted species. This can cause further competition and displacement of native fauna.

The magnitude and unmitigated significance calculations are presented in the table below.

Table 6-67 Significance of Proliferation

RECEPTOR	VALUE/ SENSITIVITY	MAGNITUDE	SIGNIFICANCE
Endangered Birds	Very High	Minor	**Moderate to Major**
Threatened Birds	High	Minor	**Minor to Moderate**
Non-threatened Birds	Medium	Minor	**Minor**
All other Birds	Low / Lower	Minor	**Minor**
Goitered Gazelle	High	Minor	**Minor to Moderate**
Non-threatened Mammals	Low / Lower	No Change	**Neutral**
Russian Tortoise	High	Minor	**Minor to Moderate**
Nationally Important Herptiles	Medium	Minor	**Minor**
Non-threatened Herptiles	Low / Lower	Minor	**Negligible to Minor**
Non-threatened Invertebrates	Low / Lower	Minor	**Negligible to Minor**

Given that the 8 additional WTGs of the Bash 52MW Project are being added within the boundaries of the original Bash 500MW Project, there may be minor increase in the unmitigated cumulative impacts of both projects.

Table 6-68 Cumulative Significance of Proliferation

RECEPTOR	VALUE/ SENSITIVITY	MAGNITUDE	SIGNIFICANCE
Endangered Birds	Very High	Very High	**Major**
Threatened Birds	High	High	**Moderate**
Non-threatened Birds	Medium	Medium	**Moderate**
All other Birds	Low / Lower	Medium	**Moderate**
Goitered Gazelle	High	High	**Moderate**
Non-threatened Mammals	Low / Lower	Low / Lower	**Negligible to Minor**
Russian Tortoise	High	High	**Moderate**
Nationally Important Herptiles	Medium	Medium	**Moderate**
Non-threatened Herptiles	Low / Lower	Low / Lower	**Moderate**
Non-threatened Invertebrates	Low / Lower	Low / Lower	**Moderate**

However, the following mitigation measures, which are identical to those applied for the Bash 500MW project, will be in place, to minimize the potential risks:

- Development of a solid waste management strategy
- Strict waste management controls in place
- Zero tolerance for littering on site
- Training will be provided to staff such as tool box meetings which include waste management
- Regular inspections and clean-up of litter
- Ban of keeping domestics or providing food for domestic species (i.e. feral cats, dogs)

With the above measures, the residual significance is presented in the following table.

Table 6-69 Residual Significance of Proliferation

RECEPTOR	VALUE/ SENSITIVITY	MAGNITUDE	RESIDUAL
Endangered Birds	Very High	Neutral	**Neutral**
Threatened Birds	High	Neutral	**Neutral**
Non-threatened Birds	Medium	Neutral	**Neutral**
All Bats	Medium	Neutral	**Neutral**
Goitored Gazelle	High	Neutral	**Neutral**
Non-threatened Mammals	Low / Lower	Neutral	**Neutral**
Russian Tortoise	High	Neutral	**Neutral**
Nationally Important Herptiles	Medium	Neutral	**Neutral**
Non-threatened Herptiles	Low / Lower	Neutral	**Neutral**
Non-threatened Invertebrates	Low / Lower	Neutral	**Neutral**

The residual cumulative impact with the above measures is presented in the following table.

Table 6-70 Cumulative Residual Significance of Proliferation

RECEPTOR	VALUE/ SENSITIVITY	MAGNITUDE	RESIDUAL
Endangered Birds	Very High	Negligible	**Minor**
Threatened Birds	High	Negligible	**Minor**
Non-threatened Birds	Medium	Negligible	**Negligible to Minor**
All Bats	Medium	Negligible	**Negligible to Minor**
Goitored Gazelle	High	Negligible	**Minor**
Non-threatened Mammals	Low / Lower	Negligible	**Negligible to Minor**
Russian Tortoise	High	Negligible	**Minor**
Nationally Important Herptiles	Medium	Negligible	**Negligible to minor**
Non-threatened Herptiles	Low / Lower	Negligible	**Negligible to minor**
Non-threatened Invertebrates	Low / Lower	Negligible	**Negligible to minor**

6.4.2.4 Environmental Quality

NOISE

Operational noise created by the rotation of the turbines and power generator can cause acoustic masking, disturbance and displacement, and general reduction in survivorship and reproductive success in a variety of fauna. Most impacted are typically acoustic communicators such as bird and bat species.

The noise studies undertaken for the project site found that existing ambient noise in the overall project location is mostly driven by wind.

- At daytime wind speeds of 2 m/s, the typical ambient background noise is between 10-25 dB, whilst at wind speeds of 10 m/s the typical levels were between 25-30 dB.
- At night-time wind speeds of 2 m/s the typical ambient background noise was between 15-25 dB , whilst at wind speeds of 10 m/s the typical levels were approximately 25-45 dB or lower.

Noise modelling assessment results indicate that modelled receptors, the closest of which is located 500m away from the nearest turbine, will be exposed to an increase in noise as follows:

- Day/night average existing baseline levels of 37/22 may increase to 37.5 dB when turbines are spinning at 5 m/s.
- Day/night average existing baseline levels of 37/22 may increase to 47.9 dB when turbines are spinning at 10 m/s.

Although the increase in ambient noise is major with higher wind speeds, the resultant effects on wildlife may be less pronounced. For one, the characteristic of the noise is not intermittent, as it will gradually build up and decrease depending on wind speed, rather than cause short, sporadic sounds. Wildlife have been known to habituate to stable conditions, which can include high ambient operational noise.

Studies show that wildlife behaviour is impacted at dB levels of 40, but this is in contrast to lower background levels. As higher wind speeds are correlated with naturally occurring noise elvels of 40 dB and higher, it is not anticipated that the addition of operational turbine noise will be significant on biodiversity.

The magnitude and unmitigated significance calculations are presented in the table below.

Table 6-71 Significance of Noise Impacts

RECEPTOR	VALUE/ SENSITIVITY	MAGNITUDE	SIGNIFICANCE
Endangered Birds	Very High	Minor	**Moderate to Major**
Threatened Birds	High	Minor	**Minor to Moderate**
Nationally Threatened Birds	Medium	Minor	**Minor**
Non-threatened Birds	Medium	Minor	**Minor**
All Bats	Medium	Minor	**Minor**
Goitered Gazelle	High	Negligible	**Minor**
Non-threatened Mammals	Low / Lower	Negligible	**Negligible to Minor**
Russian Tortoise	High	Negligible	**Minor**

RECEPTOR	VALUE/ SENSITIVITY	MAGNITUDE	SIGNIFICANCE
Nationally Important Herptiles	Medium	Negligible	**Negligible to Minor**
Non-threatened Herptiles	Low / Lower	Negligible	**Negligible to Minor**
Non-threatened Invertebrates	Low / Lower	Negligible	**Negligible to Minor**

Given that the 8 additional WTGs of the Bash 52MW Project are being added within the boundaries of the original Bash 500MW Project, there may be negligible increase in the cumulative impacts of both projects.

Table 6-72 Cumulative Significance of Noise Impacts

RECEPTOR	VALUE/ SENSITIVITY	MAGNITUDE	SIGNIFICANCE
Endangered Birds	Very High	Moderate	**Major**
Threatened Birds	High	Moderate	**Moderate to Major**
Nationally Threatened Birds	Medium	Moderate	**Moderate**
Non-threatened Birds	Medium	Moderate	**Moderate**
All Bats	Medium	Moderate	**Moderate**
Goitered Gazelle	High	Minor	**Minor to Moderate**
Non-threatened Mammals	Low / Lower	Minor	**Negligible to Minor**
Russian Tortoise	High	Minor	**Minor to Moderate**
Nationally Important Herptiles	Medium	Minor	**Moderate**
Non-threatened Herptiles	Low / Lower	Minor	**Negligible to Minor**
Non-threatened Invertebrates	Low / Lower	Minor	**Negligible to Minor**

LIGHT POLLUTION

Night-time lighting can impact nocturnal wildlife behaviour. It can act as an attractant, which can cause congregation and higher predation rates / change movement and migration behaviour; act as a repellent which causes displacement or interfere with the circadian cycle and cause lower survivorship and reproductive success.

The magnitude and unmitigated significance calculations are presented in the table below.

Table 6-73 Significance of Light Pollution

RECEPTOR	VALUE/ SENSITIVITY	MAGNITUDE	SIGNIFICANCE
Endangered Birds	Very High	Moderate	**Major**
Threatened Birds	High	Moderate	**Moderate to Major**
Nationally Threatened Birds	Medium	Moderate	**Moderate**
Non-threatened Birds	Medium	Moderate	**Moderate**
All Bats	Medium	Moderate	**Moderate**
Goitored Gazelle	High	Minor	**Minor to Moderate**
Non-threatened Mammals	Low / Lower	Minor	**Negligible to Minor**
Russian Tortoise	High	Minor	**Minor to Moderate**
Nationally Important Herptiles	Medium	Moderate	**Moderate**
Non-threatened Herptiles	Low / Lower	Minor	**Negligible to Minor**

RECEPTOR	VALUE/ SENSITIVITY	MAGNITUDE	SIGNIFICANCE
Non-threatened Invertebrates	Low / Lower	Moderate	**Minor**

Given that the 8 additional WTGs of the Bash 52MW Project are being added within the boundaries of the original Bash 500MW Project, there may be minor increase in the cumulative impacts of both projects.

Table 6-74 Cumulative Significance of Light Pollution

RECEPTOR	VALUE/ SENSITIVITY	MAGNITUDE	SIGNIFICANCE
Endangered Birds	Very High	Major	**Major**
Threatened Birds	High	Major	**Major**
Nationally Threatened Birds	Medium	Major	**Moderate to Major**
Non-threatened Birds	Medium	Major	**Moderate to Major**
All Bats	Medium	Major	**Moderate to Major**
Goitored Gazelle	High	Moderate	**Moderate to Major**
Non-threatened Mammals	Low / Lower	Moderate	**Minor**
Russian Tortoise	High	Moderate	**Moderate to Major**
Nationally Important Herptiles	Medium	Major	**Moderate to Major**
Non-threatened Herptiles	Low / Lower	Moderate	**Minor**
Non-threatened Invertebrates	Low / Lower	Major	**Minor to Moderate**

However, the following mitigation measures, which are identical to those applied for the Bash 500MW project, will be in place, to minimize the potential risks:

- Ensure lighting is fit for purpose and duration of lighting to be controlled and minimized as much as possible.
- Lights will be shielded to prevent skyglow, spill and glare

With the above measures, the residual significance is presented in the following table.

Table 6-75 Residual Significance of Light Pollution

RECEPTOR	VALUE/ SENSITIVITY	MAGNITUDE	RESIDUAL
Endangered Birds	Very High	No Change	**Neutral**
Threatened Birds	High	No Change	**Neutral**
Nationally Threatened Birds (	Medium	No Change	**Neutral**
Non-threatened Birds	Medium	No Change	**Neutral**
All Bats	Medium	No Change	**Neutral**
Goitored Gazelle	High	No Change	**Neutral**
Non-threatened Mammals	Low / Lower	No Change	**Neutral**
Russian Tortoise	High	No Change	**Neutral**

Receptor	Value/ Sensitivity	Magnitude	Residual
Nationally Important Herptiles	Medium	No Change	**Neutral**
Non-threatened Herptiles	Low / Lower	No Change	**Neutral**
Non-threatened Invertebrates	Low / Lower	No Change	**Neutral**

The residual cumulative impact with the above measures is presented in the following table.

Table 6-76 Cumulative Residual Significance of Light Pollution

Receptor	Value/ Sensitivity	Magnitude	Residual
Endangered Birds	Very High	Negligible	**Minor**
Threatened Birds	High	Negligible	**Minor**
Nationally Threatened Birds (	Medium	Negligible	**Negligible to Minor**
Non-threatened Birds	Medium	Negligible	**Negligible to Minor**
All Bats	Medium	Negligible	**Negligible to Minor**
Goitored Gazelle	High	Negligible	**Minor**
Non-threatened Mammals	Low / Lower	Negligible	**Negligible to Minor**
Russian Tortoise	High	Negligible	**Minor**
Nationally Important Herptiles	Medium	Negligible	**Negligible to Minor**
Non-threatened Herptiles	Low / Lower	Negligible	**Negligible to Minor**
Non-threatened Invertebrates	Low / Lower	Negligible	**Negligible to Minor**

6.4.3 Decommissioning

A Decommissioning Plan will be prepared at least 18 months prior to planned decommissioning and submitted to the Regulator for review and approval. No decommissioning works can be commenced without a permit from the Regulator. The Plan will detail the site and surrounding environment and receptors and will likely require new baseline studies to assess the condition of the site, adjacent areas and the overall area of influence including designated sites. Based on the details outlined in this Report, the measures will likely relate to the following:

- Removal of all Project related components and wastes and appropriate disposal method that adopts the waste hierarchy and maximises re-use and recycling of materials;
- Restoration of terrestrial ecology habitats within the Project footprint including access roads e.g. re-seeding and re-vegetation using local indigenous species; and
- Remediation and/or scarification of any compacted soils.

6.5 Implementing Mitigation: Planning, Management and Monitoring

The mitigation measures applied to reduce significant impacts will require a number of management plans to detail the implementation and action items needed, as well as

monitoring and reporting requirements to ensure compliance. A Biodiversity Management Plan has been prepared which details the management plan to be implemented during each phase of the project, monitoring and reporting requirements i.e., the Biodiversity Monitoring and Evaluation Plan (BMEP) as well the entity responsible for the implementation of each plan.

6.5.1 Design

The following outline the mitigation requirements during design phase:

- Integration of design mitigation into WTG design related to lighting design and specifications, and exclusion of roosting and perching opportunities.

6.5.2 Pre-Construction

Refer to the BMP for implementation of management plans for the pre-construction phase and BMEP for ongoing monitoring and reporting requirements for each plan. The following outline the mitigation requirements pre-construction:

- Review of Construction Methodology and Schedule by environmental consultant especially in regards to:
  - Site Clearance and Layout;
  - Timing and method of works;
  - Lighting Strategy; and
  - Solid Waste Management Strategy.
- Preparation of Biodiversity Action Plan, which illustrates the pathway to NG for CH species and NNL for PBF species:
  - Preparation of Reptile Relocation Plan;
  - Preparation of Flora Conservation Action Plan; and
  - Preparation of Breeding Bird Protection Plan;
- Carry out preconstruction survey and implementation of actions as per the above plans.
- Preparation of CEMP, inclusive of:
  - General Site Controls;
  - Solid Waste Control Plan;
  - Chance Find Procedure;
  - Air Quality Control Plan;
  - Dust Control Plan;
  - Noise Control Plan;
  - Lighting Control Plan;
  - Hazardous Materials Control Plan;
  - Emergency Action Plans:
  - Spill Prevention and Clean-up Procedures

6.5.3 Construction

Refer to the BMP for implementation of management plans for the post-construction phase and BMEP for ongoing monitoring and reporting requirements for each plan. The following outline the mitigation requirements during construction:

- The EPC will employ a full-time site-based Ecologist to ensure that ecology related measures are understood and fully implemented.
- Implementation of the Chance Find Procedure
- Implementation of CEMP:
  - Daily Checklist;
  - Weekly Inspection;
  - Monthly Reporting; and
  - Quarterly Auditing.
- Biodiversity Monitoring and Evaluation Programme BMEP for ongoing monitoring of translocation/relocation success, chance find procedures, target species impacts, etc.

6.5.4 Post-Construction

Refer to the BMP for implementation of management plans for the post-construction phase and BMEP for ongoing monitoring and reporting requirements for each plan. The following outline the mitigation requirements post-construction:

- Implementation of Restoration Action Plan;
- Carrying out restoration works;
- Post-restoration survey;
- Compensation Offset Plan;
- Habitat restoration offset works; and
- Biodiversity Monitoring and Evaluation Programme BMEP.

6.5.5 Operation

Refer to the BMP for implementation of management plans for the operations phase and BMEP for ongoing monitoring and reporting requirements for each plan. The following outline the mitigation requirements during operation:

- Preparation and Implementation of OEMP, inclusive of:
  - General Site Controls;
  - Noise Control Plan;
  - Lighting Control Plan;
  - Post Construction Fatality Monitoring Plan (PCFM);

- Collision Risk Management Plan which includes PBR thresholds, proposed SDOD mechanism, and cut-in Speed Curtailment criteria; and
- Compensation Offset Plan

- Compliance checks and reporting include:
  - Daily Checklist;
  - Weekly Inspection;
  - Monthly Reporting; and
  - Quarterly Auditing.
- Biodiversity Monitoring and Evaluation Programme BMEP.

7 AIR QUALITY

7.1 Baseline Conditions

The baseline conditions identified in the Bash 500MW ESIA remain the same for the areas surrounding the site and the access road (Chapter 8 of the Bash 500 ESIA).

7.1.1 Conditions under Bash 500MW

The construction of the Bash 500MW has commenced including the transportation of heavy project machinery and equipment using the local access road. The potential impacts from these activities primarily relate to dust from moving vehicles and excavation works.

During the Bash 52MW WF ESIA phase consultations undertaken with local communities, two grievances were received stating that the project machinery had damaged the local roads leading to a lot of dust generation and making movement difficult for locals. These grievances were logged by 5 Capitals and Juru Energy Limited and submitted to the Bash 500MW WF Project Company to be resolved in line with the SEP grievance mechanism and ensure that the EPC Contractor is implementing the appropriate mitigation, management and monitoring measures.

The grievances raised during the public consultations are a potential indication that the Bash 500MW WF EPC Contractor (CEEC) needs to enhance its implementation of the mitigation, management and monitoring measures in place due to these grievances. As such, there is potential risk that the transportation of additional construction materials under Bash 52MW WF will lead to increased dust generation along the access road. This will have further impacts on local road users including a risk to their health.

7.2 Receptors

The receptors identified within the Bash 500MW ESIA remain the same for the Project site and the access road and so will their level of sensitivity to the proposed Bash 52MW WF. These are as summarised in the table below.

Table 7-1 Potential Air Quality Receptors – Wind Farm

RECEPTOR ID	RECEPTOR	RECEPTOR TYPE	SENSITIVITY	JUSTIFICATION
R15	Ayakagitma lake	Ecological	**High**	Fishermen & other users of this lake including biodiversity will be particularly vulnerable to changes in ambient air quality

Receptor ID	Receptor	Receptor Type	Sensitivity	Justification
R22	Animal Holding Area with accommodation area	Structure & Residential	**High**	Livestock kept at this holding area and herders that use this accommodation will be particularly vulnerable to changes in ambient air quality.
R28	Water well	Ecological	**Medium**	Users of the water well will be relatively vulnerable to changes in ambient air quality as they are at the water well for a short duration.
Mining Area 2	Mining area (including mine workers)	Industrial	**Low**	If mining activities resumes before or during project construction, workers will unlikely be overly sensitive to project impacts due to the dusty nature of such works they are exposed to from the mining facilities.
	Worker accommodation area	Residential	**High**	If operations at the mine resume, workers at the worker accommodation camps will be particularly vulnerable to changes in ambient air quality.
Access Road				
R12	Kuklam Village	Residential	**High**	Residents and visitors of the village will be vulnerable to changes in ambient air quality resulting from increased traffic.
R33	Herder's structure and animal holding area	Residential	**High**	Herders using the structure and Livestock kept at this holding area will be vulnerable to changes in ambient air quality resulting from increased traffic.
R34	Herder's structure	Residential	**High**	Potential herders using the structure and their Livestock will be vulnerable to changes in ambient air quality resulting from increased traffic.
R35	Herder's structure and animal holding area	Residential	**High**	Herders using the structure and Livestock kept at this holding area will be vulnerable to changes in ambient air quality resulting from increased traffic.

7.3 Potential Impacts, Mitigation, Management & Residual Impacts

7.3.1 Construction Phase

Similar to the Bash 500MW WF, the construction phase impacts on local ambient air quality under the Bash 52MW WF Project will include the following:

- Dust generation: Resulting from earthworks, movement of vehicles and machinery, particulate dispersion from uncovered truckloads and materials etc.
- Gaseous emissions: Resulting from combustion of fossil fuels from the operation of vehicles, construction equipment etc.
- Emissions of volatile organic compounds.
- Odour.

Note: Refer to section 8.3.1 of the Bash 500MW ESIA as the nature of the impacts above will be similar to what have been assessed therein.

Table 7-2 Air Quality Impact Significance, Mitigation & Management Measures and Residual Impacts – Construction

Potential Impacts	Magnitude of Impact	Receptor	Sensitivity	Potential Impact Significance	Mitigation and Management Measures	Residual Impacts
Dust emissions within 500m of the Project boundary (Generated as a result of site preparatory works, movement of vehicles on unpaved surfaces and storage of batching plant materials) and along the access road.	**Minor Negative**	Kuklam Village **(R12)**	High	**Minor to Moderate**	• Bash 52MW will implement all the mitigation measures as identified in Bash 500MW ESIA	**Minor**
Gaseous emissions – From vehicle exhaust	**Minor Negative**	Animal holding area with accommodation structure **(R23)**	High	**Minor to Moderate**	• Bash 52MW will implement all the mitigation measures as identified in Bash 500MW ESIA	**Minor**
		Ayakagitma lake **(R15)**	High	**Minor to Moderate**		**Minor**
		Animal Holding Area with accommodation area **(R22)**	High	**Minor to Moderate**		**Minor**
		Water well **(R28)**	Medium	**Minor**		**Negligible**
		Mining area 2 (including mine workers)	Low	**Negligible to Minor**		**Negligible**
		Worker accommodation area (of mining area 2)	High	**Negligible to Minor**		**Negligible**
Gaseous emissions – From vehicle exhaust along access roads	**Negligible Negative**	Kuklam Village **(R12)**	High	**Minor**	• Bash 52MW will implement all the mitigation measures	**Negligible**

Potential Impacts	Magnitude of Impact	Receptor	Sensitivity	Potential Impact Significance	Mitigation and Management Measures	Residual Impacts
		Herder's structure and animal holding area **(R33)**	High	**Minor**	as identified in Bash 500MW ESIA	**Negligible**
		Herder's structure **(R34)**	High	**Minor**		**Negligible**
		Herder's structure and animal holding area **(R35)**	High	**Minor**		**Negligible**
Emissions of VOCs and other hazardous volatiles	**Negligible Negative**	Animal holding area with accommodation **(R23)**	High	**Minor**	• Bash 52MW will implement all the mitigation measures as identified in Bash 500MW ESIA	**Negligible**
		Ayakagitma lake **(R15)**	High	**Minor**		**Negligible**
		Animal Holding Area with accommodation area **(R22)**	High	**Minor**		**Negligible**
		Water well **(R28)**	Medium	**Negligible to Minor**		**Negligible**
		Worker accommodation area (of mining area 2)	High	**Minor**		**Negligible**
Odour from onsite sanitary facilities	**Negligible Negative**	Animal holding area with accommodation **(R23)**	High	**Minor**	• Bash 52MW will implement all the mitigation measures	**Negligible**

Potential Impacts	Magnitude of Impact	Receptor	Sensitivity	Potential Impact Significance	Mitigation and Management Measures	Residual Impacts
		Ayakagitma lake **(R15)**	High	**Minor**	as identified in Bash 500MW ESIA	**Negligible**
		Animal Holding Area with accommodation area **(R22)**	High	**Minor**		**Negligible**
		Water well **(R28)**	Medium	**Negligible to Minor**		**Negligible**
		Worker accommodation area (of mining area 2)	High	**Minor**		**Negligible**

7.4 Operational Phase

The operation of the Project is not expected to result in impacts to air quality as there will be no permanent fuel combustion requirements except for the use of vehicles for operation and maintenance works at the Wind Farm. Emission from vehicles during operation will be minor and unlikely to result in a discernible impact at receptor locations.

Table 7-3 Air Quality – Impact Significance, Mitigation & Management Measures and Residual Impacts – Operation

Potential Impacts	Magnitude of Impact	Receptor	Sensitivity	Potential Impact Significance	Mitigation and Management Measures	Residual Impact
Gaseous Emissions from Vehicles	**Negligible Negative**	Kuklam Village **(R12)**	High	**Minor**	• Bash 52MW will implement all the mitigation measures as identified in Bash 500MW ESIA	**Negligible**
		Herder's structure and animal holding area **(R33)**	High	**Minor**		**Negligible**

		Herder's structure **(R34)**	High	**Minor**		**Negligible**
		Herder's structure and animal holding area **(R35)**	High	**Minor**		**Negligible**

7.5 Cumulative Impacts

Air quality will be potentially impacted by the construction and operation of on-going activities and existing facilities within the Project area. This is as provided in the tables below.

Table 7-4 Valued Environmental & Social Components (VEC's)

Environmental Component	Considered VEC to be included in CIA?	Justification for Inclusion or Exclusion
Air Quality	**Yes**	Project related impacts on ambient air quality are those associated with construction: temporary emissions from vehicles, dust from earthworks and dust from vehicle movements within the Project. Cumulative impact on air quality with respect to dust generation and gaseous emissions will occur due to the on-going construction of the Bash 500MW WF and the construction activities at Mining Area 2.

The table below includes an assessment of the cumulative impacts on air quality due to on-going activities and existing facilities within the Project's area of influence.

Table 7-5 Cumulative Impact Assessment on Air Quality

VEC	Impact Generating Projects	Cumulative Impacts	
		Construction Phase	Operation Phase
Air Quality	1. Bash 52 MW WF (the Project) 2. Bash 500MW WF Project (under construction) 3. Mining Area 1 (under construction)	Local ambient air quality will be potentially affected by increased dust during the site clearance and excavations as well as due to the transportation of materials on local roads. This will also include impact from gaseous emissions from the exhaust of construction vehicles, equipment and temporary power generators. With the adoption of typical common management practices (mitigation, management and monitoring measures) outlined in the Bash 500MW ESIA, the cumulative impacts are anticipated to have minor significance.	None are expected

7.6 Monitoring

The Bash 52MW will implement the same monitoring requirements as provided in section 8.4 of the Bash 500MW ESIA.

8 NOISE & VIBRATION

8.1 Observation & Baseline Conditions

The baseline conditions identified in the Bash 500MW ESIA remain the same for the areas surrounding the site and the access road (Chapter 9 of the Bash 500MW ESIA).

8.1.1 Conditions under Bash 500MW

During the Bash 52MW WF ESIA phase consultations undertaken with communities from Chulobod village, a grievance relating to noise was recorded. According to the grievant, the EPC Contractor has constructed some worker accommodation facilities near the village which is contrary to the provisions of the ESIA which require off-site accommodation facilities to be located in larger town/cities and not in local communities. Due to the proximity of the workers camp to the village, the grievant stated that the workers made noise during the day and evening causing disturbance in the village. This grievance was logged by 5 Capitals and Juru Energy Limited and submitted to the Bash 500MW WF Project Company to be resolved in line with the SEP grievance mechanism and ensure that the EPC Contractor is implementing the requirements within he ESIA.

8.2 Receptors

The receptors identified within the Bash 500MW ESIA remain the same for the Project site and the access road and so will their level of sensitivity to the proposed Bash 52MW WF. These are as summarised in the table below.

Table 8-1 Potential Noise Receptors

RECEPTOR ID	RECEPTOR	RECEPTOR TYPE	SENSITIVITY	JUSTIFICATION
-	Wind Farm Site Workers	Construction Workers	**High**	The construction workers at the site will be directly impacted by exposure to increases in ambient noise levels at the project location.
R12	Kuklam Village	Residential	**High**	Residents of this village will be particularly vulnerable to increase in ambient noise levels resulting from the construction activities of the Wind Farm and increased traffic along the access road.
R15	Ayakagitma lake	Ecological	**High**	Fishermen & other users of this lake including biodiversity will be particularly vulnerable to increase in ambient noise levels.

Receptor ID	Receptor	Receptor Type	Sensitivity	Justification
R22	Animal Holding Area with accommodation area	Structure & Residential	**High**	Livestock kept at this holding area and herders that use this accommodation will be particularly vulnerable to increase in ambient noise levels.
R23	Animal Holding Area and Accommodation area	Structure	**High**	Livestock kept at this holding area and herders that use this accommodation will be particularly vulnerable to increase in ambient noise levels.
R24	Herder Accommodation Area	Residential	**High**	Herders that use this accommodation will be particularly vulnerable to increase in ambient noise levels.
R25	Fishermen Accommodation Structure	Structure	**Medium**	Fishermen that use this accommodation will be relatively vulnerable to increase in ambient noise levels as the structure will only be used for a short duration.
R26	Animal holding area	Structure	**High**	Livestock kept at this holding area will be particularly vulnerable to increase in ambient noise levels.
R28	Livestock Water wells - A	Infrastructure	**Medium**	Users of the water well will be relatively vulnerable to increase in ambient noise levels.as they are at the water well for a short duration.
R29	Livestock Water wells - B	Infrastructure	**Medium**	Users of the water well will be relatively vulnerable to increase in ambient noise levels.as they are at the water well for a short duration.
Mining area 1	Mining area (including mine workers)	Industrial	**Low**	Mining activities generate noise and as such workers at the mine will unlikely be sensitive to project impacts due to the noisy nature of works they are exposed to from the mining facilities.
Mining area 2	Mining area (including mine workers)	Industrial	**Low**	Mining activities generate noise and as such workers at the mine will unlikely be sensitive to project impacts due to the noisy nature of works they are exposed to from the mining facilities.
	Worker accommodation area	Residential	**High**	If operations at the mine resume, workers at the worker accommodation camps will be particularly vulnerable to increase in noise levels.

RECEPTOR ID	RECEPTOR	RECEPTOR TYPE	SENSITIVITY	JUSTIFICATION
-	Construction workers living on site	Residential	**High**	Workers living in the accommodation camp at the site will be particularly vulnerable to changes in ambient noise levels as they will be living on site during the construction phase of the Project.
Local Communities – Chulobod village	Local communities where workers accommodation facilities have been established	Residential	**High**	Local communities have expressed concern at the noise generated by Project workers who are living in accommodation facilities near their village.
Access Road				
R33	Herder's structure and animal holding area	Residential	**High**	Herders using the structure and Livestock kept at this holding area will be vulnerable to increase in ambient noise levels.
R34	Herder's structure	Residential	**High**	Potential herders using the structure and their Livestock will be vulnerable to increase in ambient noise levels.
R35	Herder's structure and animal holding area	Residential	**High**	Herders using the structure and Livestock kept at this holding area will be vulnerable to increase in ambient noise levels.

8.3 Potential Impacts, Mitigation, Management & Residual Impacts

8.3.1 Construction Phase

Similar to the Bash 500MW WF, the construction phase activities likely to result in temporary and short duration increases in the noise and vibration levels from the Project site, access road, laydown areas; dependant on the type of works being undertaken.

Noise will be generated by construction and propagated to the surrounding areas via a range of processes. Pertinent construction activities at the project site in relation to noise are likely to include

- Site Preparation
- Civil Works
- Construction and Installation;
- Internal Road Compacting;
- Concrete mixing and other works at the batching plant (the Bash 52MW & 500MW will share the same batching plant) ; and

- Vehicle movements (on and off-site).

It is noted that the impact of construction noise on receptors has been quantitatively assessed within the Bash 500 MW Project ESIA. In addition, the construction noise assessment within the Bash 500MW ESIA accounts for a conservative assumption that equipment is operating in tandem at the project boundary. However, it is noted that this is the worst-case scenario as very limited work if any will be undertaken at the Project boundary. Based on this, no further assessment has been undertaken in this Addendum (refer to section 9.3.1 of the Bash ESIA for more details on the assessment).

8.3.1.1 Noise Impacts on Local Communities from Workers Accommodation

According to the Bash 500MW ESIA, all worker accommodation should be located within the Project site or in larger towns in order to avoid any disturbances such as noise to the small local communities.

It is understood from ACWA Power that the EPC under this Project will construct the accommodation facilities within the site. However, just like with Bash 500MW WF, there is a risk that the EPC Contractor under Bash 52MW may potentially construct accommodation facilities near local communities.

Table 8-2 Noise and Vibration- Impact Significance, Mitigation & Management Measures and Residual Impacts – Construction

Potential Impacts	Magnitude of Impact	Receptor	Sensitivity	Potential Impact Significance	Mitigation and Management Measures	Residual Impacts
Construction Site Noise –Noise generated from general construction activities	**Negligible Negative**	Ayakagitma lake **(R15)**	High	**Minor**	• Bash 52MW WF will implement the mitigation and management measures as provided in the Bash 500MW WF ESIA and applicable management plans.	**Negligible**
		Animal Holding Area and Accommodation area **(R23)**	High	**Minor**		**Negligible**
		Herder Accommodation Area **(R24)**	High	**Minor**		**Negligible**
		Fishermen Accommodation Structure **(R25)**	Medium	**Negligible to Minor**		**Negligible**
		Animal holding area **(R26)**	High	**Minor**		**Negligible**
		Livestock Water wells – A **(R28)**	Medium	**Negligible to Minor**		**Negligible**
		Livestock Water wells – B **(R29)**	Medium	**Negligible to Minor**		**Negligible**
		Mining area 1 (including mine workers)	Low	**Negligible to Minor**		**Negligible**
		Mining area 2 (including mine workers)	Low	**Negligible to Minor**		**Negligible**

Potential Impacts	Magnitude of Impact	Receptor	Sensitivity	Potential Impact Significance	Mitigation and Management Measures	Residual Impacts
Vehicular Noise- Noise from movement of construction vehicles	**Minor Negative**	Kuklam Village **(R12)**	High	**Minor to Moderate**	• Bash 52MW WF will implement the mitigation and management measures as provided in the Bash 500MW WF ESIA and applicable management plans.	**Negligible to Minor**
		Ayakagitma lake **(R15)**	High	**Minor to Moderate**		**Negligible to Minor**
		Animal Holding Area and Accommodation area **(R23)**	High	**Minor to Moderate**		**Negligible to Minor**
		Herder Accommodation Area **(R24)**	High	**Minor to Moderate**		**Negligible to Minor**
		Fishermen Accommodation Structure **(R25)**	Medium	**Minor**		**Negligible**
		Animal holding area **(R26)**	High	**Minor to Moderate**		**Negligible to Minor**
		Livestock Water wells – A **(R28)**	Medium	**Minor**		**Negligible**
		Livestock Water wells – B **(R29)**	Medium	**Minor**		**Negligible**
		Mining area 1 (including mine workers)	Low	**Negligible to Minor**		**Negligible**

Potential Impacts	Magnitude of Impact	Receptor	Sensitivity	Potential Impact Significance	Mitigation and Management Measures	Residual Impacts
		Mining area 2 (including mine workers)	Low	**Negligible to Minor**		**Negligible**
		Herder's structure and animal holding area **(R33)**	**High**	**Minor to Moderate**		**Negligible to Minor**
		Herder's structure **(R34)**	**High**	**Minor to Moderate**		**Negligible to Minor**
		Herder's structure and animal holding area **(R35)**	**High**	**Minor to Moderate**		**Negligible to Minor**
Construction vibration impacts (including vehicle vibration)	**Negligible Negative**	Animal Holding Area with accommodation area **(R22) -** only If site works are undertaken in proximity of the wind farm boundary	**High**	**Minor**	• Bash 52MW WF will implement the mitigation and management measures as provided in the Bash 500MW WF ESIA and applicable management plans.	**Negligible**
Impacts to Construction Workers	**Moderate Negative**	Wind Farm Site Workers	**High**	**Moderate to Major**	• Bash 52MW WF will implement the mitigation and management measures as provided in the Bash 500MW WF ESIA and applicable management plans.	**Minor to Moderate**
Impacts at the accommodation areas located at the Project site	**Minor Negative**	Construction Workers living on site	**High**	**Minor to Moderate**	• Bash 52MW WF will implement the mitigation and management measures as provided in the Bash 500MW WF ESIA and applicable management plans.	**Minor**
Impacts on local communities where workers	**Moderate Negative**	Local communities	**High**	**Moderate to Major**	• The EPC Contractor will ensure that no workers accommodation facilities under	**Minor to Moderate**

Potential Impacts	Magnitude of Impact	Receptor	Sensitivity	Potential Impact Significance	Mitigation and Management Measures	Residual Impacts
accommodation are located					Bash 52MW are located near the local communities. • Bash 52MW WF will implement the mitigation and management measures as provided in the Bash 500MW WF ESIA and applicable management plans.	

8.3.2 Operational Phase

During the operation of wind turbines, noise will be generated from mechanical and aerodynamic sources. Mechanical noise is radiated by the surface of the turbine and by openings in the nacelle housing and will emanate from generator, gearbox, yaw drives etc. These components produce their own characteristic noise. Aerodynamic noise will be produced by the flow of air over the blades. This is the major source of noise during operations and it generally increases as rotor speed increases.

Both noise sources may result in propagation to areas within 2km of the WTGs. According to IFC EHS Guidelines on Wind Energy, preliminary modelling study should be conducted when sensitive receptors are located within 2km of any of the turbines. The IFC EHS Guidelines on Wind Energy do not provide additional screening criteria for modelling study other than the 2km screening limit. Although there are no noise receptors within 2km of WTGs, detailed modelling study was undertaken nonetheless as there is a potential for the cumulative operation of the Bash 500MW and Bash 52MW wind farms to result in impacts to receptors located over 2km from the WTGs.

8.3.2.1 Noise Modelling Study

The noise modelling study was undertaken to identify potential noise effects at nearby receptors as a result of the addition of Bash 52MW at the Bash 500MW wind farm project site The Bash 52MW will have 8 wind turbines while the Bash 500MW will have 79 WTGs. However the modelling assessment has considered the worst-case scenario of 15 WTGs. However, it is noted that the current Bash 52MW layout includes 8WTGs.

METHODOLOGY

The noise modelling study was conducted to calculate anticipated noise levels at receptor locations using the noise modelling suite IMMI30 in accordance with the ISO 9613 prediction methodology. This model considers the noise 'emission' of each turbine and calculates the accumulative noise level at each receptor in accordance with ISO9613 methodology (ISO 9613-2 "Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation") which describes a detailed procedure to calculate noise at a known distance from a variety of point/line/area sources under meteorological conditions favourable to sound propagation.

ISO 9613-2 computes long-term average sound levels including light downwind conditions (favourable propagation of sound with significant positive wind from source (turbine) to the receiver within an angle of +/- 45 degrees at wind speeds approximately 1m/s and 5m/s). The guidance given by ISO 9613-2 on how to determine the meteorological correction term is rather unsatisfactory and therefore the following attenuation corrections are considered in the calculation method

- Geometric divergence;
- Air absorption;
- Reflecting obstacles;
- Screening;
- Vegetation and
- Ground reflections.

Attenuation due to the above factors is applied to the sound power levels of the noise source to derive the resulting noise levels at the receptors. In addition to the attenuation corrections, the noise modelling study also considered the results of the background noise monitoring conducted for the Bash 500MW project between 10th August 2021 and 9th September 2021. The background noise monitoring was conducted at four (4) locations chosen to represent receptors. Noise data were recorded in ten-minute intervals, with $L_{A90,10min}$ readings synchronised with the on-site wind mast data to determine background noise levels.

All acoustic measurement equipment conformed to Type 1 specification of British Standard 61672: 2013: Electroacoustics. Sound level meters. Part 1 Specifications. Furthermore, equipment was calibrated at the start and end of each measurement period, with no significant drift in calibration observed.

The wind data collected from the onsite wind masts was corrected to a standardised wind speed at 10m above ground before being used in a regression analysis to determine background noise levels at specific wind speeds. Besides wind noise, it was observed during the noise survey that there was no other significant noise source.

The model also considered the following:

- Wind turbine locations for Bash 500MW (79 WTG) and Bash 52MW (15 WTG[3]) WFs;
- Turbine model;
- Sound power levels of the turbines in octave bands for the hub height of 100m relative to the ground & wind speed of 10m/s;
- Addition of +2dB to the sound power levels as the sound power levels of the turbine are not guaranteed by the manufacturer;
- Tonality of 5dB for receptors within 300m of a turbine;

[3] Please note that only 8 wind turbines will be installed and commissioned for the Bash 52MW wind farm and the 15 wind turbines considered in the noise modelling assessment is a worst -case scenario.

- Topographical conditions throughout the project area and a light downwind propagation correction to represent worst case.

The topography model was obtained at 30m resolution. Noise levels were calculated at the first-floor height (4m above ground). None of the receptors fit the concave profile as such, further corrections were not added.

RESULTS

The derived background noise limit from the ambient noise monitoring conducted for the Bash 500MW is presented in the table below. The regression analysis which shows how background noise (L_{A90}) varies with wind speed is presented in the Noise Modelling Assessment Report in **Appendix D.**

Table 8-3 Derived Background Noise Limits

LOCATION	NOISE LEVEL AT STANDARDIZED WIND SPEED (10 M/S AT 10M), $L_{A90,T}$ DB DAY/NIGHT	DERIVED CRITERIA BASED ON BACKGROUND NOISE LEVELS, $L_{A90,T}$ DB (10 M/S) DAY/NIGHT
R12	33/27	53/43
R15	29/43	53/43
R22	29/43	53/43
R23	29/43	53/43
R24	28/39	53/43
R25	28/39	53/43
R28	28/39	53/43
R29	28/39	53/43
R30	29/43	53/43

The results of the noise model for the Bash 52MW WF (worst-case scenario of 15 WTGs) are shown in the table below.

Table 8-4 Noise Levels at Receptors (Bash 52MW only) - First Floor (4m above ground)

RECEPTOR	RECEPTOR NAME	NEAREST TURBINE	DISTANCE TO NEAREST TURBINE (M)	5M/S	6M/S	7M/S	8M/S	9M/S	10M/S
				$L_{A90,T}$ DB					
R12	Kuklam Village	BH6	10654	7.3	9.4	12.8	15.6	17.0	17.3
R15	Ayakagitma Lake	BH3	7524	12.7	15.0	18.3	21.2	22.6	22.9
R22	Animal Holding Area and Accommodation area	BH11	7594	8.5	10.9	14.3	17.1	18.5	18.8
R23	Animal Holding Area and Accommodation area	BH9	6425	11.1	13.4	16.8	19.6	21.0	21.3

Receptor	Receptor Name	Nearest Turbine	Distance to Nearest Turbine (m)	5m/s	6m/s	7m/s	8m/s	9m/s	10m/s
				$L_{A90,T}$ dB					
R24	Herder's Accommodation Area	BH3	6235	13.6	15.9	19.2	22.1	23.5	23.8
R25	Fishermen Accommodation Structure	BH3	6924	12.6	15.0	18.4	21.2	22.6	22.9
R28	Livestock Water wells – A	BH3	9648	8.1	10.4	13.8	16.6	18.0	18.3
R29	Livestock Water wells – B	BH3	6122	13.8	16.1	19.5	22.3	23.7	24.0
R30	Residential use by herders	BH6	13717	3.6	5.8	9.1	12.0	13.4	13.7

Based on the table above, predicted noise emissions from wind turbines at the assessed receptors ranged between approximately 13.7dB(A) to 24dB(A) at 10m/s. The predicted noise levels at all receptors were below the 35dB L_{A90} noise limit established by the IFC EHS Guidelines: Wind Energy and the 53dB Uzbekistan limit, indicating compliance of the Bash 52MW wind farm with both IFC and Uzbekistan noise limit.

The figures below present the noise dispersion plots centred at wind speeds 5m/s and 10m/s.

Figure 8-1 Noise Contour at Receptor Location (5m/s Wind Speed) – Bash 52MW WF Only

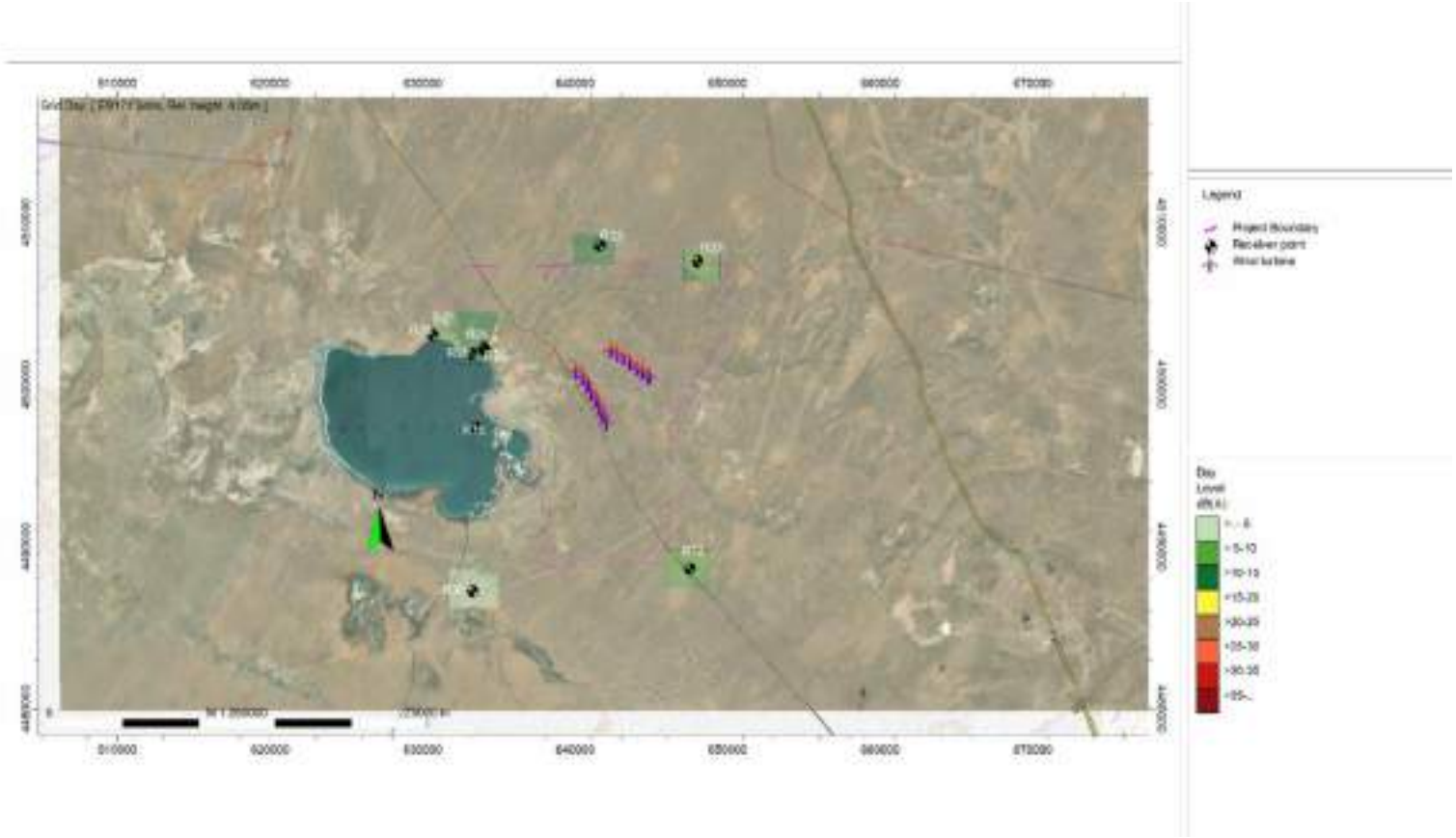
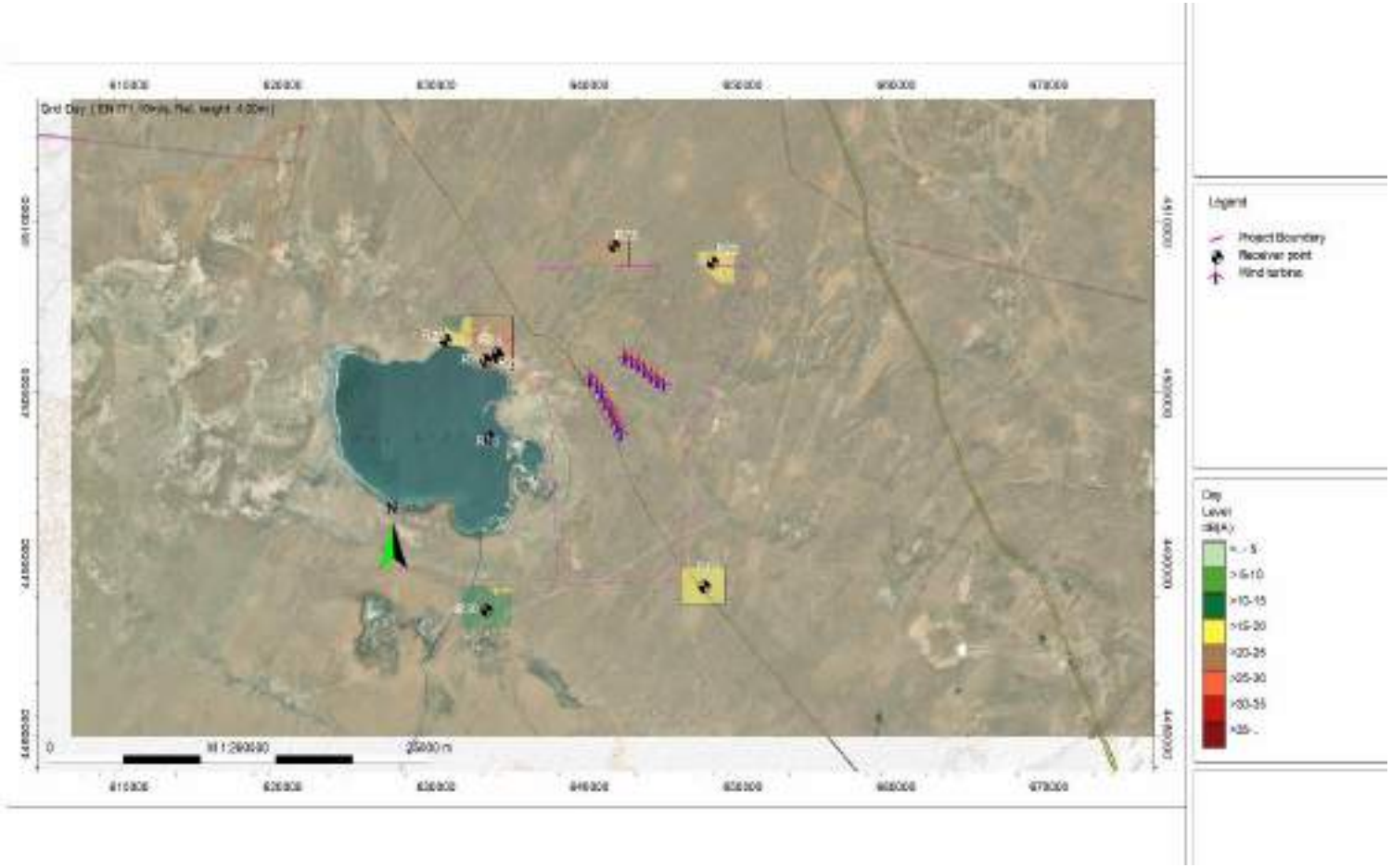


Figure 8-2 Noise Contour at Receptor Location (10m/s Wind Speed) – Bash 52MW WF Only



The results of noise modelling of the 500MW Bash Wind Farm is presented in the table below

Table 8-5 Noise Levels at Receptors (Bash 500MW Wind Farm only) - First Floor (4m above ground)

Receptor	Receptor Name	Nearest Turbine	Distance to Nearest Turbine (m)	5m/s	6m/s	7m/s	8m/s	9m/s	10m/s	Compliance Status	
				$L_{A90,T}$ dB						Initial IFC 35 dB $L_{A90,T}$ criterion	IFC General / Uzbekistan Daytime 53 dB and Night-time 43 dB criteria
R12	Kuklam Village	BAS71	4720	18.8	21.2	24.6	27.4	28.8	29.1	Y	Y
R15	Ayakagitma Lake	BAS49	4605	22.1	24.6	27.9	30.8	32.2	32.5	Y	Y
R22	Animal Holding Area and Accommodation area	BAS1	1434	30.0	32.4	35.8	38.6	40.0	40.3	N	Y
R23	Animal Holding Area and Accommodation area	BAS19	3696	25.3	27.8	31.1	34.0	35.4	35.7	N	Y
R24	Herder's Accommodation Area	BAS40	1804	30.3	32.7	36.1	38.9	40.3	40.6	N	Y
R25	Fishermen Accommodation Structure	BAS39	2492	27.6	30.0	33.4	36.2	37.6	37.9	N	Y
R28	Livestock Water wells – A	BAS35	3015	25.0	27.4	30.8	33.6	35.0	35.3	N	Y
R29	Livestock Water wells – B	BAS40	1882	29.8	32.3	35.6	38.5	39.9	40.2	N	Y
R30	Residential use by herders	BAS68	5236	16.5	18.9	22.3	25.1	26.5	26.8	Y	Y

As can be seen from the table above only three (3) receptors (R12, R15 and R30) complied with the WBG/IFC's initial 35dB $L_{A90,T}$ criterion and as such further detailed assessment was undertaken as part of the Bash 500MW wind farm ESIA.

> ***Note:*** *Detailed modelling study undertaken as part of the Bash 500MW ESIA is presented in the applicable Noise and Vibration section of the main ESIA (please refer to section 9.3.2.2)*

The table below shows the cumulative noise impact of both the Bash 500MW WF and Bash 52MW WF.

Table 8-6 Noise Levels at Receptors (Cumulative) - First Floor (4m above ground)

Receptor	Receptor Name	Nearest Turbine	Distance to Nearest Turbine (m)	5m/s	6m/s	7m/s	8m/s	9m/s	10m/s
				$L_{A90,T}$ dB					
R12	Kuklam Village	BAS71	4720	19.1	21.5	24.9	27.7	29.1	29.4
R15	Ayakagitma Lake	BAS49	4605	22.6	25.0	28.4	31.2	32.6	32.9
R22	Animal Holding Area and Accommodation area	BAS1	1434	30.0	32.4	35.8	38.6	40.0	40.3
R23	Animal Holding Area and Accommodation area	BAS19	3696	25.5	27.9	31.3	34.1	35.5	35.8
R24	Herder's Accommodation Area	BAS40	1804	30.4	32.8	36.2	39.0	40.4	40.7
R25	Fishermen Accommodation Structure	BAS39	2492	27.8	30.2	33.6	36.4	37.8	38.1
R28	Livestock Water wells – A	BAS35	3015	25.1	27.5	30.9	33.7	35.1	35.4
R29	Livestock Water wells – B	BAS40	1882	29.9	32.4	35.7	38.6	40.0	40.3
R30	Residential use by herders	BAS68	5236	16.7	19.2	22.5	25.4	26.8	27.1

The table below shows the change in noise levels for the cumulative noise effect in comparison to the 500MW Bash Wind Farm.

Table 8-7 Change in Noise Levels at Receptors (Cumulative Effects Comparison with Bash 500MW WF) - First Floor (4m above ground)

Receptor	Receptor Name	Nearest Turbine	Distance to Nearest Turbine (m)	5m/s	6m/s	7m/s	8m/s	9m/s	10m/s
				$L_{A90,T}$ dB					
R12	Kuklam Village	BAS71	4720	0.0	0.0	0.0	0.0	0.0	0.0
R15	Ayakagitma Lake	BAS49	4605	0.2	0.1	0.2	0.1	0.1	0.1
R22	Animal Holding Area and Accommodation area	BAS1	1434	0.1	0.1	0.1	0.1	0.1	0.1
R23	Animal Holding Area and Accommodation area	BAS19	3696	0.2	0.2	0.2	0.2	0.2	0.2
R24	Herder's Accommodation Area	BAS40	1804	0.1	0.1	0.1	0.1	0.1	0.1
R25	Fishermen Accommodation Structure	BAS39	2492	0.1	0.1	0.1	0.1	0.1	0.1
R28	Livestock Water wells – A	BAS35	3015	0.3	0.3	0.3	0.3	0.3	0.3
R29	Livestock Water wells – B	BAS40	1882	0.5	0.4	0.5	0.4	0.4	0.4
R30	Residential use by herders	BAS68	5236	0.2	0.3	0.2	0.3	0.3	0.3

Table 8-8 Compliance with IFC/Uzbekistan Assessment Limits (10m/s) Cumulative

Receptor	Receptor Name	Compliance Status		
		Initial IFC 35 dB $L_{A90,T}$ criterion	IFC General / Uzbekistan Daytime 53 dB	IFC General / Uzbekistan Night-time 43 dB criteria
R12	Kuklam Village	Y	Y	Y
R15	Ayakagitma Lake	Y	Y	Y
R22	Animal Holding Area and Accommodation area	N	Y	Y
R23	Animal Holding Area and Accommodation area	N	Y	Y
R24	Herder's Accommodation Area	N	Y	Y

Receptor	Receptor Name	Compliance Status		
		Initial IFC 35 dB $L_{A90,T}$ criterion	IFC General / Uzbekistan Daytime 53 dB	IFC General / Uzbekistan Night-time 43 dB criteria
R25	Fishermen Accommodation Structure	N	Y	Y
R28	Livestock Water wells – A	N	Y	Y
R29	Livestock Water wells – B	N	Y	Y
R30	Residential use by herders	Y	Y	Y

As shown in the tables above, the additional turbines under Bash 52MW do not have an influence on the 500MW Wind Farm compliance assessment as the noise increases by less than 0.4dB.

The noise modelling study is presented in **Appendix D.**

Table 8-9 Noise and Vibration- Impact Significance, Mitigation & Management Measures and Residual Impacts – Operation

Potential Impacts	Magnitude of Impact	Receptor	Sensitivity	Potential Impact Significance	Mitigation and Management Measures	Residual Impacts
Wind Turbines Operational Noise	**Negligible Negative**	Kuklam village **(R12)**	High	**Minor**	• Bash 52MW WF will implement the mitigation and management measures as provided in the Bash 500MW WF ESIA and applicable management plans • Stakeholders will continue to have access to the grievance mechanism in order to make any complaints regarding noise during the operation phase.	**Negligible**
	Negligible Negative	Ayakagitma Lake **(R15)**	High	**Minor**		**Negligible**
	Minor Negative	Animal Holding Area with accommodation area **(R22)**	High	**Minor to Moderate**		**Negligible**
	Minor Negative	Animal Holding Area with accommodation area **(R23)**	High	**Minor to Moderate**		**Negligible**
	Minor Negative	Herder's accommodation area **(R24)**	High	**Minor to Moderate**		**Negligible**
	Minor Negative	Accommodation Structures – Fishermen Shelter **(R25)**	Medium	**Minor**		**Negligible**
	Minor Negative	Livestock Water wells – A **(R28)**	Medium	**Minor**		**Negligible**
	Minor Negative	Livestock Water wells – B **(R29)**	Medium	**Minor**		**Negligible**
	Negligible Negative	Residential use by herders **(R30)**	High	**Minor**		**Negligible**

8.4 Cumulative Impacts

Impact on ambient noise is expected due to the construction and operation of on-going activities and existing facilities within the Project area. This is as provided in the tables below.

Table 8-10 Valued Environmental & Social Components (VEC's)

ENVIRONMENTAL COMPONENT	CONSIDERED VEC TO BE INCLUDED IN CIA?	JUSTIFICATION FOR INCLUSION OR EXCLUSION
Noise and Vibration	**Yes**	Project related impacts with regards to nuisance to sensitive receptors from noise and vibration are those associated with construction: use of vehicles, heavy plant and machinery, in particular earthworks and operation of the WTGs etc. This also includes noise impacts related to the location of workers accommodation facilities near local communities. Cumulative noise and vibration impacts at receptor location particularly any activities that will be undertaken at the boundary is only anticipated when extraction processes is being undertaken at the mining areas at the same time as the Bash wind farm construction activities.

The table below includes an assessment of the cumulative impacts from noise due to on-going activities and existing facilities within the Project's area of influence.

Table 8-11 Cumulative Impact Assessment

VEC	IMPACT GENERATING PROJECTS	CUMULATIVE IMPACTS	
		CONSTRUCTION PHASE	OPERATION PHASE
Noise & Vibration	1. Bash 52 MW WF (the Project) 2. Bash 500MW WF Project (under construction) 3. Mining Area 1 (under construction)	Construction activities will result in temporary and short duration increases in the noise and vibration levels emanating from the project sites, access road and the laydown areas. Cumulative impact will occur at receptors within the area of influence which is defined as 2km (in the Bash 500MW ESIA and as such in this addendum as well). Receptors within the area of influence may be temporarily impacted by the cumulative impact from the increase in ambient noise due to operation of construction machinery and equipment for both Bash 52MW & Bash 500MW WFs.	Refer to the Operational phase above for outcomes of the noise modelling.

VEC	IMPACT GENERATING PROJECTS	CUMULATIVE IMPACTS	
		CONSTRUCTION PHASE	OPERATION PHASE
		In addition, local communities may experience cumulative noise impacts if the Bash 52MW accommodation facilities are located near their village(s) as those of Bash 500MW WF. With the adoption of typical common management practices (mitigation, management and monitoring measures) outlined in the Bash 500MW ESIA, the cumulative impacts are anticipated to have minor significance.	

8.5 Monitoring

The Bash 52MW will implement the same monitoring requirements as provided in section 9.4 of the Bash 500MW ESIA.

9 SOILS, GEOLOGY, GROUNDWATER & SURFACE WATER

9.1 Baseline Conditions

The baseline conditions identified in the Bash 500MW ESIA based on site observations and geotechnical studies remain the same for the Project area (Chapter 10 of Bash ESIA). It is understood from ACWA Power that the EPC Contractor will undertake geotechnical surveys based on the proposed Project footprint but that this has not commenced as of the writing of this report.

9.2 Receptors

Table 9-1 Soils, Geology & Groundwater - Receptor Sensitivity

RECEPTOR	SENSITIVITY	JUSTIFICATION
Soil Quality	**Low**	The soil within the Project site is typical of the soil characteristics found in the project area. It is not known to be of particular significance and hence it is of low importance and rarity on a local scale.
Groundwater Quality	**High**	Water is a vital resource and is of high importance on a national scale with limited potential for substitution. In addition, water is scarce in Uzbekistan and the rest of the region.

9.3 Potential Impacts, Mitigation, Management & Residual Impacts

9.3.1 Construction Phase

During construction, impacts on soil and groundwater could arise from a number of activities. These include:

- Excavation or removal of soils;
- Spills and leaks associated with construction; and
- Inadequate waste and wastewater management

Note: Refer to section 10.3 of the Bash 500MW ESIA as the nature of the impacts above will be similar to what have been assessed therein.

Table 9-2 Geology, Soils and Groundwater Impact Significance, Mitigation & Management Measures and Residual Impacts – Construction

Potential Impacts	Magnitude of Impact	Receptor	Sensitivity	Potential Impact Significance	Mitigation and Management Measures	Residual Impacts
Cross-Contamination of soil during construction	**Minor Negative**	Soil Quality	Low	**Negligible to Minor**	• Bash 52MW WF will implement the mitigation and management measures as provided in the Bash 500MW WF ESIA and applicable management plans.	**Negligible to Minor**
Pollution from Accidental Leaks or Spillage	**Minor Negative**	Soil Quality	Low	**Negligible to Minor**	• Bash 52MW WF will implement the mitigation and management measures as provided in the Bash 500MW WF ESIA and applicable management plans.	**Negligible to Minor**
	Negligible Negative	Groundwater Quality	High	**Minor**		**Negligible**
Inadequate waste management	**Minor Negative**	Soil Quality	Low	**Negligible to Minor**	• Bash 52MW WF will implement the mitigation and management measures as provided in the Bash 500MW WF ESIA and applicable management plans.	**Negligible to Minor**
	Negligible Negative	Groundwater Quality	High	**Minor**		**Negligible**

9.3.2 Operational Phase

Specific project impacts to soil, geology and groundwater are not expected during the operational phase as the site will be static and will not have direct interactions with these environmental parameters i.e. soil & groundwater. Potential risks of concern during the operational phase are expected to be limited to the management and storage of hazardous materials/wastes/wastewater, chemicals and fuels and sanitary provision

Potential Impacts	Magnitude of Impact	Receptor	Sensitivity	Impact Significance	Mitigation and Management Measures	Residual Impacts
Accidental minor Leaks & Spillage	**Negligible Negative**	Soil Quality	Low	**Negligible to Minor**		**Negligible**

Potential Impacts	Magnitude of Impact	Receptor	Sensitivity	Impact Significance	Mitigation and Management Measures	Residual Impacts
	Negligible Negative	Groundwater	High	**Minor**	• Bash 52MW WF will implement the mitigation and management measures as provided in the Bash 500MW WF ESIA and applicable management plans.	**Negligible**

9.4 Cumulative Impacts

Impact on soil and groundwater are expected due to the construction of both the Bash 500MW and Bash 52MW at the same time. This is as provided in the tables below.

Table 9-3 Valued Environmental & Social Components (VEC's)

ENVIRONMENTAL COMPONENT	CONSIDERED VEC TO BE INCLUDED IN CIA?	JUSTIFICATION FOR INCLUSION OR EXCLUSION
Soil & groundwater	**Yes**	Project related impacts on soil and groundwater quality are those related to the potential contamination of soil and groundwater resources during construction as well as during operation. The effects of these impacts will be limited to the projects' boundary for both Bash 52MW and Bash 500MW Wind Farms.

The table below includes an assessment of the cumulative impacts from soil and groundwater due to on-going activities and existing facilities within the Project boundary.

Table 9-4 Cumulative Impact Assessment

VEC	IMPACT GENERATING PROJECTS	CUMULATIVE IMPACTS	
		CONSTRUCTION PHASE	OPERATION PHASE
Soil & groundwater	1. Bash 52 MW WF (the Project) 2. Bash 500MW WF Project (under construction)	During construction, impacts on soil and groundwater could arise from a number of activities. These include excavation and soil compaction, accidental spills or leaks, disposal of wastewater and inadequate management of waste. The Project, and Bash 500MW could contribute to potential increase in the soil and groundwater, especially in shared Projects' areas such as the batching plant. These impacts are expected to be of minor significance to soil and negligible significance to groundwater. With the adoption of typical common management practices (mitigation, management and monitoring measures) outlined in the Bash 500MW ESIA and associated management plans, the cumulative impacts are anticipated to have	None expected

VEC	IMPACT GENERATING PROJECTS	CUMULATIVE IMPACTS	
		CONSTRUCTION PHASE	OPERATION PHASE
		minor significance for soil and negligible for groundwater.	

9.5 Monitoring

The Bash 52MW will implement the same monitoring requirements as provided in section 10.4 of the Bash 500MW ESIA.

10 TRAFFIC & TRANSPORTATION

10.1 Baseline Condition

The baseline conditions identified in the Bash 500MW ESIA remain the same in relation to the existing local roads and highway near the site (Chapter 11 of the Bash 500MW ESIA).

10.1.1 Conditions under Bash 500MW

During the Bash 52MW WF consultations, two (2) grievances were received from members of the local communities stating that the movement of heavy load vehicles had caused damage to the local access road. According to these grievances, the EPC Contractor has failed to maintain the local road making it difficult for the movement of local residents. In addition, the dusty conditions generated by the Project vehicles also make it difficult for the local residents to use the access road. These grievances were logged by 5 Capitals and Juru Energy Limited and submitted to the Bash 500MW WF Project Company to be resolved in line with the SEP grievance mechanism and ensure that the EPC Contractor is implementing the appropriate mitigation, management and monitoring measures.

In addition to the above, the EPC Contractor grievance log shows that similar complaints have been submitted directly to them by local communities. The damage on local roads has led to an increase in the transportation costs and affected access to education for the children in Chulobod village. According to the grievance mechanism log, the damaged roads are currently being repaired and Project drivers have been forbidden from driving through the local villages.

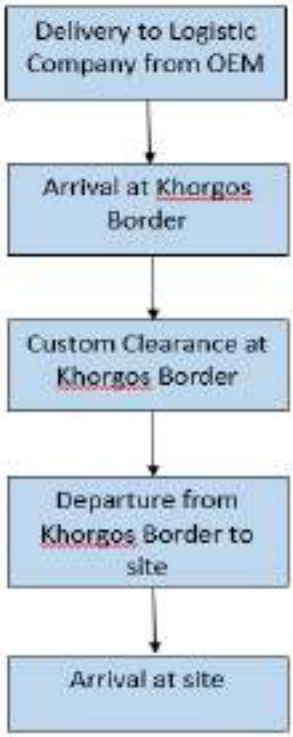
10.2 Bash 52MW Transportation Logistics

According to the Access and Transportation Management Plan prepared by the Bash 52MW EPC Contractor, a route survey will be undertaken in order to provide information on the most suitable route during the construction phase.

10.2.1 Transportation Route

The Project anticipates to transport the Project components will be transported through Khorgos border in China, Yallama (Kazakhstan – Uzbek border) through Bogdan via 4R38-4R3904R36-4R57- roads. This will be confirmed after the completion of the route survey. Based on this, it is noted that details regarding whether the preferred transportation routes will be similar to those used for Bash 500MW WF are not available at this point. As such, the both the EPC Contractors (Bash 52MW & Bash 500MW) will be required to coordinate their transportation management in the event that they use the same routes. This will especially be required for local roads in the project's area.

Figure 10-1 General Transportation Route



Source: Access and Transportation Management Plan, HDEC

10.3 Receptors

Table 10-1 Traffic & Transportation – Receptor Sensitivity

RECEPTOR	SENSITIVITY	JUSTIFICATION
Highways A379 and access road to the Project site	**High**	Modification of local roads maybe required in order to allow for the transportation of Project materials. This may present a challenge to other road users especially during the transportation of wide loads. In addition, the local residents have expressed their concerns over the damage caused to local roads as a result of the Bash 500MW WF. As such, additional transportation requirements for the Bash 52MW could potentially lead to further damage on the local roads making movement even more difficult for local communities.
Residents of nearby villages and herders near the WF and along the access road including children and vulnerable groups	**High**	Given that residents including children and vulnerable groups, herders together with livestock will use the dirt road when moving back & forth, they are particularly vulnerable to an increase in vehicular flow on the dirt road especially due to existing damages as a result of the on-going construction works under Bash 500MW WF.

10.4 Potential Impacts, Mitigation, Management & Residual Impact

10.4.1 Construction Phase

The main impacts relating to traffic and transportation for this Project will be similar to those assessed in the Bash 500MW ESIA and are as summarised below:

- Transportation of Project components, construction materials and equipment may potentially damage or cause structural faults on existing highways, bridges, utilities etc if not properly managed.
- Increased vehicular flow and traffic congestion on local roads and highways.
- Potential increase in the number of accidents involving humans and even livestock due to an increase in vehicular flow in the highways and local roads.
- Loss of access route tracks through the project site as a result of the increased project footprint.

***Note**: Refer to section 11.3 of the Bash 500MW ESIA as the nature of the impacts above will be similar to what have been assessed in the therein.*

10.4.1.1 Damage to Local Access Road

Based on the grievances submitted by the two members of the communities, that the Bash 500MW WF EPC requires to enhance the implementation of the ESIA requirements due to the grievances received. The reported damage of the local access road has made it difficult for other road users to use the same route. This impact can potentially be exacerbated if corrective action is not taken before the construction of Bash 52MW WF can commence.

As such, it will be critical for both the EPC Contractors to ensure that the local access road is maintained regularly so that the movement of local users is not impeded.

Table 10-2 Traffic & Transportation Impact Significance, Mitigation & Management Measures and Residual Impacts – Construction

Potential Impacts	Magnitude of Impact	Receptor	Sensitivity	Potential Impact Significance	Mitigation and Management Measures	Residual Impacts
Impact on Road Infrastructure including damage to local roads	**Moderate Negative**	Highways A379 and access road to the Project site	High	**Moderate to Major**	• In addition to the mitigations identified in the Bash 500MW ESIA, the Project Company will ensure that the EPC Contractors (for Bash 52MW & 500MW) regularly maintain the local access road (as required) in order to ensure that it remains accessible to other local users.	**Minor to Moderate**
Increased vehicle flow on highway and local roads	**Moderate Negative**	Highways A379 and access road to the Project site	High	**Moderate to Major**	• Bash 52MW WF will implement the mitigation and management measures as provided in the Bash 500MW WF ESIA and applicable management plans. • The Bash 500MW and bash 52MW will develop and implement a joint Traffic & Transportation Management Plan. The plan will be prepared in accordance with IFC General EHS Guideline, outline how turbine components will be delivered to the site and outline how construction traffic will be jointly managed to limit impacts upon local communities, personnel, and other road users including management of damage to local roads.	**Minor to Moderate**
Safety of Residents of nearby villages & herders	**Minor Negative**	Residents of nearby villages and herders (near the WF and along the access road) including	High	**Minor to Moderate**		**Minor**

Potential Impacts	Magnitude of Impact	Receptor	Sensitivity	Potential Impact Significance	Mitigation and Management Measures	Residual Impacts
		children and vulnerable groups				
Loss of access routes/tracks through the Project site	**Moderate Negative**	Residents of nearby villages and herders (near the WF and along the access road)	High	**Moderate to Major**	• Bash 52MW WF will implement the mitigation and management measures as provided in the Bash 500MW WF ESIA and applicable management plans.	**Minor**

10.4.2 Operational Phase

The number of vehicles during the operational phase are likely to be low, with access required for maintenance and servicing. It is expected that the majority of these vehicles will be light vehicles with HGVs only required in instances where WTG components need to be replaced.

Table 10-3 Traffic and Transportation Impact Significance, Mitigation & Management Measures and Residual Impacts

Potential Impacts	Magnitude of Impact	Receptor	Sensitivity	Potential Impact Significance	Mitigation and Management Measures	Residual Impacts
Increased vehicle flows local roads	**Negligible Negative**	Local roads	High	**Minor**	• Bash 52MW WF will implement the mitigation and management measures as provided in the Bash 500MW WF ESIA and applicable management plans.	**Negligible**

10.5 Cumulative Impacts

Impact on local roads is expected due to the construction and operation of on-going activities and existing facilities within the Project area. This is as provided in the tables below.

Table 10-4 Valued Environmental & Social Components (VEC's)

Environmental Component	Considered VEC to be included in CIA?	Justification for Inclusion or Exclusion
Traffic and road infrastructure	**Yes**	Even though the final transportation route for the Bash 52MW WF has not been finalized, there is a very high likelihood that it will overlap with some of the routes currently being used for the Bash 500MW and the Dzhankeldy 500MW WF. Such an overlap will lead to cumulative impacts relating to congestion, damage to local roads, safety risks to other road users etc.

The table below includes an assessment of the cumulative impacts from traffic and transportation from on-going activities and existing facilities within the Project's area of influence.

Table 10-5 Cumulative Impact Assessment

VEC	Impact Generating Projects	Cumulative Impacts	
		Construction Phase	Operation Phase
Traffic and road infrastructure	1. Bash 52 MW WF (the Project) 2. Bash 500MW WF Project (under construction) 3. Dzhankeldy 500MW WF	The construction activities for the Bash 52MW, Bash 500MW and Dzhankeldy 500MW will overlap, and shared routes may be used for transporting construction personnel, materials, and equipment. Given the collective magnitude of these construction operations, an increase in transportation activity can be expected. During periods of significant construction-related traffic, there is the potential for road congestion in specific areas or placing physical stress on the existing road infrastructure. In addition, the Bash 500MW and Bash 52MW will utilize the same access road into the Project site and this can cause further damage to the road and thus impeding access to other road users. In addition to implementing the mitigation and management measures in the ESIA, the EPC Contractors will be required to develop and implement a joint Traffic & Transportation Management Plan.	None expected

10.6 Monitoring

In addition to the monitoring requirements provided in section 11.4 of the Bash 500MW ESIA, the Bash 52MW and Bash 500MW EPC Contractors' will be required to undertake the additional monitoring provided in the table below:

Table 10-6 Traffic and Transportation Monitoring Requirements (Construction)

Monitoring	Parameter	Frequency & Durations	Monitoring Location
Condition of local access road	Regular rehabilitation of the local access road(s) to ensure that they are accessible to local road users.	Regularly during the construction phase	Local access road(s)

11 INFRASTRUCTURE AND UTILITIES

11.1 Observation and Baseline Environment

The baseline conditions identified in the Bash 500MW ESIA remain the same in relation to the existing infrastructure and utilities within the Project site (Chapter 12 of the Bash 500MW ESIA).

11.2 Consultations with Operators Under Bash 52MW

11.2.1 Asia Trans Gas

Asia Trans Gas operates a gas pipeline that runs through the southern section of the proposed WTGs (Refer to Chapter 12 of the Bash 500MW ESIA for more details). As such, a letter was sent to them on 13th September 2023 requesting for a meeting in order to provide them with details about the proposed Bash 52MW WF. The proposed date for the meeting was 27th September 2023 but this was tentatively moved to 13th October 2023 due to the availability of their team. It is noted that the Asia Trans Gas team has not been in touch with the E&S team yet to confirm their availability. As such, the outcome of this meeting will be included in future updates of this ESIA (if there are any additional conditions for the Project) and in the SEP.

11.2.2 Railway Authority of Uzbekistan (Bukhara)

Consultations were initiated with the Railway Authority in order to provide them with information regarding the proposed Project. This is because there is a railway line located to the southeast of the proposed 8WTGs. As a result, a letter from the Authority was received on 6th October 2023 requesting for the Project to organise a site visit to the Project. According to the letter, the purpose of the site visit will be to:

- Determine the location of the Project facilities relative to the railway line;
- Determine the ownership of the land where the Project facilities will be located;
- Determine the ownership of the affected land, obtain the technical conditions of the Project;
- Allow the Authority to prepare a site survey report; and
- Coordinate with the Project in accordance with the established procedures.

This request was submitted by 5 Capitals to the Bash 500MW WF Project Company who provided the project coordinates to the Authority. A letter was received on 16th October 2023 confirming that the project facilities were located within the required buffer zones. In addition, the Authority stated that a site visit maybe required and this is currently being coordinated by the Project Company CLO.

11.3 Potential Impacts, Mitigation, Management and Residual Impacts

11.3.1 Construction Phase

There are existing infrastructure & utilities within the Project boundary. These include existing OHTLs, gas pipelines, railway line, railway station and communication lines. The construction phase of the Wind Farm may lead to potential damage of this infrastructure thus resulting to disruption of services. In order to mitigate against this, the EPC Contractor will be required to conduct a risk assessment, adhere to all relevant construction buffer zones, obtain necessary permits and ensure on-going stakeholder consultations with the relevant agencies operating the infrastructure.

In addition, erection of WTGs can present a physical obstruction to aircrafts and also cause radar and other navigational aid interference where the blades appear as 'clutter' on radar screens and can be mistaken for aircraft. The nearest airport to the Bash site is the airport in Navoi which is 60km south east of the site. As such the Project is required to undertake consultations with the Civil Aviation Authority in relation to the Bash 52MW WF and obtain a permit for the Project.

***Note**: Refer to section 12.3 of the Bash 500MW ESIA for more details as the nature of the impacts above will be similar to what have been assessed in the therein.*

Table 11-1 Existing Infrastructure Mitigation & Management Measures - Construction

Impacts	Magnitude of Impacts	Receptor	Sensitivity	Impact Significance	Mitigation and Management Measures	Residual Impact
Damage to existing infrastructure and disruption of services	**Moderate Negative**	Gas pipeline (R19)	High	**Moderate to Major**	• In addition to implementing the mitigation measures within the Bash 500MW ESIA, the Project will implement any additional requirements agreed with Asia Trans Gas based on the on-going consultations.	**Minor to Moderate**
	Minor Negative	Railway line & station (R4 & R8)	High	**Minor to Moderate**	• In addition to implementing the mitigation measures within the Bash 500MW ESIA, the Project will implement any additional requirements agreed with the Railway Authority based on the outcome of their site visit.	**Minor**
	Minor Negative	OHTLs (R1)	Medium	**Minor**	• Bash 52MW WF will implement the mitigation and management measures as provided in the Bash 500MW WF ESIA and applicable management plans.	**Negligible to Minor**
Disruption of aviation services	**Minor Negative**	Aviation & Radar	Low	**Negligible to Minor**	• Bash 52MW WF will implement the mitigation and management measures as provided in the Bash 500MW WF ESIA and applicable management plans.	**Negligible**

11.3.2 Operational Phase

The Project site facilities will be static during the operational phase of the Project. As such, no further excavations are expected to be undertaken and the movement of vehicles will be minimal. However, the movement of maintenance and security vehicles could potentially damage the gas pipelines and the railway lines but the risk is considered minimal.

In relation to aviation and radar interference, no further mitigations measures are envisioned during the operational phase separate to those in the construction phase of the Project.

Table 11-2 Existing Infrastructure Mitigation & Management Measures– Operational Phase

Potential Impacts	Magnitude of Impact	Receptor	Sensitivity	Potential Impact Significance	Mitigation and Management Measures	Residual Impact
Damage to existing infrastructure and disruption of services	**Negligible Negative**	Gas pipeline (R19)	High	**Minor**	• Bash 52MW WF will implement the mitigation and management measures as provided in the Bash 500MW WF ESIA and applicable management plans	**Negligible to Minor**
	Negligible Negative	Railway line & station (R4 & R8)	High	**Minor**	• Bash 52MW WF will implement the mitigation and management measures as provided in the Bash 500MW WF ESIA and applicable management plans	**Negligible to Minor**
	Negligible Negative	OHTLs (R1)	Medium	**Negligible to Minor**	• Bash 52MW WF will implement the mitigation and management measures as provided in the Bash 500MW WF ESIA and applicable management plans	**Negligible**

11.4 Cumulative Impact

Table 11-3 Valued Environmental & Social Components (VEC's)

ENVIRONMENTAL COMPONENT	CONSIDERED VEC TO BE INCLUDED IN CIA?	JUSTIFICATION FOR INCLUSION OR EXCLUSION
Infrastructure & Utilities	**No**	The impact on existing infrastructure and utilities would be mainly related to potential damages and disruption of services to users. However, the cumulative impact is not expected to be significant as the Project will be required to adhere to the buffer zones established within the Bash 500MW WF including the implementation of other identified mitigation measures.

11.5 Monitoring

Monitoring will be undertaken based on the requirements within the Bash 500MW WF ESIA section 12.4.

12 ARCHAEOLOGY AND CULTURAL HERITAGE

12.1 Observation and Baseline Environment

12.1.1 Archaeology

There are known archaeological sites within the Wind Farm based on surveys undertaken by the Institute of Archaeology between 28th May to 21st June 2021. As a result of this survey, buffer zones were established to include 100m for complex relief areas and 50m for flat relief (Refer to Chapter 13 of the Bash 500MW ESIA for more details on the surveys undertaken and outcomes). I

All the Bash 52MW WF facilities are located outside of the buffer zones established by the Institute of Archaeology.

12.1.2 Tangible Cultural Heritage

Consultations undertaken as part of the Bash 500MW ESIA established that the main tangible cultural heritage item in the project area is Malikajdar (Xazonur bobo) burial place located 9km from Ayakagitma village. This is a holy place that is visited once or twice a year by locals for pilgrimage. This holy place is 22km from Chulobod village and 35km from Kuklam village and is out of the Project area of influence.

12.1.3 Intangible Cultural Heritage

Intangible cultural heritage elements identified in Ayakagitma, Chulobod nad Kuklam villages include Wedding ceremonies, "Kyz alyp kashu" ceremony and national holiday Navruz. These were established during the ESIA phase consultations undertaken as part of the Bash 500MW WF.

12.1.4 Access Road

A Memorial Site was identified along the access road leading to the site during the bash 500MW ESIA site visits. Memorial sites are built in commemoration of the locations where road accidents resulted in the loss of lives and are considered of high cultural importance in Uzbekistan and will therefore need to be preserved to avoid any impacts from Project vehicles.

12.2 Receptors

12-1 Archaeology & Cultural Heritage –Receptors

RECEPTOR	SENSITIVITY	JUSTIFICATION
Known items of cultural or archaeological significance	**High**	Archaeological finds from Neolithic, Palaeolithic Age and classical periods (V-XII ages) have been found within the Project site and some are under Category 1 (high importance). Archaeological finds in Category I are of high importance and rarity with limited potential for substitution.
Unknown items of cultural or archaeological significance	**High**	Given the location of the Project in an area of known archaeological & cultural importance as identified during the archaeological surveys, unknown items of cultural & archaeological importance are likely to be present especially because only surface excavations were conducted during the surveys conducted by the Institute of Archaeology.
Intangible cultural heritage	**High**	The Proposed project site is located within communities that practice the Palov culture, Nawrouz., Art of Miniature & Bakshi art These are important elements and part of a national identity that has also been recognised by UNESCO.
Access Road		
Memorial Site	**High**	The Memorial Site is of high cultural importance and is vulnerable to damage resulting from project vehicles.

12.3 Potential Impacts, Mitigation, Management and Residual Impacts

12.3.1 Construction Phase

The construction phase impacts will be similar to those identified in the Bash 500MW ESIA and are as summarised below:

- Indirect impact on existing finds of archaeological and cultural importance: The presence of archaeological finds at the Project is high and construction activities undertaken at the Project site have the potential to damage or impact these sites if the appropriate mitigation and management measures are not implemented;
- Direct impact to unknown buried archaeological finds: Given the location of the Project in an area of archaeological significance, there is the potential of encountering unknown buried archaeological remains or artefacts during excavation and earthwork activities. This could lead to damage, destruction and loss of archaeological artefacts of conservation value.
- Impact on intangible cultural heritage: The Project could potentially induce social change and introduce new cultural influences especially from the workforce recruited from outside of Uzbekistan. This could result into tensions between the workers and locals.

***Note**: Refer to section 13.4 of the Bash 500MW ESIA for more details as the nature of the impacts above will be similar to what have been assessed in the therein.*

Table 12-2 Archaeology and Intangible Cultural Heritage Impact Significance, Mitigation & Management Measures and Residual Impacts – Construction

Impacts	Magnitude of Impacts	Receptor	Sensitivity	Impact Significance	Mitigation and Management Measures	Residual Impacts
Impact to existing archaeology and/cultural items	**Moderate Negative**	Known items of cultural or archaeological significance	**High**	**Moderate to Major**	• Bash 52MW WF will implement the mitigation and management measures as provided in the Bash 500MW WF ESIA and applicable management plans.	**Minor to Moderate**
	Moderate Negative	Unknown items of cultural or archaeological significance	**High**	**Moderate to Major**		**Minor to Moderate**
Impact on Memorial site	**Minor Negative**	Memorial site	**High**	**Minor to Moderate**		**Minor**
Accidental destruction of unknown archaeological resources buried within the Project site	**Moderate Negative**	Unknown Buried archaeological artefacts or remains	**High**	**Moderate to Moderate**		**Minor to Moderate**
Impact on intangible and tangible cultural heritage	**Minor Negative**	Communities who practice the intangible cultural heritage elements	**High**	**Minor to Moderate**		**Minor**

12.3.2 Operational Phase

The operational phase will not result in further impacts to archaeology, as the site will be static and further excavations will not be required. However, during maintenance and operation activities it will be important to ensure that archaeological sites are not damaged by the O&M staff. This includes run over of archaeological sites by vehicles in the event of off-roading. As such, a cultural management plan will be developed as part of the operational ESMS to include locations and procedures to be implemented in ensuring protection of the archaeological sites.

Table 12-3 Archaeology and Cultural Heritage Impact Significance, Mitigation & Management Measures and Residual Impacts – Operational Phase

Impacts	Magnitude of Impacts	Receptor	Sensitivity	Impact Significance	Mitigation and Management Measures	Residual Impacts
Impact on existing archaeology and cultural items	**Minor**	Archaeological sites	**High**	**Minor to Moderate**	• Bash 52MW WF will implement the mitigation and management measures as provided in the Bash 500MW WF ESIA and applicable management plans	**Minor**

12.4 Cumulative Impacts

Table 12-4 Valued Environmental & Social Components (VEC's)

Environmental/Social Component	Considered VEC to be included in CIA?	Justification for Inclusion or Exclusion
Archaeology and Cultural Heritage	**No**	Project related impacts in relation to archaeology and cultural heritage would mainly be those related to the excavation, earthworks and clearance of the Project site and the potential for encountering unknown buried archaeological remains. However, it is not expected that there will be significant effect on known or unknown archaeological sites in combination with the Bash 500MW. Any impacts from these Projects will be managed through the implementation of the Bash 500MW ESIA, applicable management plans and adherence to the buffer zones established by the Institute of Archaeology.

12.5 Monitoring

Monitoring will be undertaken based on the requirements within the Bash 500MW WF ESIA section 13.5.

13 LANDSCAPE AND VISUAL AMENITY

13.1 Observation & Baseline Conditions

The baseline conditions established outside the Project boundary remain the same as those of Bash 500MW WF. However, some changes have occurred to the landscape within the Project boundary based on the following:

- Herders who were identified as having structures within the Project boundary (under the Bash 500MW ESIA) have since been relocated to suitable alternative land in accordance with the RAP. As such, there structures are no longer on the site.
- Construction of the Bash 500MW WF has commenced and as such levelling, grading and other construction activities have begun which will have some impact on the landscape.

13.2 Receptors

The potential landscape and visual receptors are presented in the table below and are similar to those identified under the Bash 500MW WF apart from the on-site receptors which have since been relocated to other suitable locations under the Bash 500MW WF RAP.

Table 13-1 Landscape and Visual Impacts – Sensitive Receptors

ID	RECEPTOR	RECEPTOR TYPE	SENSITIVITY	JUSTIFICATION
-	Landscape Character	Undeveloped Desert Landscape **(LCA 1)**	**Low**	The landscape is that of the typical desert landscape present across Uzbekistan with no features of local or national importance. It is therefore of low or medium importance and rarity on a local scale.
		Lake / Saltmarsh Landscape **(LCA 2)**	**Very High**	This landscape comprise of an Important Bird Area (IBA) with species of conservative value as such it is of very high importance with limited potential for substitution
		Developed Areas **(LCA 3)**	**Low**	The landscape in the developed areas lacks any recognised features of local or national value hence it is of low importance on a local scale
		Mining Areas **(LCA 4)**	**Very Low**	The landscape value of the mining areas is of very low importance.
R22	Animal holding areas houses used for accommodation all year round.	Residential	**High**	The herders using the animal holding areas and accommodation area will have direct visibility of the WTGs and as such will be particularly vulnerable to changes on landscape character.

ID	Receptor	Receptor Type	Sensitivity	Justification
R23	Animal holding areas houses used for accommodation all year round.	Residential	**High**	If herders are present at the Project site, the herders using the animal holding areas will have direct visibility of the WTGs and as such will be particularly vulnerable to changes on landscape character.
R24	Herder's accommodation area	Residential	**High**	The herders using the accommodation area will have direct visibility of the WTGs and as such will be particularly vulnerable to changes on landscape character.
R25	Accommodation structure used for shelter by fishermen in Lake Ayakagitma	Residential	**High**	Fishermen using the accommodation structure will have direct visibility of Project site and as such will be particularly vulnerable to changes on landscape character as the Project WTGs and some project buildings will be visible to them whenever the accommodation structure is in use
-	Mining Areas 1 & 2 (including mine workers)	Industrial	**Low**	If mining activities commences before the installation of the WTGs, workers at the mines located 1.4km east & 900m west will have direct visibility of the WTGs and as such will be relatively vulnerable to changes on landscape character.

13.3 Potential Impacts, Mitigation, Management and Residual Impacts

13.3.1 Construction & Operational Phases Impacts

LANDSCAPE

The development of the wind farm will include levelling, grading, construction of administrative buildings, erection of WTGs and many more activities which will transform the landscape in the area into a 'Desert with Wind Turbines' landscape character as large vertical rotating features will be added into the landscape. The installation of towers, turbines, and the shape or colour will result in visual intrusion at receptor location in proximity to WTG areas.

In addition, the use of lighting across the site in an environment classified as 'Rural/suburban transition site' during construction phase will introduce some limited light spill & glare that may be visible from outside the Project boundary. However, this impact will be temporary. Any impacts from lighting are anticipated to be minimised by limiting works being undertaken during the night and by the implementation of specific controls detailed in the CESMP on-site.

VISUAL

The continuous movement of the wind turbine rotors will also result in changes to the visual envelope of receptors overlooking the Project site as there would be loss of static landscape view. This will especially impact the herders with structures near the Project site (outside of the Project boundary).

Note: Refer to Chapter 14 of the Bash 500MW ESIA for more details of the assessment undertaken as part of the ESIA.

Table 13-2 Landscape and Visual Quality Impact Significance, Mitigation & Management Measures and Residual Impacts- Construction

Potential Impact	Magnitude of Impacts	Receptor	Sensitivity	Impact Significance	Mitigation and Management Measures	Residual Impacts
Changes in Landscape Character	**Minor Negative**	Landscape character of the entire Project site **(LCA 1 & LCA 3**)	Low	**Negligible to Minor**	• Bash 52MW WF will implement the mitigation and management measures as provided in the Bash 500MW WF ESIA.	**Negligible to Minor**
Disturbance to Visual Envelope of Receptors	**Moderate Negative**	Accommodation structure used for shelter by fishermen in Lake Ayakagitma **(R25)**	High	**Moderate to Major**	• Bash 52MW WF will implement the mitigation and management measures as provided in the Bash 500MW WF ESIA.	**Moderate to Major**
	Minor Negative	Mining Areas **(Mining Area 1 & 2** including mine workers)**)**	Low	**Negligible to Minor**		**Negligible to Minor**
Addition of Lighting	**Moderate**	Accommodation structure used for shelter by fishermen in Lake Ayakagitma **(R25)**	High	**Moderate to Major**	• Bash 52MW WF will implement the mitigation and management measures as provided in the Bash 500MW WF ESIA.	**Moderate to Major**
	Minor Negative	Mining Areas **(Mining Area 1 & 2** including mine workers)**)**	Low	**Negligible to Minor**		**Negligible to Minor**

Table 13-3 Landscape and Visual Amenity Impact Significance, Mitigation & Management Measures and Residual Impacts – Operation

Potential Impacts	Magnitude of Impact	Receptor	Sensitivity	Potential Impact Significance	Mitigation and Management Measures	Residual Impacts
Changes in landscape character	**Moderate Negative**	Landscape character of the entire Project site **(LCA 1 & LCA 3**)	Low	**Minor**	• Bash 52MW WF will implement the mitigation and management measures as provided in the Bash 500MW WF ESIA.	**Minor**
Disturbance to Visual Envelope of Receptors and Addition of Lighting	**Moderate Negative**	Herders that use animal holding areas& accommodation areas within the site **(R22 & R23**)	High	**Moderate to Major**	• Bash 52MW WF will implement the mitigation and management measures as provided in the Bash 500MW WF ESIA (herders with structures within the Project footprint have already been relocated in line with the Bash 500MW RAP).	**Moderate to Major**
	Moderate Negative	Herders that use accommodation areas outside the site **(R24)**	High	**Moderate to Major**		**Moderate to Major**
	Moderate Negative	Accommodation structure used for shelter by fishermen in Lake Ayakagitma **(R25)**	High	**Moderate to Major**		**Moderate to Major**

13.4 Cumulative Impacts

Landscape and visual amenity will be potentially impacted by the construction and operation of on-going activities and existing facilities within the Project area. This is as provided in the tables below.

Table 13-4 Valued Environmental & Social Components (VEC's)

Environmental Component	Considered VEC to be included in CIA?	Justification for Inclusion or Exclusion
Landscape and visual amenity	**Yes**	Project related impacts in relation to landscape will mainly be those related to the clearance of the Project site, loss of typical desert landscape and visual impact due to the anthropogenic intrusion of vertical wind turbine structures. The Bash 500MW WF will also lead to further clearance of the land and erection of the WTGs.

The table below includes an assessment of the cumulative impacts on landscape and visual amenity due to on-going activities and existing facilities within the Project's area of influence.

Table 13-5 Cumulative Impact Assessment

VEC	Impact Generating Projects	Cumulative Impacts	
		Construction Phase	Operation Phase
Landscape and visual amenity	1. Bash 52 MW WF (the Project) 2. Bash 500MW WF Project (under construction)	Through the construction and sustained operations of Bash 52MW WF and Bash 500MW WF, the land in the Project area will change from desert landscape due to the intrusion of vertical turbine structures. This will result to a significant change to the visual amenity. Lighting from the projects especially during construction will introduce some limited light & spill & glare in a night time haze likely to be visible from outside the projects boundary. Any impacts from lighting are anticipated to be minimised by limiting works being undertaken during the night and by the implementation of specific controls detailed in the CESMP on-site	

14 SHADOW FLICKER

14.1 Observation and Baseline Environment

There is no baseline information for shadow flicker.

14.2 Receptors

According to the Ireland Wind Energy Development Guidelines (2006), the potential for shadow flicker at distances greater than 10 rotor diameters from a turbine is very low. In the instance of this Wind Farm, the rotor diameter of the WTGs is 171m and therefore the area of influence for shadow flicker is 1710m from the nearest WTG.

However, in order to cover larger area and account for worst case scenario the shadow flicker assessment has assessed the impact of shadow flicker at all identified residential receptors location within a 2,500m radius.

The sensitive receptors considered for the Shadow Flicker Assessment are shown in the table and figure below. This is in consideration that all the herders with structures within the Project site have been relocated in accordance with the RAP.

Table 14-1 Shadow Flicker Assessment – Receptors

RECEPTOR ID	RECEPTOR	RECEPTOR TYPE	SENSITIVITY	JUSTIFICATION
R23	Structure used by herders (within the project site)	Structures	**High**	Herders at the accommodation area will be particularly vulnerable to shadow flicker effect
R24	Herder Accommodation Area	Structures - Residential	**High**	Herders at the accommodation area will be particularly vulnerable to shadow flicker effect
R29	A water well used by locals as a source of water for their livestock.	Ecological	**High**	Exposure is expected to be for short durations when they use the well.

14.3 Potential Impacts, Mitigation and Management Measures and Residual Impacts

14.3.1 Shadow Flicker Analysis/Modelling

14.3.1.1 Methodology

Shadow flicker modelling was undertaken using WindPRO (v3.6), an industry-leading software package for the design and planning of wind energy projects. The modelling considered the

79 Envision EN171 (6.5MW capacity) turbines proposed for the Bash 500MW wind farm and 15 Envision EN171 (6.5MW capacity) turbines for the Bash 52MW wind farm[4]. The model software considers the shadow flicker of all turbines at a specific receptor at any given time and the potential increase of the shadow flicker intensity or frequency.

The input parameters for the model include:

- The turbine locations and dimensions;
- The receptors located within a 6.5km radius of any given turbine (this is a robust approach as receptors within a distance of 10 rotor diameter is internationally considered an acceptable distance for shadow flicker assessment);
- The size of windows on each receptor and the direction that the windows face; and
- The topography model of the site (Obtained from the (Space) 'Shuttle Radar Topography Mission', (SRTM) at 30m resolution).

Table 14-2 Turbine Details

Turbine Model	Rotor Diameter (m)	Hub Height (m)	Rotor tip height (m)	Rotor Swept Area (m^2)	Rotor Speed Range (rpm)
EN171 (6.5MW)	171	100	-	22964	7.1 – 9.94

In order to determine the number of hours shadow flicker might occur at receptor location, the modelling study considered two (2) scenarios; a conservative worst case approach based on the requirements outlined in IFC EHS Guideline for Wind Energy and a more realistic approach to consider actual site conditions.

The conservative worst-case scenario assumed the following:

- There is continual sunshine and permanently cloudless skies from sunrise to sunset (i.e., there is clear sky 365 days per year);
- There is sufficient wind for continually rotating turbine blades (i.e., the turbine blades are rotating for 365 days per year);
- Sun angles less than 3 degrees above the horizon level are disregarded (due to likelihood for vegetation and building screening);
- The receptor is occupied at all times;

[4] Please note that only 8 wind turbines will be installed and commissioned for the Bash 52MW wind farm and the 15 wind turbines considered in the shadow flicker modelling assessment is a worst -case scenario

- No screening (from either trees or man-made obstacles) is taken into account; and
- All receptors have a 2m x 2m window facing directly towards the turbine.

Note: WindPro utilises the concept of 'Green House' mode which allows for shadow flicker effects to be evaluated for each receptor in every direction for the nearest group of WTGs.

The more realistic approach used long term weather conditions obtained from Tashkent meteorological station (approximately 385km from the project site) and the sunshine probability used is presented in the table below. Due to the geographical extent of the Project site, screening (trees or man-made obstacles) was not considered for the realistic scenario.

Note: Other meteorological sites in the immediate vicinity of the Project site do not have a complete set of the required data.

Table 14-3 Sunshine Hours for Realistic Scenario

Sunshine Hours											
Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
3.43	4.40	5.12	7.24	9.40	11.89	12.23	11.73	10.01	7.16	4.87	3.07

14.3.1.2 Results

The result of the shadow flicker modelling assessment for the Bash 52MW wind farm project is presented in the table below and it shows that all receptors will not experience shadow flicker that exceed the threshold of 30 hours per year established by IFC EHS Guideline for Wind Energy for worst case scenario and the IFC recommended limit for real case scenario

Table 14-4 Shadow Flicker Occurrence at Each Receptor (Bash 52MW Wind Farm Only)

Receptor ID	Description	IFC Worst-case Shadow hours per year (h/year)	Realistic Shadow hours per year (h/year)	IFC Max Shadow hours per day (h/day)
		HH:MM	HH:MM	HH:MM
R23	Residential use by herders	00:00	00:00	00:00
R24	Residential use by herders	00:00	00:00	00:00
R29	Ecological Use (water-well for livestock)	00:00	00:00	00:00

Likewise, all receptors considered for the Bash 500MW wind farm comply with the IFC criteria for worst case scenario and realistic scenario.

Table 14-5 Shadow Flicker Occurrence at Each Receptor (Bash 500MW Wind Farm Only)

Receptor ID	Description	IFC Worst-case Shadow hours per year (h/year)	Realistic Shadow hours per year (h/year)	IFC Max Shadow hours per day (h/day)
		HH:MM	HH:MM	HH:MM
R23	Residential use by herders	00:00	00:00	00:00
R24	Residential use by herders	00:00	00:00	00:00
R29	Ecological Use (water-well for livestock)	00:00	00:00	00:00

Cumulative shadow flicker assessment i.e., Bash 52MW WF in combination with Bash 500MW wind farm also demonstrates that all receptors comply with both the IFC criteria (30 hours per year or less than 30 mins per day) for the WBG/IFC worst-case scenario as well as the realistic scenario.

Table 14-6 Shadow Flicker Occurrence at Each Receptor (Cumulative)

Receptor ID	Description	IFC Worst-case Shadow hours per year (h/year)	Realistic Shadow hours per year (h/year)	IFC Max Shadow hours per day (h/day)
		HH:MM	HH:MM	HH:MM
R23	Residential use by herders	00:00	00:00	00:00
R24	Residential use by herders	00:00	00:00	00:00
R29	Ecological Use (water-well for livestock)	00:00	00:00	00:00

Table 14-7 Shadow Flicker Impact Significance, Mitigation & Management Measures and Residual Impacts – Operation

Potential Impacts	Magnitude of Impact	Receptor	Sensitivity	Potential Impact Significance	Mitigation and Management Measures	Residual Impacts
Shadow Flicker	**No Change**	Animal Holding Area with accommodation area **R23**	High	**Neutral**	• No Mitigation Required	**Neutral**

14.4 Cumulative Impacts

Refer to sections above for the outcome of the cumulative impact assessment.

14.5 Monitoring Requirements

No monitoring requirement proposed as herders with structures at the Project site will be relocated to alternative land outside the impact zone

Refer to Appendix E for the modelling report.

15 SOLID WASTE & WASTEWATER MANAGEMENT

15.1 Observation and Baseline Environment

The baseline conditions identified in the Bash 500MW ESIA remain the same for the areas surrounding the site and the access road (Chapter 28 of the Bash 500 ESIA).

15.2 Potential Impacts

15.2.1 Construction Phase

The impacts from the construction phase of the Bash 52MW will be similar to those identified under the Bash 500MW WF albeit in lower volumes. The construction of the WF will result in the generation of waste due to excavations, packaging waste and small quantities of hazardous waste. This will also include sanitary waste which will be contained in septic tanks prior to removal by a licensed wastewater contractor.

15.2.2 Operational Phase

During the operational phase, there will be relatively few waste streams, although maintenance waste may be generated in small quantities on a continued basis. The ESIA outlines the mitigation and management measures and the implementation of a Waste Management Plan.

15.3 Mitigation and Management Measures

The Project will be required to implement the same mitigation measures as the Bash 500MW WF for both the construction and operational phase. These will include undertaking a capacity assessment for the local waste facilities, the development and implementation of a Construction Environmental & Social Management Plan (CESMP), Operational Phase Environmental & Social Management Plan (OESMP) and construction/operational Waste Management Plan.

Note: *Refer to chapter 28 of the Bash ESIA for more details on the construction and operational phase impacts and the applicable mitigation and management measures.*

15.4 Cumulative Impacts

Impact from waste and wastewater is expected due to the construction and operation of on-going activities and existing facilities within the Project area. This is as provided in the tables below.

Table 15-1 Valued Environmental & Social Components (VEC's)

Environmental Component	Considered VEC to be included in CIA?	Justification for Inclusion or Exclusion
Waste and Wastewater Management (waste facilities)	**Yes**	The project related impacts related to waste management. This includes general waste, hazardous waste and wastewater etc. Even though the Bash 52MW WF is not expected to generate a lot of waste, the cumulative waste generated by both WFs (Bash 52+Bash 500MW) could potentially overwhelm local waste facilities if the capacity of these facilities is not assessed properly.

The table below includes an assessment of the cumulative impacts relating to waste and wastewater management based on on-going activities and existing facilities within the Project's area of influence.

Table 15-2 Cumulative Impact Assessment

VEC	Impact generating Projects	Cumulative Impacts	
		Construction Phase	Operation Phase
Waste and Wastewater Management	1. Bash 52 MW WF (the Project) 2. Bash 500MW WF Project (under construction)	The construction phase of the Bash 52MW WF will overlap with the construction of the Bash 500MW WF. The generation of liquid, solid and hazardous waste by these Projects could potentially impose additional demands on the existing waste management facilities in the area/region. The above impacts can be managed through the implementation of the ESIA and applicable management plans. In addition, the Bash 52MW WF will undertake a capacity assessment of the waste facilities before the start of the construction phase.	Waste generated during the operational phase is expected to be in small quantities and it will be managed by the same O&M team for both projects.

15.5 Monitoring

The monitoring requirements will be based on those established under the Bash 500MW WF ESIA under section 28.4.

16 SOCIO-ECONOMICS

16.1 Observation and Baseline Condition

The socio-economic data collected and analysed as part of the Bash 500MW ESIA remains relevant to the Bash 52MW as both Projects are located in the same area.

16.2 Receptors

Table 16-1 Potential Socio-Economic Receptors

RECEPTOR	SENSITIVITY	JUSTIFICATION
Welfare of local population	**High**	Any change to infrastructure, population or regional inputs is likely to have effects on the welfare of the local population in the villages close to the Project site.
Local/Regional Economy	**High**	The proposed Project is likely to influence regional businesses. Not only local contractors and those directly involved in the construction but also local commercial operations such as food suppliers.
Employment Market	**Medium**	The development of the Project will result in the creation of employment opportunities and will offer an opportunity for greater dissemination of skills especially during the construction phase of the Project.
Water resources	**Medium**	Given the scarcity of water in the project area, the Project demand for water can potentially create a shortage for surrounding local communities or lead to an increase in the price of water in the absence of proper management particularly if water is sourced from the same water supply network used by the local communities
Vulnerable groups & women	**High**	Vulnerable groups & women are particularly vulnerable and can experience disproportionate impacts from the Project compared to other groups.
Grazing activities on the site	**High**	Herders identified as living and/or using the project site during the Bash 500MW ESIA have since been moved to suitable alternative grazing land as per the RAP. However, the additional project facilities under Bash 52MW are expected to have an impact on available land once construction is complete.
Workers working within the supply chain	**High**	Workers working within the supply chain are highly likely to be exposed to risks relating to labour & working conditions.

16.3 Potential Impacts, Mitigation, Management and Residual Impacts

16.3.1 Construction Phase

The section below summarises the key socio-economic impacts relating to the Bash 52MW WF. It is noted that the impacts will be fairly similar to those identified under the Bash 500MW WF.

16.3.1.1 Employment and Economics

The primary economic impact during construction is likely to result from limited project timeline centric employment creation during this phase. This Project is expected to create employment opportunities for 85 personnel 50% of whom are expected to be from Uzbekistan during peak construction period.

Other impacts from the Project that will have a direct impact on the economy will include:

- Training & dissemination of skills: The Project will promote the dissemination of construction and construction support skills from expatriate workers into the local labour force.
- Purchase of construction materials and food products locally.

16.3.1.2 Consumption of Water

The key uses of water during the construction phase are expected to be for personal consumption, domestic use, dust control, civil works and concrete works at the batching plant. According to the EPC Contractor, this will require 1,000,000 lit for the entire construction phase. It is understood that the EPC will source this water through water providers. Based on this, the EPC will undertake a water supply assessment to determine the source of the water supplied by the third parties in order to ensure this does not impact other water users.

16.3.1.3 Impacts to Vulnerable Groups & Women

Vulnerable groups and women are more likely to be impacted differently compared to other groups in the local communities. This means that they may not be able to enjoy all the benefits of the Project. For instance, women and people living with disabilities in the local communities may experience challenges and unequal opportunities during the recruitment process due to existing gender biases.

In addition, there may be risks associated with GBVH (refer to chapter 17 below) and increase in traffic (refer to chapter 10).

16.3.1.4 Land Use Change

As discussed in section 2.2.1.1, the Project has been allocated a total of 21.673ha of land. Out of this, 17.673ha is allocated for the life of the Project and 4ha under the construction phase.

This accounts for an impact of 0.0066% during operation and 0.0015% during construction based on the total land owned by Kokcha (267,398.1ha) within and outside the Project boundary. In addition, all the herders who were living and/or using the Project site for grazing have been relocated to suitable grazing alternative land in accordance with the Bash 500MW WF RAP.

16.3.1.5 Supply Chain Risks

It is understood from ACWA Power that the Bash 52MW WF will use the same suppliers as those under the Bash 500MW WF. As such, supply chain risk assessment has already been undertaken for these suppliers and corrective actions provided. ACWA Power will therefore be required to ensure that all the corrective actions are implemented in a timely manner in order to ensure that the identified risks along the supply chain are managed.

Table 16-2 Socio-Economics Impact Significance, Mitigation & Management Measures and Residual Impacts-Construction

Potential Impact	Magnitude of Impact	Receptor	Sensitivity	Impact Significance	Mitigation and Management Measures	Residual Impacts
Employment Opportunities	**Minor Positive**	Employment Market	Medium	**Minor Positive**	• Bash 52MW WF will implement the mitigation and management measures as provided in the Bash 500MW WF ESIA and applicable management plans.	**Minor Positive**
Training and dissemination of construction skills	**Minor Positive**	Welfare of Local Population	High	**Minor to Moderate Positive**		**Minor to Moderate Positive**
Purchase of construction materials and food resources locally	**Minor Positive**	Local/Regional Economy	High	**Minor to Moderate Positive**		**Minor to Moderate Positive**
Consumption of water	**Moderate Negative**	Water resources	Medium	**Moderate Negative**		**Minor Negative**
Disproportionate impacts on vulnerable groups	**Minor Negative**	Vulnerable groups & women	High	**Minor to Moderate Negative**		**Minor Negative**
Disruption of Local Custom	**Minor Negative**	Welfare of Local Communities	High	**Minor to Moderate Negative**		**Minor Negative**
Social risks related to supply chain	**Moderate Negative**	Workers working within the supply chain	High	**Moderate to Major Negative**		**Moderate Negative**

16.3.2 Operational Phase

The purpose of the wind farm will be to supply power to the grid and wheeling power to the hydrogen plant in Tashkent. Its development is a strategic measure towards moving Uzbekistan into a greener economy in line with the Uzbekistan Resolution No. PP-5063 "*On measures for the development of renewable and hydrogen energy in the Republic of Uzbekistan*", 2021.

The operational phase will also provide employment opportunities though at a smaller scale because the O&M staff will be the same for both Bash 500MW & Bash 52MW WFs. Whilst the size of the required workforce is significantly smaller, the type of work and the increased timescales involved offer an opportunity for greater dissemination of skills. A targeted system of local recruitment and investment in the human capital of the local workforce will enhance this process and consequently increase the benefit to the local economy.

Impacts relating to operational phase such as labour issues, security are discussed under Chapter 17 Community Health, Safety & Security and Chapter 18 Labour & Working Conditions.

Table 16-3 Socio-Economics Impact Significance, Mitigation & Management Measures and Residual Impacts-Operation

Potential Impact	Magnitude of Impact	Receptor	Sensitivity	Impact Significance	Mitigation and Management Measures	Residual Impacts
Power supply to the hydrogen plant.	**Moderate Positive**	Hydrogen plant	High	**Moderate to Major Positive**	• Ensure the appropriate operation and maintenance of the Wind Farm to enable a secure supply to the hydrogen plant.	**Moderate to Major Positive**
Employment Opportunities	**Minor Positive**	Employment Market	Medium	**Negligible to Minor Positive**	• The Bash 52MW will implement the same measures as the Bash 500MW WF.	**Negligible to Minor Positive**

***Note**: Refer to Chapter 16 of the Bash 500MW ESIA for more details of the assessments above and proposed mitigation measures.*

16.4 Cumulative Impacts

Impact on socio-economic aspects is expected due to the construction and operation of on-going activities and existing facilities within the Project area. This is as provided in the tables below.

Table 16-4 Valued Environmental & Social Components (VEC's)

Social Component	Considered VEC to be included in CIA?	Justification for Inclusion or Exclusion
Socio-economic	**Yes**	Project related impacts in relation to socio-economics would be mainly those related to creation of employment (beneficial impact) and dissemination of skills during both construction and operational phases. Given the scale of the Project, significant beneficial cumulative impacts are anticipated. In addition, cumulative impacts on grazing land is expected though this is envisaged to be negligible.

The table below includes an assessment of the cumulative impacts relating to on-going socio-economic activities and existing facilities within the Project's area of influence.

Table 16-5 Cumulative Impact Assessment

VEC	Impact generating Projects	Cumulative Impacts	
		Construction Phase	Operation Phase
Socio-economic	1. Bash 52 MW WF (the Project) 2. Bash 500MW WF Project (under construction)	The Bash 52MW and Bash 500MW WFs will be constructed at the same time. This will create income-generating opportunities for both skilled, unskilled labour and various enterprises in the Projects region. Employed locals will also benefit from capacity enhancement and transferable skills, which will boost future employability.	None expected as the O&M team will be the same for Bash 500MW & Bash 52MW WFs.

16.4.1 Cumulative Impacts on Land Use

As stated in section 2.2.1.1 of this Addendum, the impacted grazing land is under Kokcha LLC. The LLC has been allocated a total of 267,398.1ha of grazing land under their management which includes the land within the Project boundary and outside.

The Bash 500MW WF was allocated 149.93ha of land through a Presidential decree while the Bash 52MW has been allocated 21.673ha of land as shown in the table below.

Table 16-6 Land Allocated to the Bash 52MW & Bash 500MW

PROJECT FACILITY	BASH 52MW	BASH 500MW	TYPE OF OWNERSHIP
WTGs. (Including foundation & hardstand and WTG transformer	6.08ha for 8 WTGs	39.58ha for 79WTGS	Land lease for the Projects lifetime
Roads	6.965ha	63.53ha	
Underground cable trench	Included in the land allocated to the roads land plots	28.03ha	
Wind farm sub-station	2.618ha	9.7618ha	
Lay down area (temporary laydown area, yard, office, storage, camp, batching plant)	4.0ha	9.0287	During the construction phase
Met mast	2.01ha	-	Land lease for the Projects lifetime
Total	**21.673**	**149.9305**	**n/a**

The total land allocated to both Bash 52MW and Bash 500MW is equal to 171.6035ha. This includes the following:

- 17.673ha and 4ha allocated to the Bash 52MW for the lifetime of the Project and during construction respectively.
- 140.9018ha and 9.0287ha allocated to the Bash 500MW for the lifetime of the Project and during the construction phase respectively.

Based on the total grazing land available to Kokcha LLC (267,398.1ha) the permanent and temporary impacts to the grazing land as a result of the Project is expected to be limited. This will constitute the following:

- 0.0066% permanent impact and 0.0015% temporary impact on grazing land from the Bash 52MW WF.
- 0.053% permanent impact and 0.0034% temporary impact on grazing land from the Bash 500MW WF.
- The total cumulative impact on grazing land for both Bash 52MW and bash 500MW will be 0.059% permanent impact and 0.0049% temporary impact on grazing land.

Based on this, it is expected that the Project will have limited impact on Kokcha LLC (and its herders) activities and operations. In addition, an update will be undertaken on the Bash 500MW WF Resettlement Action Plan (RAP) to ensure that there is no impact to herders livelihoods as a result of the cumulative impact.

16.5 Monitoring

The Project will implement the same monitoring requirements as outlined in the Bash 500MW ESIA section 16.4.

17 COMMUNITY, HEALTH, SAFETY & SECURITY

This chapter assesses the impacts relating to the health & safety of the local community who live and work in the surrounding area and may be subject to project related impacts. This chapter concentrates more specifically on the potential emergency impacts that could relate to the project, and the security of the project to avoid instances of trespass, malicious intrusions and other misdemeanours.

The primary purpose of this chapter is therefore to identify specific management measures in regard to community, health, safety and security.

17.1 Observation and Baseline Condition

17.1.1 Conditions under the Bash 500MW WF

During the Bash 52MW Wind Farm ESIA phase consultations, three (3) grievances were recorded relating to the conduct and behaviour of some of the Bash 500MW WF construction workers. These grievances related to the harassment of female members of the community which constitutes Gender Based Violence & Harassment (GBVH). According to the complainants, the actions of these workers have caused fear in women and children and affected their lives. In addition, one of the grievant also stated that some of the workers living near Chulobod village do not dress in a way that is culturally appropriate.

These grievances were logged by 5 Capitals and Juru Energy Limited and submitted to the Bash 500MW WF Project Company to be resolved in line with the GBVH grievance mechanism and procedures.

17.2 Potential Impacts

17.2.1 Construction Phase

The Bash 52MW WF will have similar potential impacts on community health, safety & security as identified and assessed under the Bash 500MW WF. These are as summarised below:

- Public/community safety: Potential risks relating to public safety that could arise include isolated incidents as a result of construction activities (heavy machinery, transportation, excavations etc). These risks will be managed through the implementation of a robust CESMP and an Emergency Preparedness and Response Plan.
- Public/community security: There is a risk that the security personnel mandated by the Project can abuse their position of power and status and become perpetrators of GBVH either to the members of the community or the workforce. These risks will be managed through the implementation of a Security Management Plan and training of the security personnel.

- Economic displacement of herders: The Bash 52MW WF will have additional impacts on the grazing land at the site. However, this is expected to be minimal and the herders who previously used the Project site were relocated to suitable grazing land in compliance with the Bash 500MW WF RAP.
- Risks to vulnerable groups: There is a risk for GBVH being perpetrated on community members. These will be managed through the implementation of the GBVH grievance mechanism and applicable GBVH procedures prepared under Bash 500MW WF.
- Influx, community health & crime: Refer to chapter 19 below.

17.2.2 Operational Phase

The potential impacts identified during the operational phase of the Project (under the Bash 500MW WF) are as summarised below:

- Public/community safety: Such reasonably foreseeable situations may include:
  - Blade and ice throw from the turbine: to be addressed through the implementation of the required buffer zones.
    - The Projects Companies will be required to register the required buffer zones with the Agency for Sanitary and Epidemiological Welfare (under the Ministry of Health) before the commencement of the operational phase. The conditions and measures to be implemented as part of the buffer zones will be established by the Agency during the registration process.
  - Security & safety concerns in relation to children and young people attempting to access Project facilities: To be managed through on-going awareness campaigns by the O&M.
    - These awareness campaigns will be undertaken biannually with children (preferably at their schools or in the presence of their guardians) and young people. These will include the organisation of meetings, erection of warning signs in strategic areas across the site and in the local communities.
    - The agenda of the meetings will include providing details of the projects' operation, the risks involved in trying to access project facilities, respond to questions (including curious questions about how a WF functions) and concerns, provide details of the grievance mechanism etc.
  - Safety risks associated with fire, explosions, VOC releases etc: To be managed through the implementation of an Emergency Preparedness and Response Plan.
- Public/community security concerns associated with Project security personnel and GBVH: These will be managed through the implementation of appropriate GBVH procedures/policy and Security Management Plan.

17.3 Mitigation & Management Measures

The Bash 52MW WF will be required to implement the same mitigation measures as the Bash 500MW WF. The main policies, plans and procedures required are as provided in the tables below.

Table 17-1 Community Health, Safety and Security Mitigation & Management Measures – Construction Phase

POTENTIAL IMPACT	MITIGATION AND MANAGEMENT MEASURES
All Impacts	• The Project Company and EPC Contractor will ensure that the following plans/policies are prepared and implemented. - Community Health & Safety Management Plan - Worker Code of Conduct - Emergency Preparedness and Response Plan - Security Management Plan - GBVH Policy - GBVH Procedures o Outcomes of the Bash 500MW GBVH Risk Assessment. o GBVH Grievance Mechanism o GBVH Incident Reporting Procedure o GBVH Training Plan o GBVH Response Support Procedure o GBVH Action Plan - Resettlement Action Plan - Stakeholder Engagement Plan (including the implementation of the grievance mechanism) - Human Rights Policy - Security Management Plan

The Project Company will ensure that the implementation of the mitigation, management and monitoring measures related to community, health & safety are coordinated between the Bash 500MW WF and Bash 52MW WF Projects. This will include the formation of a joint task force details of which are provided in the SEP.

Table 17-2 Community Health, Safety and Security Mitigation & Management Measures – Operational Phase

POTENTIAL IMPACT	MITIGATION AND MANAGEMENT MEASURES
All Impacts	The Project Company & O&M Company will ensure that the following plans/procedures/policies are in prepared and implemented: - Emergency Preparedness & Response Plan - Worker Code of Conduct - GBVH Policy - Implement the outcomes of the GBVH risk assessment & associated GBVH plans - GBVH Prevention & Response Action Plan - Stakeholder Engagement Plan (including the implementation of the Grievance Mechanism). - Human Rights Policy

The O&M Company personnel will be the same for Bash 500MW & Bash 52MW WFs and as such they will be responsible for implementing the required measures for both projects.

***Note**: Refer to Chapter 29 of the Bash 500MW ESIA for more details of the assessments above and proposed mitigation measures.*

17.4 Cumulative Impacts

Community health, safety & security will be potentially impacted by the construction and operation of on-going activities and existing facilities within the Project area. This is as provided in the tables below.

Table 17-3 Valued Environmental & Social Components (VEC's)

Social Component	Considered VEC to be included in CIA?	Justification for Inclusion or Exclusion
Community Health, Safety & Security	**Yes**	Project related impacts with regards to community health, safety and security would mainly be those associated with construction: influx of workers, public trespassing, security concerns as well as incidents (accidents) from the presence of vehicles, heavy plant and machinery. Given the proximity of residential receptors to the Project site, mining areas and the construction of Bash 500MW WF, cumulative impacts are therefore anticipated as a result of increase in equipment & machinery use, influx of workers.

The table below includes an assessment of the cumulative impacts on community health, safety & security due to on-going activities and existing facilities within the Project's area of influence.

Table 17-4 Cumulative Impact Assessment

VEC	Impact Generating Projects	Cumulative Impacts	
		Construction Phase	Operation Phase
Community Health, Safety & Security	1. Bash 52 MW WF (the Project) 2. Bash 500MW WF Project (under construction) 3. Mining areas	The construction period of these Projects coincide and as such there will be an influx of workers which could lead to outbreak of diseases and illnesses, strain the public social services etc. Impacts relating to workers influx could lead to significant impacts if the required mitigations and management measures are not implemented.	The cumulative impact from blade throw and ice throw is expected to be negligible since the WFs are located over 2km from the nearest local communities. In addition, no new structures will be built within the stipulated 1km health protection zone.

VEC	IMPACT GENERATING PROJECTS	CUMULATIVE IMPACTS	
		CONSTRUCTION PHASE	OPERATION PHASE
		Construction works could also increase the risk relating to public safety particularly in regard to use of high-powered equipment, machinery etc. However, impacts relating to safety and security will be site-specific and therefore the cumulative impacts are considered to be insignificant	

17.5 Monitoring

The Bash 52MW will implement the same monitoring requirements as provided in section 29.4 of the Bash 500MW ESIA.

18 LABOUR & WORKING CONDITIONS

18.1 Observations and Baseline Conditions

18.1.1 Labour Conditions under the Bash 500MW

During the preparation of this addendum, 5 Capital's reviewed the Bash 500MW WF grievance logs (from the EPC and Project Company) to establish the key labour concerns raised by workers to date. Based on these logs, the following issues have been identified:

- Some workers are working without any contract in place: According to the GRM log, the employment contracts will be signed by October 2023.
- Some of the workers have not been provided with the full PPE kits: According to the grievance logs, the issue of PPE kits (winter kits) will be resolved by November 2023.
- Workers' welfare: This complaint stated that the workers were not receiving enough food and that there had been changes to their diet: The GRM log shows that this matter has since been resolved.

***Note**: A third-party labour audit report (based on Uzbek and lenders requirements) for the Project was not available at the time of preparing this addendum. As such 5 Capitals has relied to the GRM logs to establish the labour issues raised by the workers.*

18.2 Potential Impacts, Mitigation, Management & Residual Impact

18.2.1 Construction Phase

The Bash 52MW Wind Farm workers will be potentially be exposed to the same risks as those identified in the Bash 500MW WF ESIA. These include:

- Occupational health & safety;
- Forced labour;
- Child labour;
- Lack of worker representation & restrictions on trade unions;
- Compulsory overtime, excessive working hours and job security;
- Provision of inadequate accommodation facilities;
- Lack of access to a grievance mechanism; and
- Gender risks such as GBVH, wage, benefits and guarantees discrimination.

18.2.2 Operational Phase

The potential labour risks associated with the operational phase of the Project include:

- Occupational health & safety;
- Forced labour and child labour;
- Provision of inadequate accommodation facilities;
- Gender risks such as GBHV/SEA/SH, wage discrimination and access to employment benefits etc

It is noted that all the above potential risks can be mitigated and managed through robust implementation of the ESIA requirements and applicable management plans/procedures and policies.

Note: *Refer to chapter 30 of the Bash 500MW ESIA for a detailed assessment of the labour risks above and the proposed mitigation, management and monitoring requirements.*

18.3 Mitigation and Management Measures

The Bash 52MW WF will implement the same mitigation measures as provided in the Bash 500MW ESIA key of which are provided in the tables below.

Table 18-1 Workers Condition & Occupational Health & Safety Mitigation & Management Measures – Construction

POTENTIAL IMPACT	MITIGATION AND MANAGEMENT MEASURES
All Impacts	The Project Company and EPC Contractor will ensure that the following plans/policies are prepared and implemented. - Occupational Health & Safety Plan - Emergency Preparedness & Response Plan - Supply Chain Management Plan - Labour Management Plan - Human Resource Policies & Procedures - Worker Accommodation Plan - Stakeholder Engagement Plan (including implementation of the Grievance Mechanism) - Human Rights Policy - GBVH Policy - GBVH Procedures - Worker Code of Conduct

Table 18-2 Workers Condition & Occupational Health & Safety Mitigation & Management Measures – Operational Phase

Potential Impact	Mitigation and Management Measures
All Impacts	The Project Company & O&M Company will ensure that the following plans/procedures/policies are in prepared and implemented: - Emergency Preparedness & Response Plan - Worker Code of Conduct - Labour Management Plan - Human Resources Policies & Procedures - Human Rights Policy - GBVH Policy - GBVH Procedures - Stakeholder Engagement Plan (including the implementation of the Grievance Mechanism).

18.4 Cumulative Impacts

Table 18-3 Valued Environmental & Social Components (VEC's)

Social Component	Considered VEC to be included in CIA?	Justification for Inclusion or Exclusion
Workers conditions & occupational health & safety	**No**	Project related impacts with regards to worker conditions and occupational health and safety will be those associated with the construction phase and they will be specific to each Project based on the implementation of mitigation and management measures. As such, significant cumulative impacts between the Bash 500MW & Bash 52MW WFs are therefore not envisaged.

18.5 Monitoring

The Bash 52MW will implement the same monitoring requirements as provided in section 30.4 of the Bash 500MW ESIA

19 INFLUX IMPACT ASSESSMENT

According to the Bash 500MW WF ESIA, the project is required to have approximately 700-1000 personnel during peak construction period while the Bash 52MW WF is expected to have 85 personnel. While this is not a huge increase in the workforce, the impacts of worker influx under Bash 500MW WF are already being felt by local communities based on the type of grievances that have been submitted (refer to Chapter 17 above). As such, there is need to ensure a robust implementation of the ESIA and relevant management plans in order to address any issues/risks that may arise and address stakeholder concerns.

19.1 Potential Impacts, Mitigation, Management & Residual Impact

In addition to the influx of workers in the area, the development of the wind farm may result in the in-migration of other people seeking direct or indirect opportunities from the Project such as opportunistic in-migrants seeking jobs from the Project, opportunistic traders aiming to take advantage of business opportunities encouraged by the Project and by the increased income of the local community and other migrants seeking to take advantage of the economic and development opportunities created in the area.

This may result to social conflict, increased competition on public services, health risks (relating to spread of communicable diseases and sexually transmitted diseases), GBVH, disruption of local culture, increase in crime, local inflation etc

Note: *Refer Chapter 31 of the Bash 500MW ESIA for more details on the assessment of these potential risks.*

19.2 Mitigation and Management Measures

The Bash 52MW WF will be required to implement the same mitigation measures as the Bash 500MW WF. The main policies, plans and procedures required are as provided in the tables below.

Table 19-1 Influx Impact Assessment Mitigation & Management Measures

POTENTIAL IMPACT	MITIGATION AND MANAGEMENT MEASURES

All Impacts	• Influx Management Plan
	• Local Recruitment Plan
	• Security Management Plan
	• Worker Code of Conduct
	• GBVH Policy
	• GBVH Procedures
	  ○ Outcomes of the Bash 500MW GBVH Risk Assessment.
	  ○ GBVH Grievance Mechanism

POTENTIAL IMPACT	MITIGATION AND MANAGEMENT MEASURES
	○ GBVH Incident Reporting Procedure ○ GBVH Training Plan ○ GBVH Response Support Procedure ○ GBVH Action Plan • Accommodation Management Plans • Stakeholder Engagement Plan (including the implementation of the grievance mechanism) • Local Content Plan

19.3 Cumulative Impacts

Refer to section 17.4 above.

19.4 Monitoring

Monitoring of influx of non-locals will be undertaken as provided in the Bash 500MW ESIA Chapter 31.

20 REFERENCES

1. Bash 500MW ESIA Report https://acwapower.com/en/projects/bash-wind-ipp/
2. Data Provided by ACWA Power through Request for Information

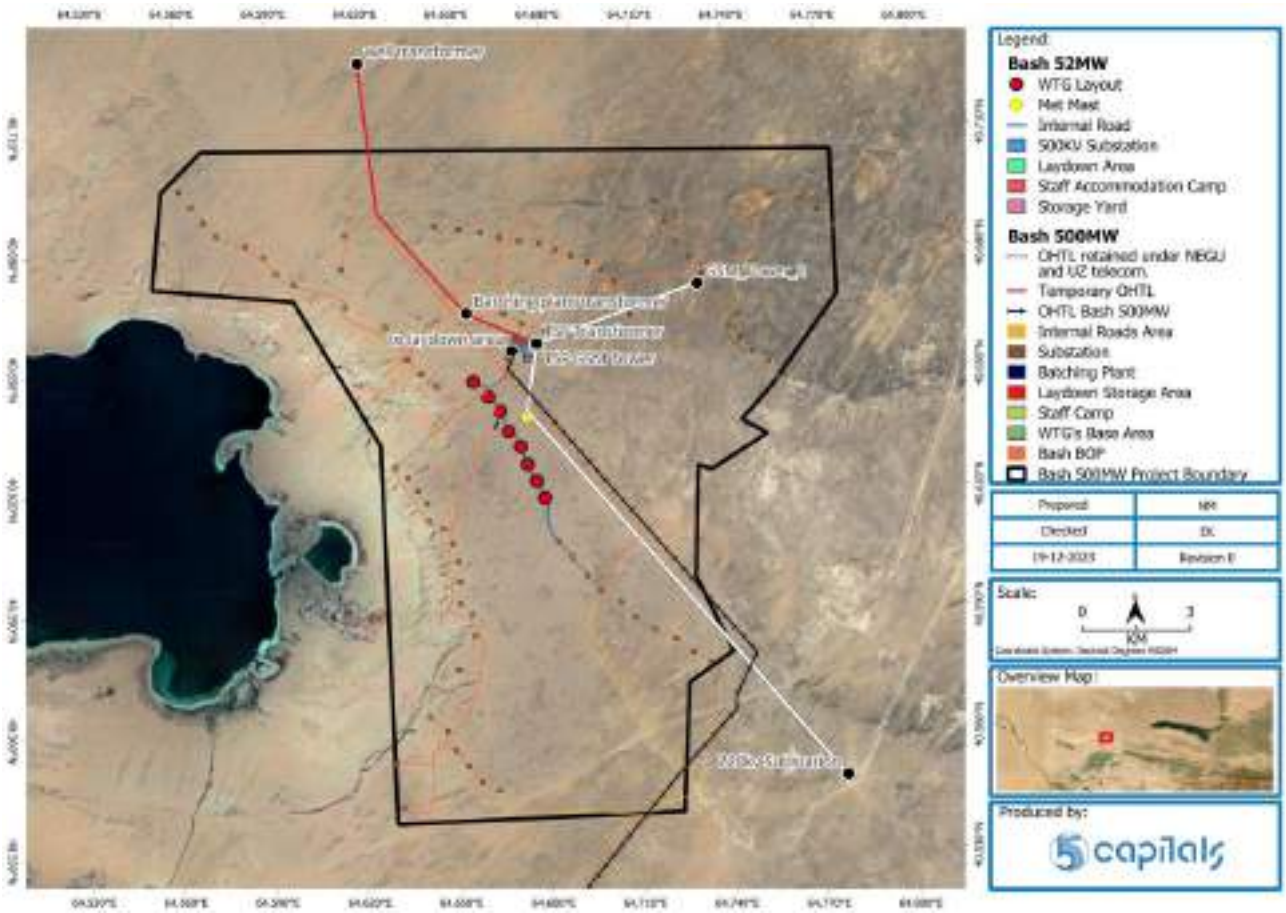
ANNEX: BASH 500MW CONSTRUCTION OHTL

Introduction

The Bash 500MW WF EPC Contractor (CEEC) has constructed an OHTL with a total length of 31.64km (refer to figure below) with a rating of 6kV. There are 519 OHTL towers reinforced with concrete with a height of 9m. The distribution OHTL has been constructed to supply electricity to the Projects' temporary facilities such as the base camps, batching plant and the water pump.

It is understood from ACWA Power that the distribution OHTL will not require to be extended because of the Bash 52MW WF. This is because the Bash 52MW WF temporary site facilities will be located close to an existing line.

Annex Figure 1: Alignment of the OHTL



Annex Table 1 Length of the OHTL including No. of poles.

T-Line Code	Origin	Terminal	Number of Poles	Length in meters
T1	220kV substation	TSF Transformer	277	15,178.7
T2	T1-T2 connection point	Storage yard transformer	9	717.2
T3	T1-T3 connection point	Batching plant transformer	41	2,292.3
T4	T3-T4 connection point	Construction transformer _NCPE	5	230.1
T5	T3-T5 connection point	Water well transformer	108	8,023.5
T6	T1-T6 connection point	GSM tower 2 transformer	77	5,158.4
T7	Railway transmission line connection point	GSM tower 3 transformer	2	36.1
Total			**519**	**31,636.3m**

The construction OHTL connects to an existing 220kV sub-station, and it runs parallel to existing 220kV OHTL.

As stated above, the 31.64km OHTL distribution line has been constructed to supply power to the construction of the Bash 500MW WF and Bash 52MW and will become redundant at the operational stage of the WFs. As such, the Bash 500MW WF Project Company and EPC, will be responsible for decommissioning parts of the OHTL that directly connect to the temporarily projects facilities and other sections of the OHTL will be retained under NEGU and UZ Telecom, but they will no longer be used by the WFs.

This is as summarised in the table below and as shown in the Annex figure 1 above.

Annex Table 2 Status of OHTL after construction phase

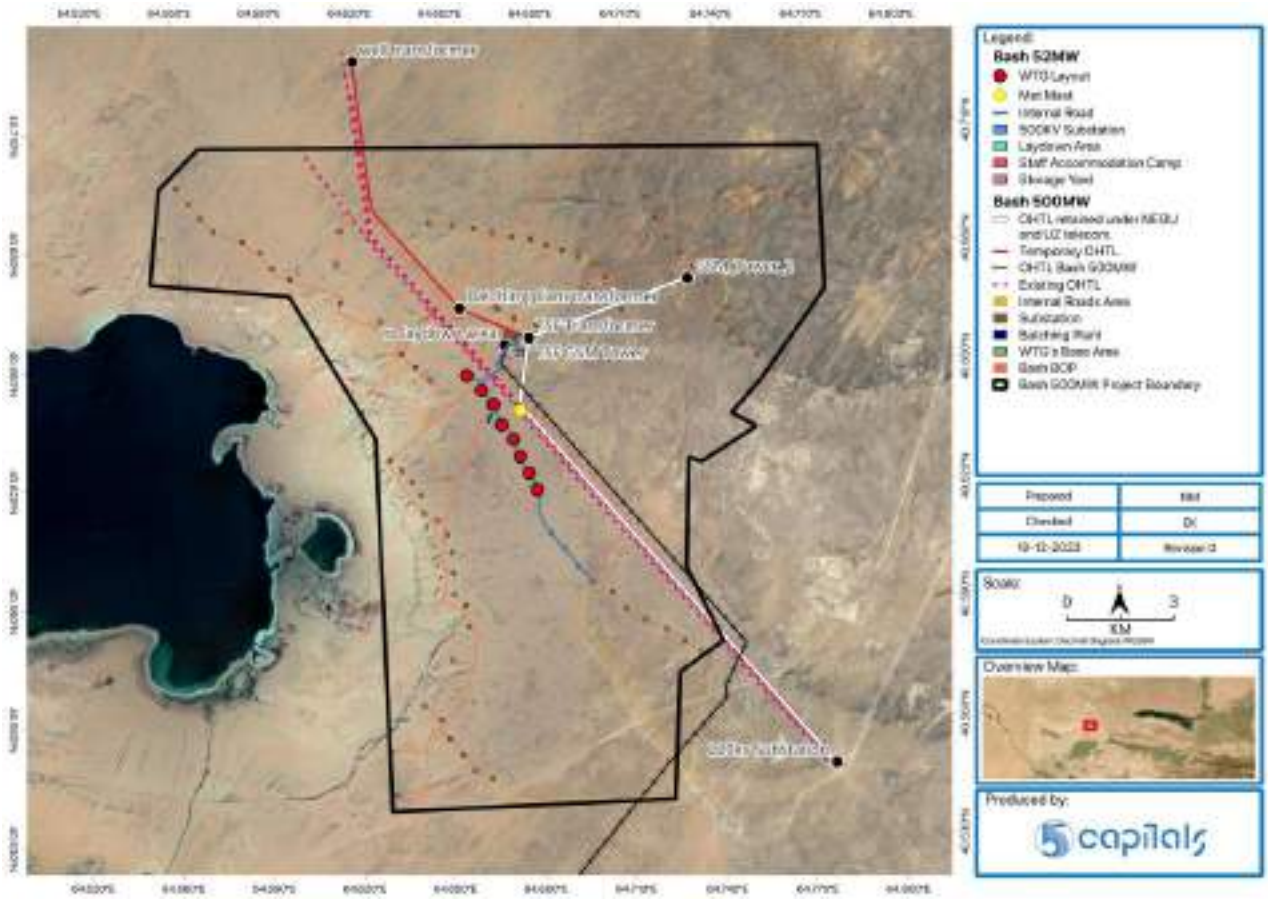
OHTL section	Status after completion of construction
Bash transmission line to the temporary site facilities	Decommissioned
Transmission line to global system for mobile tower (GSM Tower) 2	Retained
Transmission line to the well	Decommissioned
Transmission line to the laydown areas	Decommissioned
Transmission line from the temporary site facility to the GSM tower 3	Retained
Transmission line to the batching plant	Decommissioned

It is understood from ACWA Power that NEGU and UZ Telecom intends to retain sections of the OHTL for future use such as to distribute power and provide telecommunication services to local users in the projects area.

Location of the OHTL

The 31.63km OHTL is located parallel to existing OHTL lines as shown in the figure below:

Annex Figure 2: Alignment of the OHTL to existing lines



Based on the alignment of the construction phase OHTL, the following can be derived:

- The construction OHTL that will be retained after the construction phase runs parallel to existing OHTL lines from its point of origin at the 220kV substation until it branches off to connect to the project facilities and the GSM tower. This ensures that there is no further fragmentation of the land, and that the area of impact is limited to the existing OHTL corridor.
    - At the nearest point, the construction OHTL runs parallel to the existing lines at 80m and 1.5km at its furthest point where it branches off to connect to the temporary facilities.
- Much of the construction OHTL that will be decommissioned was also aligned near the existing OHTL where practicable based on the location of the project facilities. It is noted that that areas where the OHTL will be decommissioned (within the project site) will be restored in accordance with the habitat restoration plan requirement.

Land Ownership & Use

It is understood from the Bash 500MW Project Company that the land where the construction of the OHTL was undertaken belongs to the government who has leased it to Kokcha LLC. It is also the understanding of 5 Capitals that a meeting was held between Bash 500MW WF Community Liaison Officer and Kokcha LLC Director on 23rd December 2022 where he was informed about the construction of the OHTL, and he did not express any objection to its construction.

In addition, the permit to construct the OHTL was issued through the government entity Uzenergoinspection (refer to Appendix F or a copy of the permit issued).

LAND USE

The land within the area where the construction OHTL is located is predominantly used for grazing purposes. This also includes the land within the project footprint where a RAP has been prepared and is being implemented.

The construction of the OHTL did not lead to any physical displacement or impact on any assets. This is largely because it is aligned to existing OHTLs corridor and because the area is largely uninhabited. In addition, the construction OHTL within the WF boundaries, does not impact land use as the herders who previously used the site for grazing were relocated to suitable alternative grazing land in accordance with the Bash 500MW WF Resettlement Action Plan.

While the impact on grazing land was not assessed during the construction phase of the OHTL, this is expected to be minimal and only within the construction OHTL tower footprint. In addition, any grazing in this area can still be undertaken without disruption since the OHTL is currently operational (refer to the impact on land use below for more details).

Receptors

The OHTL line runs parallel to existing lines and goes through areas of an uninhabited land. The closest human receptors are found at Kuklam village which is approximately 3km from the OHTL and therefore outside the OHTL area of influence.

At one point, the OHTL crosses a gas pipeline belonging to Asian Transgas and the JSC 'UZtransgas". These parties were engaged during the construction of the OHTL, and they issued technical conclusions showing no objection to the OHTL construction.

Annex Figure 3: Point where the construction OHTL crosses the gas pipeline

TERRESTRIAL ECOLOGY

Baseline Data

Refer to the Bash 500MW WF ESIA and this Bash 52MW Addendum for:

- Foreward on Bash 52MW Extension
- Baseline Ecological Conditions
- Sensitive Ecological Receptors
- Potential Impacts, Mitigation, Management & Residual Impacts on Ecology

This document is an annex specifically assessing the impact of a low-voltage OHL.

Potential Impacts, Mitigation, Management & Residual Impacts

Construction Phase

The low-voltage overhead lines (OHL) have already been constructed and are currently operational for use by the EPC contractor building the Bash 500MW Wind Farm.

Typical construction impacts that are considered relevant to the building of the OHL are:

- Habitat loss from direct vegetation clearance and earthworks
- General disturbance from movement, noise, machinery which likely resulted in displacement of fauna.

JURU undertook a site visit on 6th December 2023. Some vegetation clearance was undertaken to build the OHL; the significance of this is considered negligible as the footprint of the OHL poles is very minimal.

Furthermore, the surveying ecologist confirmed that there was no evidence of laydown areas or new access roads and subsequently determined that there had not been any associated habitat loss of significance due to the construction of the OHL.

The habitat loss is negligible, and the majority of receptors likely dispersed away during active construction. Therefore, it is considered unlikely that any significant magnitude of impact occurred because of construction of the OHL.

Breeding Birds

Sensitive ecological receptors include raptor nests of various species that have been identified in the overall Bash Wind Project(s) Area of Influence.

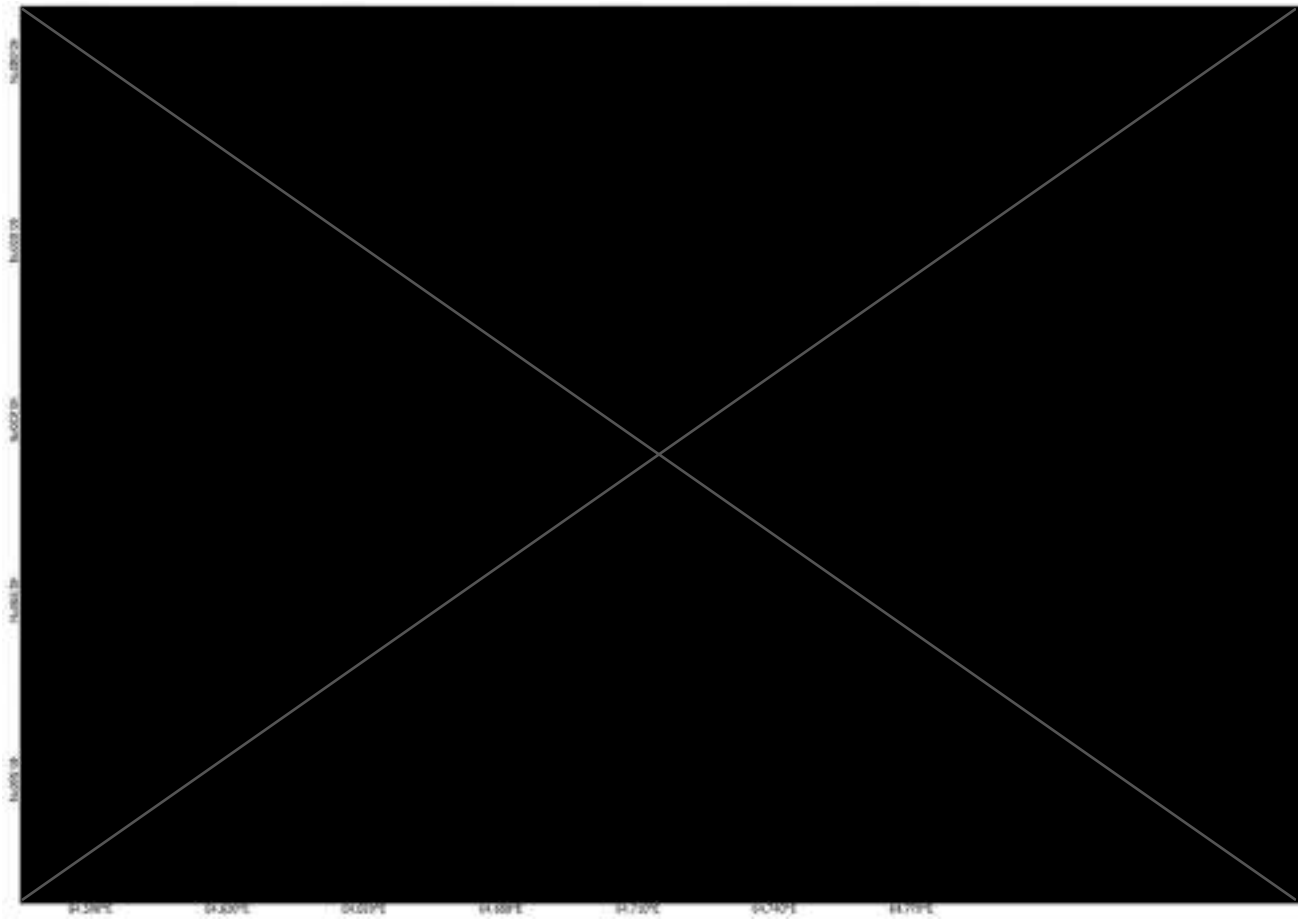
Category 1 species include Endangered Egyptian Vulture and Saker Falcon. The nearest Category 1 nest to the OHL alignment is over 3km distance away which is more than sufficient

of a distance buffer (refer to BBPP) and as such it is not considered that there were any significant impacts on Category 1 raptor nests during construction of the OHL. The following table provides the exact distances from all nests to the OHL.

Annex Table 3: Nests Identified within the Projects area and distance from OHTL

NEST NUMBER	SPECIES	CATEGORY	DISTANCE FROM OHTL IN KM
NB-1-2022	*Aquila chrysaetos*	Category 1	9.3190
NB-2-2022	*Aquila heliaca*	Category 1	7.0919
NB-3-2022	*Falco cherrug*	Category 1	3.0801
NB-4-2022	*Neophron percnopterus*	Category 1	9.7923
NB-5-2022	*Falco tinnunculus*	Category 2	9.7923
NB-6-2022	*Buteo rufinus*	Category 2	3.4503
NB-7-2022	*Neophron percnopterus*	Category 1	7.3358
NB-8-2022	*Falco tinnunculus*	Category 2	7.3358
NB-9-2022	*Athene noctua*	Category 2	7.3358
NB-10-2022	*Falco tinnunculus*	Category 2	0.0036
NB-11-2022	*Falco tinnunculus*	Category 2	0.0022
NB-12-2022	*Falco tinnunculus*	Category 2	0.0421
NB-13-2022	*Falco tinnunculus*	Category 2	0.0081
NB-14-2022	*Falco tinnunculus*	Category 2	0.0924
NB-15-2022	*Falco tinnunculus*	Category 2	0.1115
NB-16-2022	*Falco tinnunculus*	Category 2	0.1131
NB-17-2022	*Falco tinnunculus*	Category 2	0.0706
NB-18-2022	*Falco tinnunculus*	Category 2	0.1566
NB-19-2022	*Falco tinnunculus*	Category 2	0.0657
NB-20-2022	*Falco tinnunculus*	Category 2	0.0736
NB-21-2022	*Falco tinnunculus*	Category 2	0.0773
NB-22-2022	*Falco tinnunculus*	Category 2	0.0776
NB-23-2022	*Neophron percnopterus*	Category 1	4.7321
NB-24-2022	*Neophron percnopterus*	Category 1	3.4295
NB-25-2022	*Neophron percnopterus*	Category 1	5.0032
NB-2-2021	-	Category 2	3.9628

Annex Figure 4: Location of nests in relation to the OHTL & other Project facilities



Category 2 nests include a number of Kestrel nests which are themselves located on the previously existing medium-voltage OHTL towers. The distance between the constructed OHL and these Category 2 nests are less than 80m. This is less than the 500m that is the required buffer during the active nest site selection and active breeding periods. It is unknown if there were any Kestrel located at these nests during these periods while construction was ongoing. However, the construction of the OHL had a very short duration; furthermore, Kestrel do not exhibit strong nest fidelity and would likely have selected nesting sites on other transmission towers if disturbed by construction of the OHL. Thus, it is anticipated that residual impact of construction on Kestrel nests are negligible, if they occurred.

Operation Phase

The OHL is currently operational. At this time, the timeframe for the decommissioning of the line has not been confirmed, therefore, this assessment conservatively assumes the full length of the line is permanent. However, it should be noted that the line to the EPC facility will be removed post construction (by April 2025) and that the remaining line will be handed over to NEGU who may decide to keep this for the benefit of local communities, but this decision lies with the government utility company.

It should be noted that the following section has assessed the OHL's potential operational impact as a stand-alone assessment focused purely on the OHL. Cumulative impact assessment is ongoing and will be undertaken and delivered as per the ESAP.

Ecosystem Function Degradation

HABITAT FRAGMENTATION (BARRIER EFFECT)

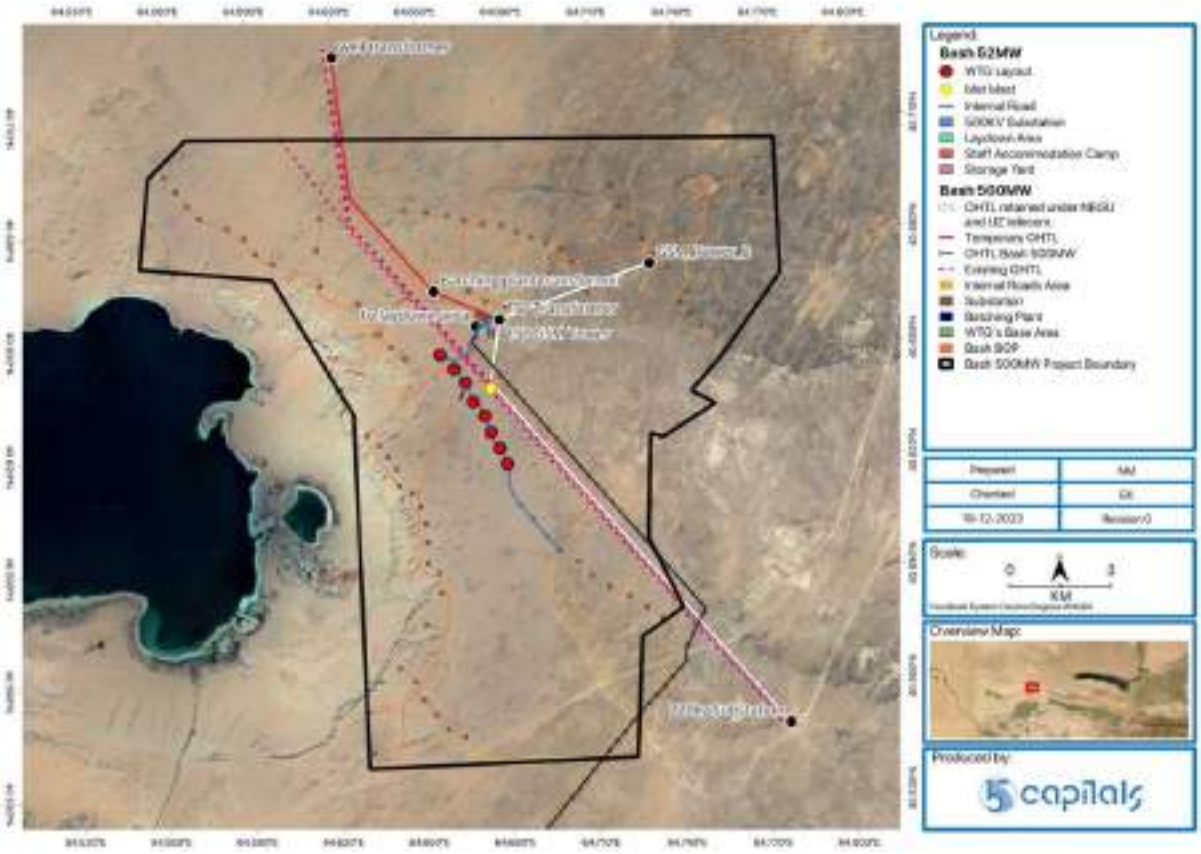
Development and operation of large-scale and linear alignment projects will fragment the landscape's existing habitats, reducing overall ecosystem connectivity and function. This in turn reduces the ability for vegetation recruitment and wildlife movement between habitat patches. Species with large home range requirements and migratory species in particular may be affected by fragmented habitat. Long-term fragmentation caused by physical barriers may also lead to a reduction in genetic exchange which is a concern for r-selected species with rapid generation turnover.

Even when there are no physical barriers to movement, fauna may exhibit avoidance behaviours or dispersal as a result of the new infrastructure. This in turn can lead to the same barrier effects as physical barriers (for example, fencing, or roads).

The OHL was built in an existing alignment adjacent and running parallel to medium-voltage OHL at a distance of approximately 80 meters away.

Therefore, it is not considered likely that there was any significant fragmentation/barrier impact as a result of the addition of the low-voltage OHL.

Annex Figure 5: Previously Existing OHTL & Low-voltage OHL



Biodiversity Loss – Direct Mortality and Lowered Survivorship

<u>OHTL Electrocution</u>

Power transmission lines present potential electrocution risk to birds. In particular, larger-bodied birds which tend to prefer perching at high altitudes such as raptors, including eagles and vultures, have the highest risk for electrocution, as larger wingspans create the opportunity to span the distance between energized and ground components of power lines. Further compounding the impact is the fact that many of these species are K-selected with low reproductive rates, so additive mortality is of significance. For many endangered species worldwide, electrocution by powerlines is considered to be the highest conservation threat contributing to population decline, only surpassed by habitat destruction.

Based on size, behaviour, and records from literature, the following categorizes the electrocution risk of the identified species of concern that may occur within the project site.

Annex Table 4 Level of OHTL Electrocution Risk

Grouping Value	Species of Concern (identified to date)	Wingspan (cm)	Perching Behaviour	Electrocution Risk (I=un likely; II=possible; III=highly probable)
Endangered Birds - Raptors	Steppe Eagle	160-200[5]	Yes	III
	Egyptian Vulture	155-170[6]	Yes	III
Threatened Birds - Raptors	Eastern Imperial Eagle	180-215[7]	Yes	III
Threatened Birds - Groundbirds	Houbara Bustard	135-170[8]	No	I
Nationally Threatened Birds - Raptors	Osprey	127-174[9]	Yes	III
	Short-toed Snake-eagle	185-195[10]	Yes	III
	White-tailed Sea Eagle	178–245[11]	Yes	III
	Golden Eagle	185-220[12]	Yes	III
Nationally Threatened Birds - Waterbirds	Great White Pelican	226-360[13]	Can perch on poles but extremely unlikely to choose to perch here; would more likely be transiting through the project airspace to Lake Agytma	I
Non-threatened Raptors	Hen Harrier	97-122[14]	Yes	III
	Long-legged Buzzard	112-163[15]	Yes	III
	Black Kite	140-150[16]	Yes	III

[5] BirdLife International (2023) Species factsheet: Aquila nipalensis. Downloaded from http://datazone.birdlife.org/species/factsheet/steppe-eagle-aquila-nipalensis on 19/12/2023.

[6] BirdLife International (2023) Species factsheet: Neophron percnopterus. Downloaded from http://datazone.birdlife.org/species/factsheet/egyptian-vulture-neophron-percnopterus on 19/12/2023.

[7] Handbook of the Birds of the World Vol 2 by Josep del Hoyo-Andrew Elliot-Jordi Sargatal - Lynx Edicions - ISBN: 8487334156

[8] https://www.oiseaux.net/birds/houbara.bustard.html. Accessed on 19/12/2023.

[9] https://www.oiseaux.net/birds/osprey.html. Accessed on 19/12/2023.

[10] https://www.birdid.no/bird/eBook.php?specieID=1720. Accessed on 19/12/2023.

[11] https://www.britishbirdofpreycentre.co.uk/our-birds/white-tailed-sea-eagle/. Accessed on 19/12/2023.

[12] http://www.biokids.umich.edu/critters/Aquila_chrysaetos/. Accessed on 19/12/2023.

[13] https://www.animalia.bio/great-white-pelican. Accessed on 19/12/2023.

[14] https://www.animalia.bio/hen-harrier. Accessed on 19/12/2023.

[15] https://www.animalia.bio/long-legged-buzzard. Accessed on 19/12/2023.

[16] https://www.animalia.bio/black-kite. Accessed on 19/12/2023.

Grouping Value	Species of Concern (identified to date)	Wingspan (cm)	Perching Behaviour	Electrocution Risk (I=un likely; II=possible; III=highly probable)
	Western Marsh Harrier	115-130[17]	Yes	III
	Common Kestrel	65-82[18]	Yes	III
	Shikra	58-60[19]	Yes	III
Non-threatened Waterbirds	Grey Heron Great White Egret Purple Heron	175-195[20] 140 – 170[21] 120-150[22]	Yes	III
Non-threatened Groundbirds	Black-bellied Sandgrouse Common Pheasant	70-73[23] 70-90[24]	No	I

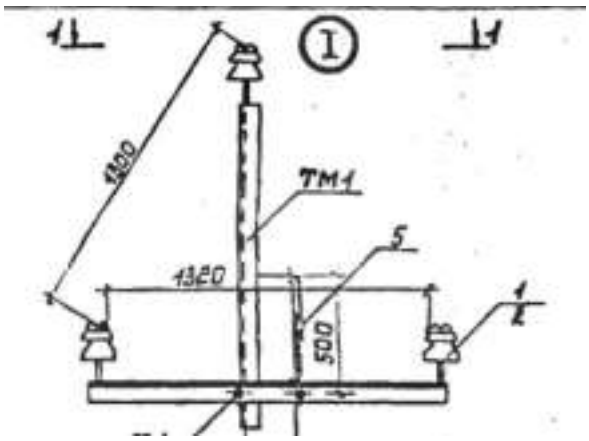
The largest species which are of elevated concern that have high electrocution risk are Steppe Eagle and Golden Eagle with average wingspans ranging up to 2m and 2.2m respectively. As per the Bash 500MW ESIA, a safe distance between all live conductors and grounded elements is set at a minimum of 2 meters.

The OHL is built and commissioned and includes multiple design elements of high electrocution risk. As a low-voltage distribution line, the separation distances between live (conductor) and grounded elements are relatively small. The full detailed design drawing package of the built OHL was not available at the time of writing; however, typical pole configuration schematics as well as ground-truthed photos have been provided of the built OHL.

[17] https://animalia.bio/western-marsh-harrier. Accessed on 19/12/2023.
[18] https://animalia.bio/common-kestrel. Accessed on 19/12/2023.
[19] https://animalia.bio/shikra. Accessed on 19/12/2023.
[20] https://www.rspb.org.uk/birds-and-wildlife/grey-heron. Accessed on 19/12/2023.
[21] https://avibirds.com/great-egret/. Accessed on 19/12/023,
[22] https://www.birdid.no/bird/eBook.php?specieID=1580. Accessed on 19/12/2023.
[23] de Juana, E. and P. F. D. Boesman (2020). Black-bellied Sandgrouse (*Pterocles orientalis*), version 1.0. In Birds of the World (J. del Hoyo, A. Elliott, J. Sargatal, D. A. Christie, and E. de Juana, Editors). Cornell Lab of Ornithology, Ithaca, NY, USA. https://doi.org/10.2173/bow.blbsan1.01
[24] https://www.oiseaux-birds.com/card-common-pheasant.html. Accessed on 19/12/2023.

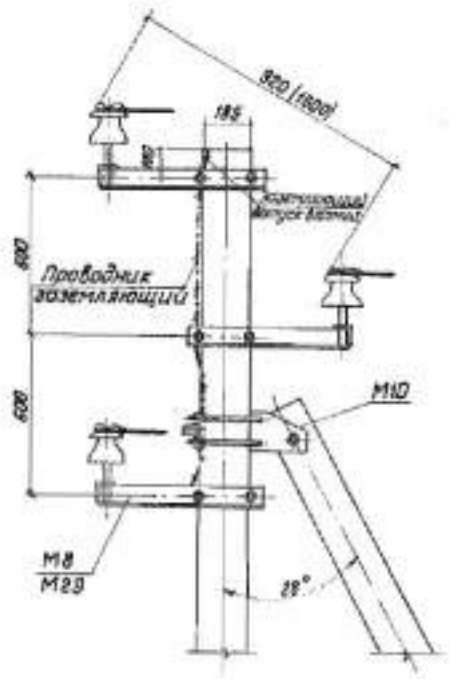
Annex Figure 6: Schematics of Typical Pole Configurations

Type 1 conductor fixing on intermediate poles P10-1.



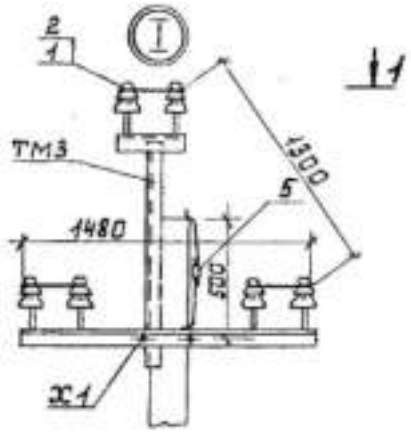
A bird sitting on either lower pin insulator is at risk of electrocution as the separation distance to the grounded pole is 1.32 meters.

Type 2 conductor fixing on poles UP10-1, UOA10-1 (or UP10-1B, UA10-1B).



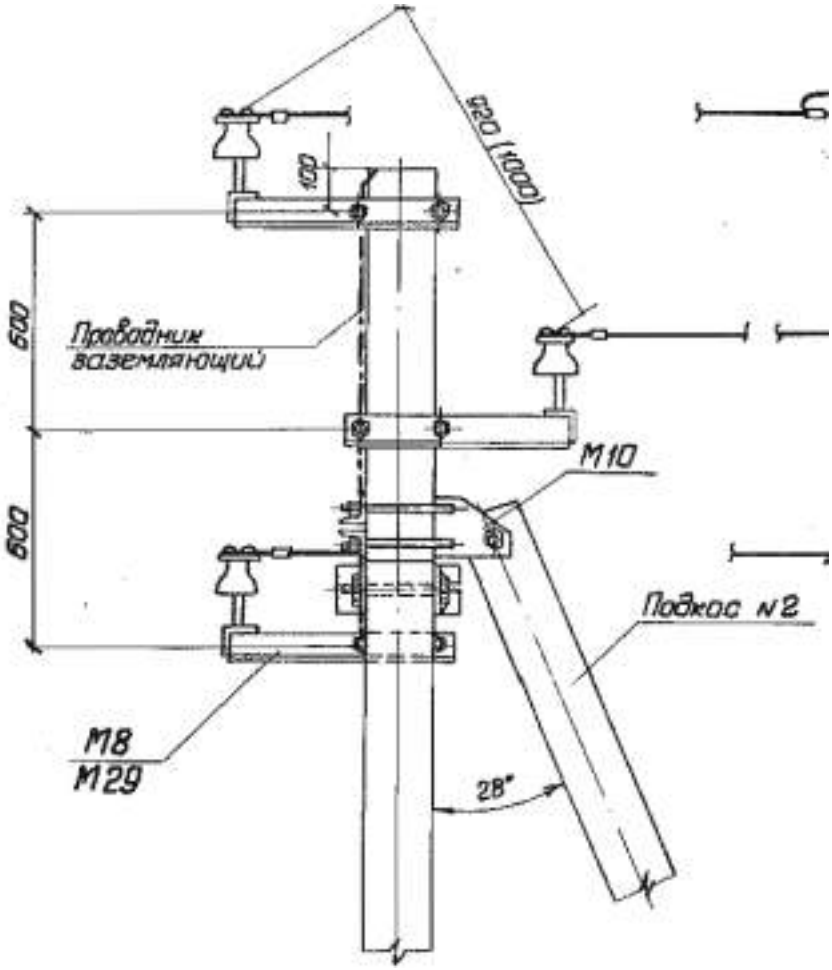
A bird sitting on any pin insulator is at risk of electrocution as the separation distance to the grounded pole is not detailed but is clearly less than 1 meter.

Type 3 conductor fixing on poles PP10-1, P10-2.



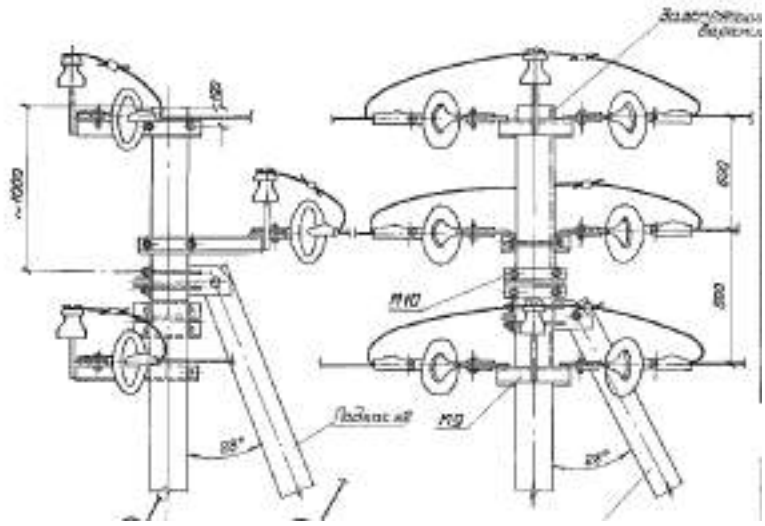
A bird sitting on any pin insulator is at risk of electrocution as the separation distance to the grounded pole or nearest conductor is not detailed but is clearly less than 1.48 meter.

Type 4 conductor fixing on poles UA10-1, A10-1 (or UA10-1B).



A bird sitting on any pin insulator is at risk of electrocution as the separation distance to the grounded pole is not detailed but is clearly less than 1 meter.

Type 5 conductor fixing on poles UA10-1, A10-1(or UA10-2B) where an additional pin insulator is installed for jumper fixing.



A bird sitting on any pin insulator is at risk of electrocution as the separation distance to the grounded pole is not detailed but is clearly less than 1 meter.

Annex Figure 7: Photos of OHL taken during the JURU Survey

Based on the schematics and ground-truthed photos, it is evident that the majority of poles have risk zones where there is less than 2 meters between the live conductors and grounded elements such as poles, insulators, etc. Therefore, the unmitigated risk of the OHL as is, is considered to be of major magnitude for perching species that are prone to electrocution risk.

The magnitude and **unmitigated** significance calculations are presented in the table below.

Annex Table 5: Significance of OHTL Electrocution

RECEPTOR	VALUE/ SENSITIVITY	MAGNITUDE	SIGNIFICANCE
Endangered Birds (Raptors) - Egyptian Vulture	Very High	Major	**Major**
Endangered Birds (Raptors) - Steppe Eagle	Very High	Major	**Major**
Threatened Birds (Raptors) - Imperial Eagle	High	Major	**Major**
Threatened Birds (Groundbirds) - Houbara Bustard	High	Minor	**Minor to Moderate**
Nationally Threatened Birds (Raptors) - Osprey	Medium	Major	**Moderate to Major**
Nationally Threatened Birds (Raptors) - Golden Eagle	Medium	Major	**Moderate to Major**
Nationally Threatened Birds (Raptors) - Short-toed Snake Eagle	Medium	Major	**Moderate to Major**
Nationally Threatened Birds (Raptors) - White-tailed Sea Eagle	Medium	Major	**Moderate to Major**
Nationally Threatened Birds (Waterbirds) - Great White Pelican	Medium	Minor	**Minor**
Non-threatened Birds (Raptors)	Low / Lower	Major	**Minor to Moderate**

Receptor	Value/ Sensitivity	Magnitude	Significance
Non-threatened Birds (Waterbirds)	Low / Lower	Minor	**Negligible to Minor**
Non-threatened Birds (Groundbirds)	Low / Lower	Minor	**Negligible to Minor**
All other Birds	Low / Lower	Minor	**Negligible to Minor**

The optimal design mitigation to completely remove electrocution risk is to bury the lines. However, this is not always possible and comes with other associated impacts.

For above-ground designs, the following are considered as current best practice to minimize electrocution risk:

- Design as per recommendations provided in APLIC's 'Suggested Practices for Avian Protection on Power Lines: State of the Art 2006'.
- Establish the minimum 'safe distance' as per the average wingspan of the largest species which is considered at risk. Due to the inclusion of golden eagle, this is 2 meters.
- Ensure safe design of the cross arm and related equipment (separate energized conductors and grounded hardware).
- Ensure safe distance between suspended conductor/jumper wire and lower branch in the cross arm.
- Use suspended insulators and avoid pin and dead-end/strain insulators
- In the configurations with high electrocution risk (derivations, tap, transformer and switch poles and its connected grounded wires and jumpers) all grounded elements will be insulated, and grounded wires and jumpers will be sheathed wires.

However, as the line is already built and commissioned (has gone live), it is not possible to integrate all of the above design measures. Therefore, the design configurations will remain as built but with the addition of retrofitting mitigation measures to alleviate the electrocution risk associated.

Retrofitting which does not involve re-design of the configurations/layouts is primarily related to insulation. Insulation via a sheath can stop the flow of electrons from a live component, through the bird, through to the grounded component, thus alleviating the electrocution risk.

The following insulation is proposed to be applied as an insulating sheath around the lengths of wire on either side of the insulators. Detailed design of the retrofitting solution has not been finalized, however it can be assumed that a minimum of 2 meters of sheathing would be required on either side of each live conductor.

Annex Figure 8: Example of Insulating Sheath

Annex Figure 9: Example of Insulation Sheath

The suggested insulation devices include an insulating hood over an insulator and two insulating corrugated sleeves (50 to 200 cm in length), securely attached to the wires using specialised clips or ties. Dielectric properties of the material and design of the device will provide reliable insulation of the wire in the area of its attachment to the insulator and reduce the risk of contact between birds and grounded elements of the support and phase voltage output points. This protective measure has an estimated service life of around 3 years.

The installation process is ground-based, and in certain cases, it may not require a power outage. The installation of the insulation devices on Type 1 conductor fittings may be achieved without the need for OHL shutdowns by employing operating rods equipped with various functional components including grippers and coilers. The operating rods' length should be suitable for installations at a height ranging from 8 to 9 meters. The following figures shows examples of operating rods.

Annex Figure 10: Examples of operating rods.

The approximate time to mount the one bird protection device on one phase of the OHL is 15 minutes as per installation manual from one of the bird protection device manufacturers. However, this does not take into account the access time for the technical equipment/special vehicles, access to the poles and operational workers access to the conductor fixing height on the pole.

All works should be performed in accordance with the rules on labor protection during the operation of electrical installations and others in accordance with the safety regulations.

The following are the technical specifications required for the insulation devices:

- Voltage class up to 20 kV
- Climatic design
- Flammability class not lower than – FV (ПВ)-0
- Wind load resistance up to and including district VII
- Ice thickness district VII

- Stability to seismic activity 9 points
- Warranty period of operation 10 years since sale
- Service life not less than 40 years from the date of sale by the manufacturer
- The devices are made of polymeric materials resistant to environmental influences
- Operational temperature -60-+50 degrees in areas with moderate to intense conductor galloping
- Static mechanical load from the weight of the bird 10 kg
- Polymeric electrical insulating material with an electrical strength of 20 kV/mmln areas with 1-4 degree of pollution
- The working parts of the bird protection devices should be arc-trek-erosion-resistant
- Resistant to ultraviolet radiation
- Withstands standardized lightning impulse test voltages in dry condition for insulators of the corresponding voltage class without overlap and bird protection device breakdown

The OHL will be monitored to ensure ongoing management of risk. Monitoring will be undertaken via carcass searches which will be done in a manner consistent with good international practice, to inform fatality estimate predictions; these should be monitored against scientific-based thresholds for species of concern. The thresholds, methodology, timing and roles and responsibilities for carrying out monitoring, fatality estimations and management requirements will be captured in the **Overhead Line (OHL) Avian Fatality Control Plan.**

Other mitigation measures are available, such as the provision of safe perching / nesting platforms; if erected on top or higher than the poles, they provide an attractive structure away from high risk areas. However these elements need to be designed carefully in accordance with regulatory guidelines and are not always 100% effective in drawing birds away from high risk areas. It is recommended that this mitigation measure would only be considered in the event that the monitoring showcases there is an insufficient reduction in risk from insulation retrofitting.

With the application of insulating sheaths which increase the distance between energized and grounded elements to a minimum of 2m, **and given adaptive management programme will be in place with ongoing monitoring**, the **residual** significance is presented in the following table.

Annex Table 6: Residual Significance of OHTL Electrocution

RECEPTOR	VALUE/ SENSITIVITY	MAGNITUDE	RESIDUAL
Endangered Birds (Raptors) - Egyptian Vulture	Very High	Negligible	**Minor**
Endangered Birds (Raptors) - Steppe Eagle	Very High	Negligible	**Minor**
Endangered Birds (Waterbirds)	Very High	Negligible	**Minor**
Threatened Birds (Raptors) - Imperial Eagle	High	Negligible	**Minor**
Threatened Birds (Groundbirds) - Houbara Bustard	High	Negligible	**Minor**
Nationally Threatened Birds (Raptors) - Osprey	Medium	Negligible	**Negligible to Minor**
Nationally Threatened Birds (Raptors) - Golden Eagle	Medium	Negligible	**Negligible to Minor**
Nationally Threatened Birds (Raptors) - Short-toed Snake Eagle	Medium	Negligible	**Negligible to Minor**
Nationally Threatened Birds (Raptors) - White-tailed Sea Eagle	Medium	Negligible	**Negligible to Minor**
Nationally Threatened Birds (Waterbirds) - Great White Pelican	Medium	Negligible	**Negligible to Minor**
Non-threatened Birds (Raptors)	Low / Lower	Negligible	**Negligible to Minor**
Non-threatened Birds (Waterbirds)	Low / Lower	Negligible	**Negligible to Minor**
Non-threatened Birds (Groundbirds)	Low / Lower	Negligible	**Negligible to Minor**
All other Birds	Low / Lower	Negligible	**Negligible to Minor**

OHTL Collision

Thin, dark wires used in overhead transmission lines as well as guylines for weather masts are visually difficult to detect. Bird mortality by collisions with these wires are documented for a variety of species. During the Spring 2021 survey of existing OHTLs, three carcasses of three different species were observed; White-tailed Sea Eagle, White Pelican and Rufus Scrub Robin.

In the case of power lines, the bird collides with one of the wires, generally the earth wire, which is less visible. Particularly at risk are birds migrating between 20-50m altitude, birds flying at night, birds flying in flocks, and / or large and heavy birds of limited manoeuvrability.

Based on morphology, behaviour, and records from literature, the following categorizes the collision risk of the identified species of concern that may occur within the project site.

Annex Table 7: Level of OHTL Collision Risk

Grouping Value	Species of Concern (identified/suspected)	Risky Flight Indicators	Collision Risk (I=un likely; II=possible; III=highly probable)
Endangered Birds - Raptors	Steppe Eagle	Migratory Large-bodied	II
	Egyptian Vulture	Large-bodied	III
Threatened Birds - Raptors	Eastern Imperial Eagle	Migratory Large-bodied	II
Threatened Birds - Groundbirds	Houbara Bustard	Poor Manoeuvrability Low Visual Detectability Low Altitude	III
Nationally Threatened Birds - Raptors	Osprey	Migratory	II
	Short-toed Snake-eagle	Migratory	II
	White-tailed Sea Eagle	Migratory	II
	Golden Eagle	Migratory	II
Nationally Threatened Birds - Waterbirds	Great White Pelican	Large-bodied Poor Manoeuvrability	III
Non-threatened Raptors	Hen Harrier	Migratory	II
	Long-legged Buzzard	Migratory	II
	Black Kite	Migratory	II
	Marsh Harrier	Migratory	II
	Common Kestrel	Migratory	II
	Shikra	Migratory	II
Non-threatened Waterbirds	Grey Heron Great Egret Purple Heron	Poor Manoeuvrability Large-bodied	III
Non-threatened Groundbirds	Black-bellied Sandgrouse Common Pheasant	Poor Manoeuvrability Low Altitude	III

Typically, medium to high voltage transmission lines are higher collision risks than low voltage distribution lines, because the height of the lines occur at altitudes commonly traversed; additionally, the length of line between spans increases. **As a low voltage distribution line with a pole height of approximately 7.5 meters, is not considered that the design itself is of high collision risk. However, there remains an element of risk, especially considering species such as Asian Houbara Bustard which is highly susceptible.**

The magnitude and **unmitigated** significance calculations are presented in the table below.

Annex Table 8: Significance of OHTL Collision

RECEPTOR	VALUE/ SENSITIVITY	MAGNITUDE	SIGNIFICANCE
Endangered Birds (Raptors) - Egyptian Vulture	Very High	Minor	Moderate to Major
Endangered Birds (Raptors) - Steppe Eagle	Very High	Minor	Moderate to Major
Endangered Birds (Waterbirds)	Very High	Minor	Moderate to Major
Threatened Birds (Raptors) - Imperial Eagle	High	Minor	Minor to moderate
Threatened Birds (Groundbirds) - Houbara Bustard	High	Moderate	Minor to moderate
Nationally Threatened Birds (Raptors) - Osprey	Medium	Minor	Minor
Nationally Threatened Birds (Raptors) - Golden Eagle	Medium	Minor	Minor
Nationally Threatened Birds (Raptors) - Short-toed Snake Eagle	Medium	Minor	Minor
Nationally Threatened Birds (Raptors) - White-tailed Sea Eagle	Medium	Minor	Minor
Nationally Threatened Birds (Waterbirds) - Great White Pelican	Medium	Minor	Minor
Non-threatened Birds (Raptors)	Low / Lower	Minor	Negligible to minor
Non-threatened Birds (Waterbirds)	Low / Lower	Minor	Negligible to minor
Non-threatened Birds (Groundbirds)	Low / Lower	Minor	Negligible to minor
All other Birds	Low / Lower	Minor	Negligible to minor

The optimal design mitigation to completely remove collision risk is to bury the lines. However, this is not always possible and comes with other associated impacts.

For above-ground designs, the following are considered as current best practice to minimize collision risk:

- Removing the thin neutral or earth (shield) wire above the lines where feasible, and where this is not possible, marking the line to make it more visible;
- Bundling high voltage wires, and using spacers to increase visibility;
- Minimising the vertical spread of power lines. Having lines in a horizontal plane reduces collision risk;
- Using existing infrastructure corridors such as road and railway RoW; existing powerline transmission corridors; and other areas with existing disturbances that deter bird activity

Several of these are already integrated within the design:

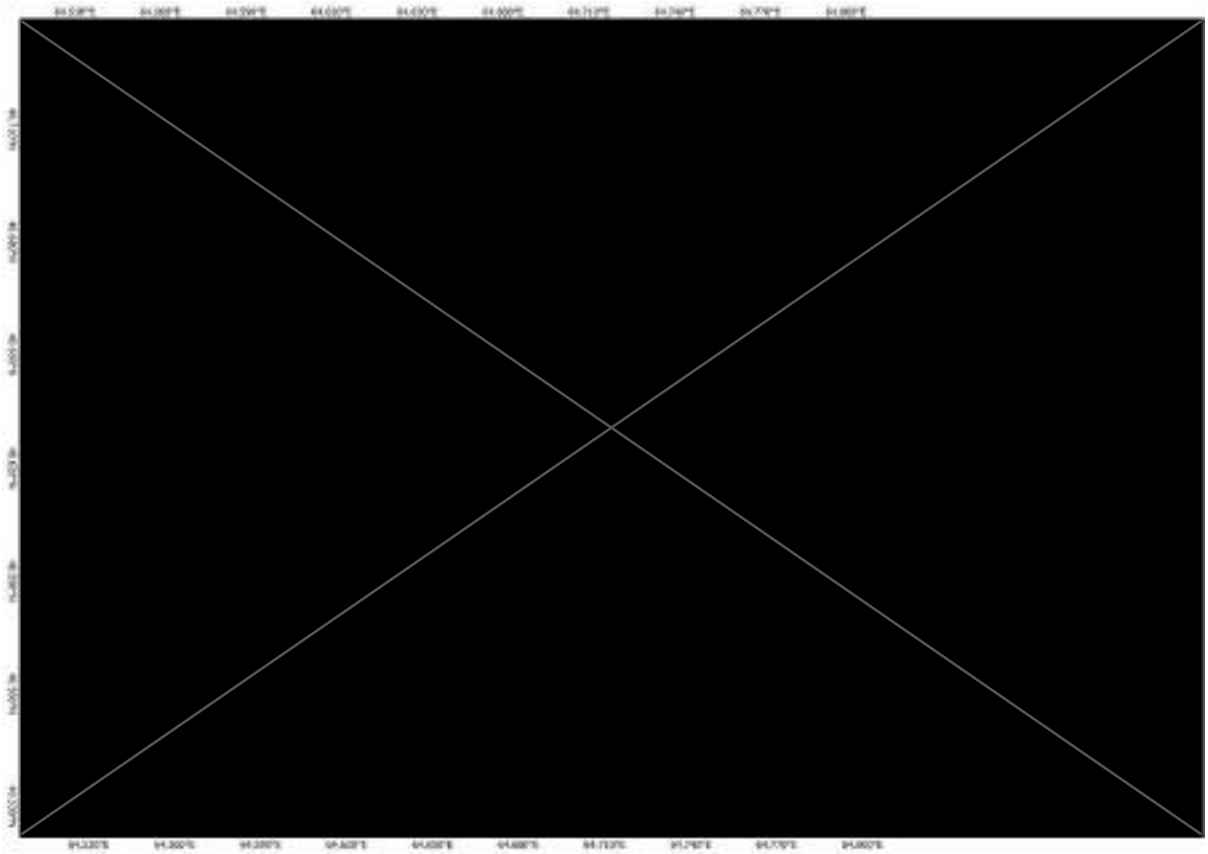
- The line was built adjacent to an existing medium voltage OHL within utility RoW
- The vertical spread is relatively minimal
- There are no thin wires (guylines, earthwire)

Therefore, the design configurations will remain as built.

Because the risk of collision is not major, but the location of individuals is close to the OHL, it is proposed that preliminary monitoring is commenced within 2 weeks in accordance with suitable protocols which will then be updated for carcass monitoring and fatality estimates as per the **Overhead Line (OHL) Avian Fatality Control Plan**. Should it become apparent that collisions of species of concern are occurring, retrofitting options include the adding of "bird flight diverters", visual tags with contrasting colors, UV reflectance and that are dynamic (able to move in the wind).Any markers must be robust to allow long-term durability for the environmental conditions of exposure; maintenance plans for the OHL will include inspections of marker devices and replacements as needed.

The species of highest concern in terms of avian OHL collision risk is the Asian Houbara Bustard for which critical habitat has been triggered.

Annex Figure 11: Potential Asian Houbara Bustard breeding & sightings



Although, as shown, the overall potential impact is of minor significance, the findings of any Houbara carcasses must be recorded; and these records will trigger a review of the situation in alignment with the following documents:

- Compensation Offset Plan (in case Net Gain targets are to be revisited)
- Biodiversity Action Plan (update in alignment with the updated Compensation Offset Plan)
- Biodiversity Management Plan; Biodiversity Monitoring & Evaluation Plan
- Collision Risk Management Plan, if applicable (relating to PBR thresholds)

With the above measures ensuring adaptive management of the risk, the **residual** significance is presented in the following table.

Annex Table 9: Residual Significance of OHTL Collision

RECEPTOR	VALUE/ SENSITIVITY	MAGNITUDE	RESIDUAL
Endangered Birds (Raptors) - Egyptian Vulture	Very High	Negligible	**Minor**
Endangered Birds (Raptors) - Steppe Eagle	Very High	Negligible	**Minor**
Endangered Birds (Waterbirds)	Very High	Negligible	**Minor**
Threatened Birds (Raptors) - Imperial Eagle	High	Minor	**Minor to Moderate**
Threatened Birds (Groundbirds) - Houbara Bustard	High	Minor	**Minor to Moderate**
Nationally Threatened Birds (Raptors) - Osprey	Medium	Minor	**Minor**
Nationally Threatened Birds (Raptors) - Golden Eagle	Medium	Minor	**Minor**
Nationally Threatened Birds (Raptors) - Short-toed Snake Eagle	Medium	Minor	**Minor**
Nationally Threatened Birds (Raptors) - White-tailed Sea Eagle	Medium	Minor	**Minor**
Nationally Threatened Birds (Waterbirds) - Great White Pelican	Medium	Minor	**Minor**
Non-threatened Birds (Raptors)	Low/Lower	Minor	**Negligible to Minor**
Non-threatened Birds (Waterbirds)	Low/Lower	Minor	**Negligible to Minor**
Non-threatened Birds (Groundbirds)	Low/Lower	Moderate	**Minor**
All other Birds	Low/Lower	Negligible	**Negligible to Minor**

SOCIAL IMPACTS

Stakeholder Consultations

It is understood from the Bash 500MW WF Project Company's Community Liaison Officer (CLO) that the following stakeholders were identified and consulted during the construction of the OHTL.

Annex Table 10: Stakeholder bodies engaged during the OHTL construction

STAKEHOLDER BODIES	RELEVANCE TO THE OHTL IMPACT BASED, (I) INTEREST BASED, OR (D) DECISION MAKER	AGENDA FOR CONSULTATIONS
UzTransgas	**A**: The construction OHTL crosses the gas pipeline which is under the management of UzTransgas & Asian TransGas	Inform them about the OHTL construction and establish any conditions in the areas where the OHTL crosses the gas pipeline.
Asian Transgas		
Kokcha LLC	**A**: The OHTL is located within land that is leased to Kokcha LLC	Inform them about the OHTL construction as it is located within the land leased to the LLC.
Kuklam Village	**I:** Even though this village is located approximately 3km from the OHTL, the villagers expressed interest in the overall construction activities related to the Bash 500MW and the construction phase OHTL	Inform them about the OHTL and purpose.
Uzenergoinspection	**D**: Responsible for issuing OHTL construction permit	This body is responsible for providing the construction permit for the OHTL.
UZ Telecom	**D**: Telecommunication provider at the projects site.	UZtelecom runs the GSM towers within the Wind farm which supports the telecommunication needs of the project.
NEGU Bukhara Regional Office	**D**: Responsible for the 220kV sub-station where the OHTL originates.	Bilateral consultations during the permitting and construction of the 31.63km OHTL.

Outcome of Consultations

According to the notes of meetings shared by the Bash 500MW WF Project Company, consultation meetings were undertaken with Kokcha LLC and Kuklam village on 23rd December 2022 and 19th January 2023 respectively. The agenda of the meetings was to:

- Provide details about the Bash 500MW WF

- Provide information on the construction of the 6kV OHTL which connects project construction facilities.
- Provide details about the grievance mechanism procedure.

Based on the notes of meetings, Kokcha LLC and Kuklam village were provided with the details about the construction OHTL, and no objections or concerns were raised (refer to Appendix G for the notes of meeting).

Annex Figure 12: Photos of consultations

Kuklam Village

Consultations with Kokcha LLC

Conclusions from Asia Transgas

As discussed above under the 'Receptor' section, the OHTL crosses a gas pipeline that is under the management of Asian Transgas and the JSC 'UZtransgas'. It is understood from the Bash

500MW WF Project Company that these parties issued the technical conclusions for the OHTL and did not object its construction.

Land Use Impact

As stated in the 'Land Ownership & Use' section, the construction of the 31.63km OHTL did not lead to physical displacement or impact on assets. In addition, the impact on grazing land was minimal as this is restricted to the OHTL tower footprint within an existing OHTLs corridor and grazing can be undertaken during the operational phase of the OHTL.

It is noted that approximately 75% of the 31.63km OHTL falls within the Bash 500MW & Bash 52MW WF boundaries while approximately 25% is outside the boundaries. As such, the alignment of the OHTL within the projects' boundaries is not expected to have disrupted herders' activities. This is because herders living and using the land within the projects' boundaries were relocated to suitable alternative grazing areas under the Bash 500MW WF Resettlement Action Plan (RAP). Any impact to future grazing activities is considered negligible as the OHTL that will be retained after the construction phase of the WFs is largely aligned to an existing OHTL corridor. In addition, areas where the OHTL will be decommissioned will be restored in line with the habitat restoration plan.

It is noted that an assessment was not undertaken to identify any additional land users and potential economic impacts (i.e., herders) outside of the project boundaries where approximately 25% of the OHTL is located. This is because the OHTL was constructed in line with Uzbekistan national regulations. As such, the Bash 500MW WF Project Company will be required to close any gaps between the national regulations and the lenders requirements to ensure compliance.

To comply with EBRD PR5 and IFC PS5, the Bash 500MW WF Project Company will be required to undertake further consultations with Kokcha LLC to determine if there are any land users within the OHTL areas outside of the WFs projects boundaries[25]. If any users are identified during these consultations, corrective actions will be undertaken in line with the Bash 500MW WF Resettlement Action Plan and in accordance with the requirements provided in the mitigation section below.

[25] There are no current land users within the OHTL sections found within the Bash 500MW & Bash 52MW WF as herders who previously used the project site were relocated to suitable alternative land under the Bash 500MW WF RAP.

It Is expected that any impacts of the 25% OHTL located outside of the Projects boundaries will be minimal. This is because the impact will be restricted to the OHTL tower locations, and the line is largely aligned with an existing OHTL corridor. In addition, the larger area close to the OHTL corridor is also suitable for grazing.

Public/Community Safety

It is noted that the OHTL is operational and supplying electricity to the Bash 500MW WF construction phase. As such, the operation of the OHTL may pose some risk to general members of the public who may want to access these areas or any existing land users (if any). Such risks may include electrocution from direct contact with the OHTL. However, this is considered as negligible as the OHTL is understood to have been built in line with Uzbekistan requirements.

The Bash 500MW WF EPC Contractor will be expected to update the 'Bash 500MW WF Emergency Preparedness Response Plan' to include the construction OHTL to appropriately address risks to public safety.

Mitigation & Monitoring Requirements

Land Use

The Bash 500MW WF Project Company will commence consultations with Kokcha LLC immediately to determine if there are land users within the OHTL areas outside the WFs boundaries. If any land users are identified during the consultations, the Bash 500MW WF Project Company will undertake the following:

- Notify the Bash 500MW & Bash 52MW WF lenders immediately relating to the number of land users identified and their land use type.
- Undertake consultations with the identified land users, assess the economic impacts on these land users in line with PR5 and PS5 and implement the required corrective and monitoring actions including livelihood support as applicable.
- The preparation and implementation of the corrective actions will be in a way consistent with the requirements set in the Bash 500MW RAP and Bash 52MW RAP Addendum.
    - The assessment report and corrective action plan will be submitted to the lenders for approval.

Public/Community Safety

The following mitigation measures will be implemented:

- Update the Bash 500MW WF 'Emergency Preparedness Response Plan' to include the construction OHTL to appropriately address risks to public safety.
- EPC Contractor will undertake regular monitoring along the OHTL to detect any faults with the OHTL and implement corrective action immediately.
- Safety signals and warning signs will be posted at strategic areas along the OHTL immediately.

Stakeholder Consultations

The activities in the table below will be undertaken as part of the on-going stakeholder consultations for the Bash WFs and in the overall context of the SEP.

Annex Table 11: Stakeholder consultations requirements

ACTIVITY	STAKEHOLDERS	ENGAGEMENT METHOD	TIMING AND FREQUENCY
Consultations with Kokcha LLC to determine whether there are any land users within the construction OHTL area.	Kokcha LLC	Bilateral meetings	To commence immediately
Corrective action plan (only if any impacted land users are identified after undertaking consultations with Kokcha LLC)	Kokcha LLC Land users (if any)	Bilateral meetings, public consultations	Based on the implementation schedule approved by the lenders
Discloser of the impacts assessed herein	Impact & interest-based stakeholders identified in Annex Table 10	Bilateral meetings, door to door meetings at Kuklam village where facilities to hold meetings do not exist.	As part of the ESIA phase disclosure period
Notification of the decommissioning protocols, timeline, and any safety requirements	Impact & interest-based stakeholders identified in Annex Table 10	Bilateral meetings, door to door meetings at Kuklam village where facilities to hold meetings do not exist	1 month before the start of the decommissioning phase
Notification to stakeholders that the sections of the OHTL that will be retained have been handed over to NEGU & UZ Telecom and are no longer being used	Impact & interest-based stakeholders identified in Annex Table 10	Bilateral meetings, door to door meetings at Kuklam village where facilities to hold meetings do not exist	1 month before the project stops utilising the OHTL.

Activity	Stakeholders	Engagement Method	Timing and Frequency
to supply power to the project.			
(i) Notification on the start of land restoration efforts along the OHTL decommissioned areas. (ii) Invitation to Kokcha LLC to visit the OHTL after the completion of restoration.	Kokcha LLC	Bilateral meetings	(i) Prior to the start of the start of the OHTL areas restoration efforts. (ii) Before the EPC hands over the construction areas to the Project Company.

Decommissioning Requirements

The Bash 500MW WF Project Company and the EPC Contractor will prepare a decommissioning plan for the OHTL. This will include the assessment of the impacts and the corresponding mitigation and monitoring requirements. The mitigation will ensure that the decommissioning footprint is limited including use of designated access roads, informing stakeholders including local communities and land users (if any) about the decommissioning safety protocols, timelines etc and habitat restoration etc.

This plan will be submitted to the lenders for approval 2 months before the planned decommissioning. In addition, any permits required for the decommissioning phase will also be obtained in a timely manner.

In addition, the Project Company will also provide details to the lenders and stakeholders on the timeline for when the 'retained' OHTL will be completely under NEGU and UZ Telecom after the end of the construction phase.